

# Safety Food

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Have a question for experts in the animal nutrition or poultry meat industry? Write to us! This magazine was created to respond to the needs of our customers.



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Dear Readers:

The length and quality of our lives largely depends on ourselves. In particular, on what genes we have, what air we breathe, whether we are active, and what we eat. Nowadays, the consumer expects us to produce in an environmentally neutral way and to take into account animal welfare during animal farming. Products must be healthy and safe for consumers. Food manufactures pay special attention to this, as they provide the fuel for a long and healthy life.

This issue of Safety Food magazine is dedicated specifically to these issues: healthy food, animal welfare, and environmental protection. We wish you pleasant reading.

  
CEO  
Wipasz S.A.

*a time*

**A cup of tea  
is the perfect moment  
of respite and rest  
from daily stress.**





Tea

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### Wipasz News

## Time for electric cars – a heavyweight category

**Svenn Brändén - Director of Transportation at Wipasz S.A.**

There is no doubt, Wipasz S.A. has carried out a lot of work in an environmentally friendly manner. One of the main reasons for this is that we are an environmentally friendly company. For many years we have been consistently following the principles of the European Green Deal in our production and services, which, among other things, means that we are committed to the use of green energy. Now, in the time for fully green transportation, we are looking for solutions that are both environmentally friendly and economically viable. One of the main reasons for this is that we are an environmentally friendly company. For many years we have been consistently following the principles of the European Green Deal in our production and services, which, among other things, means that we are committed to the use of green energy. Now, in the time for fully green transportation, we are looking for solutions that are both environmentally friendly and economically viable.



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### Wipasz Vademecum

## Green Transition – Wipasz S.A. invest in Renewable Energy Sources

**Przemysław Kowalski - Purchasing Specialist, Head Division Wipasz S.A.**

The European Green Deal is a development strategy for the European Union, which aims to create a climate-neutral economy. It is a response to the climate crisis and a step towards a more sustainable future. Wipasz S.A. is committed to this strategy and is investing in renewable energy sources to reduce its carbon footprint and contribute to a greener future.




Category	Share
Renewable Energy (RECs)	100%

22 25

### Wipasz Vademecum

## Polish protein – growing legumes in Poland

**Sebastian Węgrzyn - Purchasing and Market Analysis Specialist Wipasz S.A.**

Polish protein is a source of amino acids for livestock and is highly valued in the feed industry. Wipasz S.A. is committed to producing high-quality Polish protein in Poland, supporting local agriculture and ensuring a sustainable supply of feed ingredients.




52 55

### Wipasz Vademecum

## Wipasz S.A. – the path to a reduction of greenhouse gas emissions

**Derzka Aleksandra - Training and Improvement Services Manager, Central Europe, LRQA**

Wipasz S.A. is committed to reducing its greenhouse gas emissions and contributing to a more sustainable future. The company has implemented various measures to improve energy efficiency and reduce its carbon footprint, including the use of renewable energy and energy-saving technologies.



Scope	2021 (tCO <sub>2</sub> e)
Scope 1	605 192
Scope 2	207 000
Scope 3	20 000
Transformation-GHG	1 332 214

68 69

### Wipasz Vademecum

## Health-promoting methods in pig nutrition

**Jakub Górecki - Pig Nutritionist Advisor Wipasz S.A.**

The health of our animals depends on a variety of factors, including nutrition. Wipasz S.A. is committed to providing high-quality pig nutrition that promotes animal health and productivity. This includes the use of natural ingredients and advanced feeding technologies.



78 79

### Wipasz Vademecum

## Reducing the carbon footprint in feed rations for dairy cows – more fat in milk, lower feeding costs

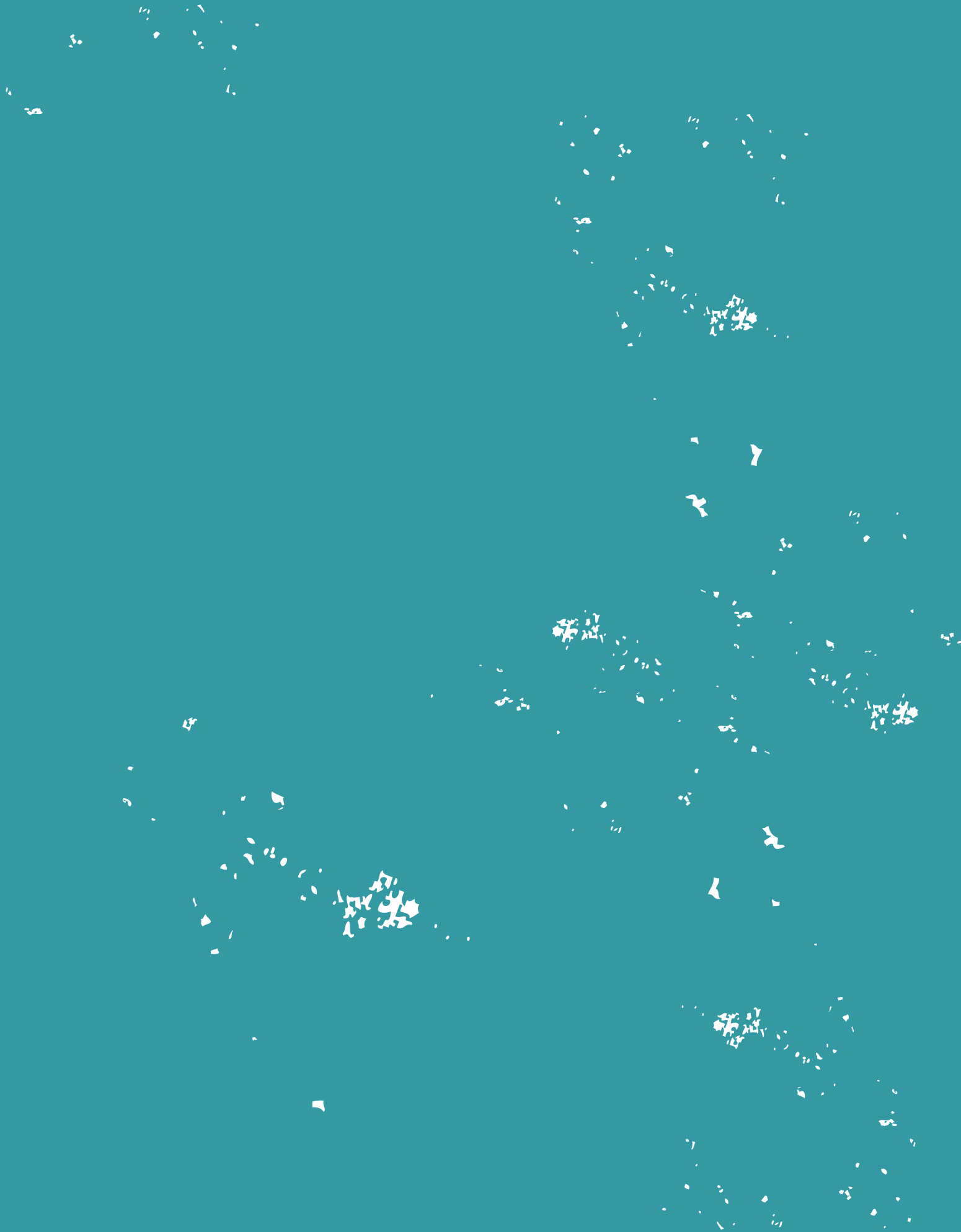
**Marcin Fajkowski - Adoxxo Polska Sp. z o.o.**

Wipasz S.A. is committed to reducing its carbon footprint and contributing to a more sustainable future. The company has implemented various measures to improve feed efficiency and reduce its carbon footprint, including the use of high-quality feed ingredients and advanced feeding technologies.




Category	Share
Energy of milk	26%
Energy of milk	26%
Energy of milk	26%
Energy of milk	26%

86 91





**In this section you will read:**

- Time for electric cars – a heavyweight category
- Eco-schemes – a novelty in direct payments for 2023–2027



# Time for electric cars – a heavyweight category

## Marcin Bruzda – Director of Transportation Wipasz S.A.

Since its inception, Wipasz S.A. has carried out its operations in an environmentally friendly manner. We can declare with full responsibility that we are an environmentally friendly company. For many years, we have consistently followed the principles of the European Green Deal. One example is Wipasz Green Farms, whose standards combine animal welfare, environmental care, and concern for consumer health. Now is the time for fully green, zero-emission transportation. We begin with a test of a Scania electric tractor unit. We are the leader in Poland and Europe in introducing environmentally friendly solutions for livestock transportation.

There is no turning back from zero-emission transportation, an ambitious direction clearly set by the European Union, in particular by the European Commission. It will not be possible to achieve sustainable development of the economy and the society without transforming the road transport sector. Reducing pollution and taking care of the environment and consumer health – the introduction zero-emission trucks is an essential condition for progress in these areas. With current advances in technology and engineering, a solution that is already within our reach is electric tractor units that draw electricity from traction batteries – BEV (Battery Electric Vehicles).

Wipasz S.A. is carrying out a test of a Scania electric tractor unit – a zero-emission vehicle. Since the range of electric tractor units is still relatively short (350–500 km), the tested unit will first be used to collect poultry livestock (chickens) from our suppliers in the Międzyrzec Podlaski area. Breeders supplying chickens are located within a maximum distance of 130 kilometers from the slaughterhouse in Międzyrzec and in most cases much closer.

As we know, livestock is picked up primarily at night. Under such conditions, one will immediately be able to appreciate the two most important advantages of an electric tractor unit: emission-free operation and low noise levels. It is really an amazing transformation: zero exhaust gases, carbon dioxide, soot, particulates, or toxic substances. Of course, modern Scania trucks used by Wipasz S.A. meet the stringent Euro VI emission standard, but the electric tractor unit is incomparably better in this respect. In addition to a significantly less environmental impact, it also provides more comfort for the driver. The electric tractor unit runs quieter and without vibration, and accelerates steadily and decisively.

The tests of the Scania zero-emission tractor unit will help us determine the operating costs compared to a regular turbodiesel unit. As for the other two aspects, namely ecology and the impact on humans, the electric vehicle wins right from the start. The domestic battery charging network in Poland is still modest and, most importantly, is not suitable for trucks with over 16 tons gross vehicle weight. Therefore, a charging station will be provided at our transport depot in Międzyrzec Podlaski. The tractor unit's traction battery will be charged during breaks in operation.

Another important goal related to the planned test is to increase the competence of our mechanics and electronics engineers. We operate an in-house Scania authorized service station and its crew is made up of experienced, dedicated employees. The electric vehicle will be a very interesting novelty for them. The experience gained by operating such a vehicle will certainly come in handy in the future. It is true that electric vehicles are simpler in many respects as they do not have a number of

components and subassemblies typical of standard trucks, but they still require the mechanics to acquire and master specialized skills related to high voltage, for example.

Until the end of 2022, electric trucks in Poland had been used primarily in municipal services (e.g. as

garbage trucks) and in distribution of goods over short distances. Thanks to our initiative, food transportation will be another important area where electromobility will become a reality. As a responsible food producer, Wipasz S.A. strongly believes this. We consider this as an opportunity and the future of our company's transportation!



# Eco-schemes – a novelty in direct payments for 2023 – 2027

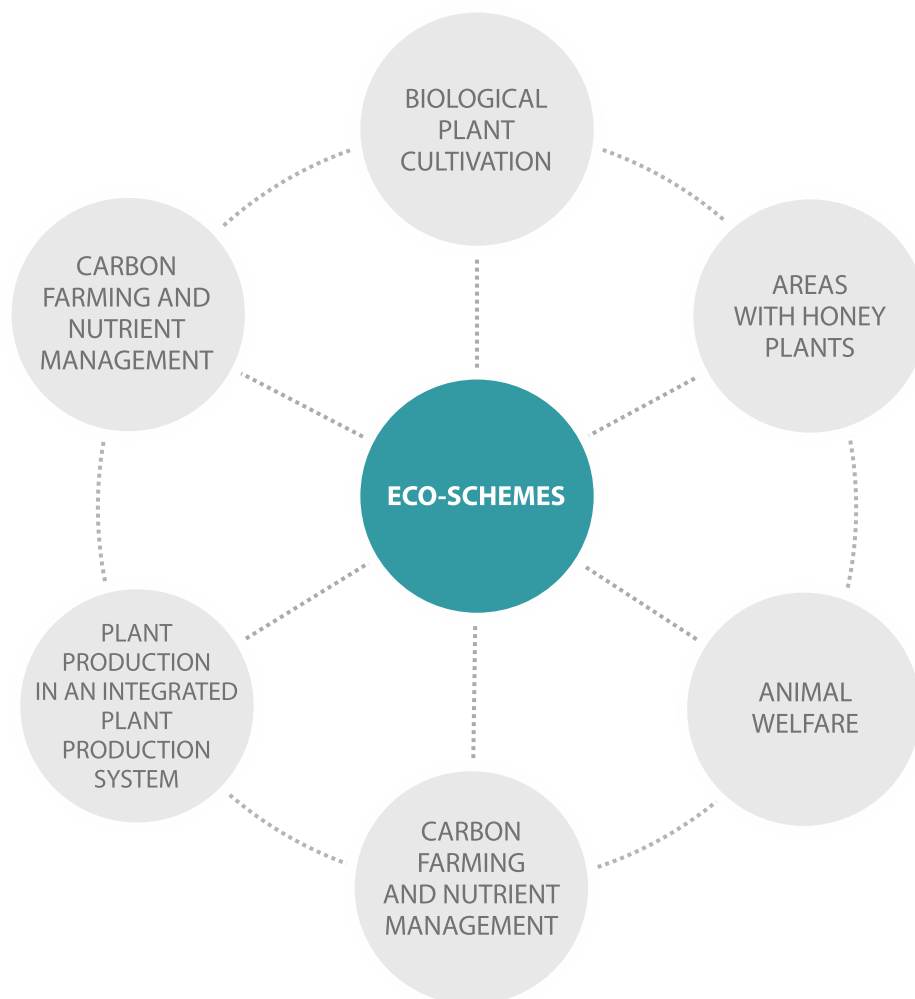
Iwona Galewska-Gurzinska – Financing Specialist Wipasz S.A.

One of the first measures implemented under the Strategic Plan of the Common Agricultural Policy is eco-schemes, a voluntary type of direct payment for every farmer. From March 13, 2023, farmers will be able to submit applications for payments for practices that are beneficial to the environment, the climate, and animal welfare that go beyond the applicable requirements of conditionality. The total budget is more than 4 billion euros.

The purpose of the eco-schemes is to mitigate climate change and protect natural resources –

water, soil, air, and biodiversity – while encouraging farmers to actively engage in environmental and climate protection activities. As of 2023, 6 eco-schemes have been introduced for implementation: one relates to animal welfare, while the others are area-based.

A farmer with a farm with an area of not less than 1 hectare or a farmer whose farm has an area of less than 1 hectare, but who receives direct payments for animals, can apply for an eco-scheme payment.



All eco-schemes are available to all farmers and can be widely used on farms. This will make it possible to achieve the highest efficiency in terms of the positive impact on the environment and the climate. The wide range of practices proposed under area eco-schemes, which takes into account the diversity of Polish agriculture in terms of agrotechnology, technology, farm structure and size, and type of production (plant, livestock), will enable farmers to choose the best option for their farms.

However, it should be borne in mind that legislative work is currently underway that will determine the specific rules for granting payments under the eco-schemes. The general rule is that eco-schemes are to be granted for one year, at the euro exchange rate in effect in September, and implemented for a part of a farm with an area of at least 0.1 hectare. The payment rates determined in EUR will be converted into PLN according to the exchange rate in effect on the last business day of September of a given year.

### Areas with honey plants

Encouraging farmers to establish areas with honey plants (e.g. sunflower, buckwheat, alfalfa, white mustard, honey clover, lacy phacelia, etc.) that provide long-lasting, diverse, and safe foraging grounds for honey bees and wild pollinators. This eco-scheme involves:

- ☒ establishing an area with honey plants by sowing a mixture consisting of at least two species of honey plants;
- ☒ banning agricultural production (including grazing and mowing) until August 31; and
- ☒ banning the use of plant protection products.

Estimated rate: 269.21 EUR/ha

### Plant production in an integrated plant production system

Farmers will be entitled to a payment for growing crops in a given year in accordance with integrated plant production methodologies under the supervision of certification bodies. The requirements for this type of intervention are:

- ☒ having in a given year a certificate issued by the national quality system (Integrated Plant Produc-

tion), certifying the cultivation of plants in accordance with integrated plant production methodologies; and

- ☒ preserving in a given calendar year all permanent grassland on the farm.

The annual payment will be granted for:

- ☒ the area of crops from which the plant products bearing the certificate of Integrated Plant Production in a given year originate; and
- ☒ the area of permanent grassland corresponding to the equivalent of the area of crops from which the plant products bearing the certificate of Integrated Plant Production in a given year originate.

Estimated rate: 292.13 EUR/ha

### Biological crop protection

Reducing the use of chemical plant protection products will contribute to the protection of biodiversity and reduce the deposition of chemical plant protection products in the environment using microbial preparations in accordance with the label of the specific product. Use of chemical plant protection products will be allowed only as a last resort when it is not possible to eliminate pathogens with microbiological products.

Estimated rate: 89.89 EUR/ha

### Water retention in permanent grasslands

Promoting water retention improves water management and also reduces carbon dioxide emissions into the atmosphere by reducing the decomposition of organic matter. The condition for receiving payments in a given year is the occurrence on permanent grassland of flooding or waterlogging, defined as saturation of the soil profile with water at the level of at least 80%, between May 1 and September 30, for a period of at least 12 consecutive days. Implementation of the eco-scheme will be based on satellite monitoring.

The support will apply to farms that simultaneously implement in a given area obligations under:

- ☒ selected options of nature packages related to the preservation of valuable natural habitats

and habitats of endangered bird species under the Agri-environmental and climatic measure of the RADP 2014–2020: Package 4. Valuable habitats and endangered bird species in Natura 2000 areas (except for option 4.3. Turfs) or Package 5. Valuable habitats outside Natura 2000 areas (except for option 5.3. Turfs) and analogous agri-environmental and climate commitments under the Strategic Plan 2023–2027; or

- ☒ the Carbon Agriculture and Nutrient Management eco-scheme for the practice Extensive use of permanent grassland with placement of animals or the intervention Extensive use of meadows and pastures in Natura 2000 areas; or
- ☒ the intervention of Organic agriculture and the measure of Organic agriculture of the RADP 2014–2020.

Estimated rate: 63.15 EUR/ha

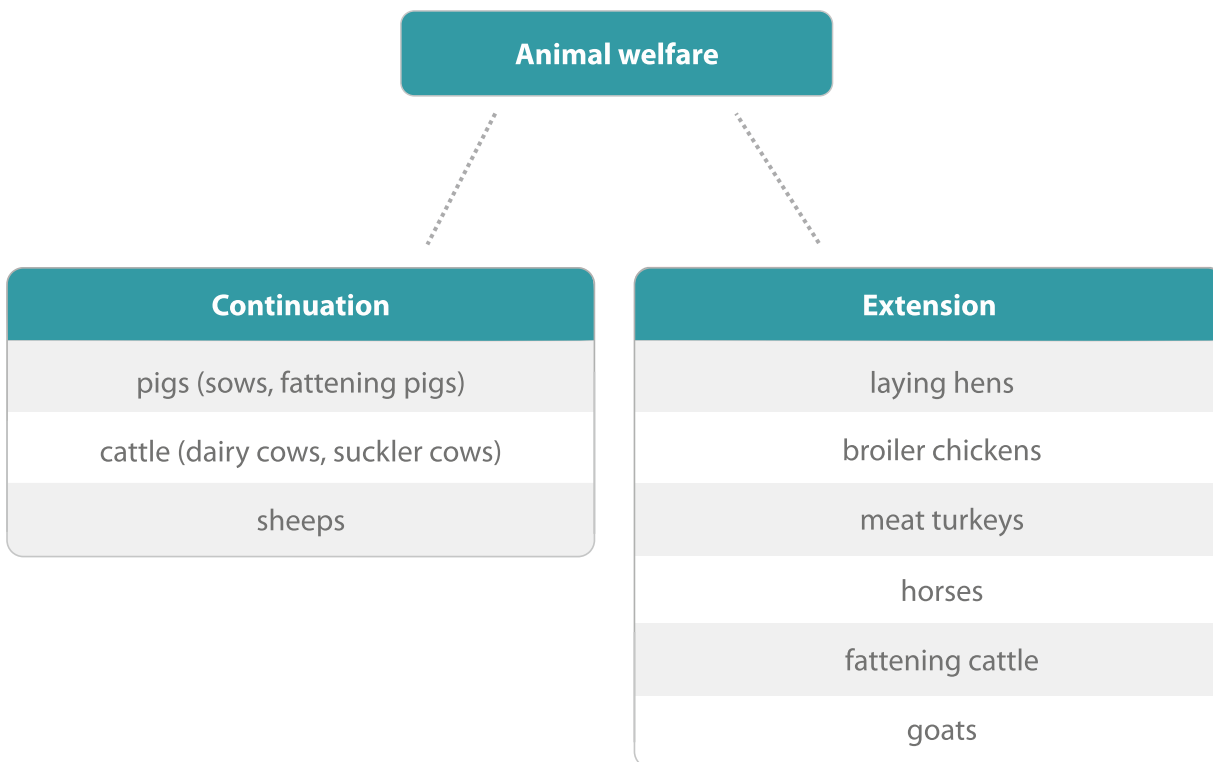
### **Animal welfare**

The goal is to encourage farmers to promote animal welfare conditions that are higher than the standards in force.

The general requirements for this intervention are:

- ☒ having an appropriate herd location registered in accordance with the regulations on the animal identification and registration system, and in the case of poultry – the poultry plant location;
- ☒ having an animal welfare improvement plan (does not apply to dairy cow grazing);
- ☒ animals covered by the requirements must be marked and registered in accordance with the provisions of the animal identification and registration system (if applicable); and
- ☒ undergoing a one-time training on methods to reduce the use of antibiotics (this requirement will take effect in 2024).

Animal welfare will be a continuation of the support for animal species/groups covered by the Animal Welfare measure of the RADP 2014–2020:



**Sows [(area 20/50%) – 192.29/458.55 euro/LSU; weaning of piglets – 133.13 euro/LSU]**

- ☒ all sows kept on a farm must be individually marked and registered in accordance with current regulations on animal registration and identification;
- ☒ keeping sows in a crateless system – it is allowed to keep sows in crates during the perinatal period, but not for more than 14 days;
- ☒ providing sows with living space in premises/buildings larger by at least 20% (a condition for joining the eco-scheme) or by at least 50% (higher payment amount).

If the above requirements are met, the farmer will be able to receive an additional payment provided that:

- ☒ he will ensure that sows are kept on a bedding of straw or other similar material in an area that allows sows to rest at the same time; or
- ☒ he will wean piglets no earlier than on the 35<sup>th</sup> day after their birth.

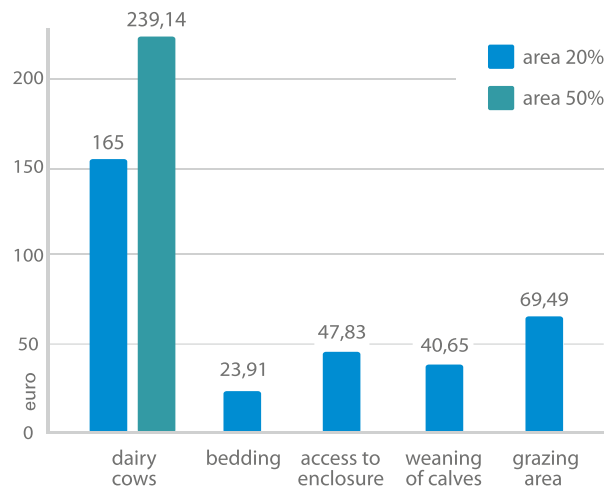
**Fattening pigs [(area 20/50%) – 32.42/48.63 euro/LSU; bedding – 48.63 euro/LSU]**

- ☒ the following are eligible for payment: fattening pigs from sows kept on farms implementing the sow welfare eco-scheme or fattening pigs from sows kept at a herd location no further than approx. 50 km from the welfare herd location;
- ☒ providing sows with living space in premises/buildings larger by at least 20% (a condition for joining the eco-scheme) or by at least 50% (higher payment amount).

If the above requirements are met, the farmer will be able to receive an additional payment if he ensures that animals are kept on a bedding of straw or other similar material in an area that allows the animals to rest at the same time.

For farms with closed-cycle pig production (simultaneous implementation of sow welfare and fattening pig welfare), the farmer will receive an additional payment for each pig to be fattened from his own welfare sow.

**Dairy cows**



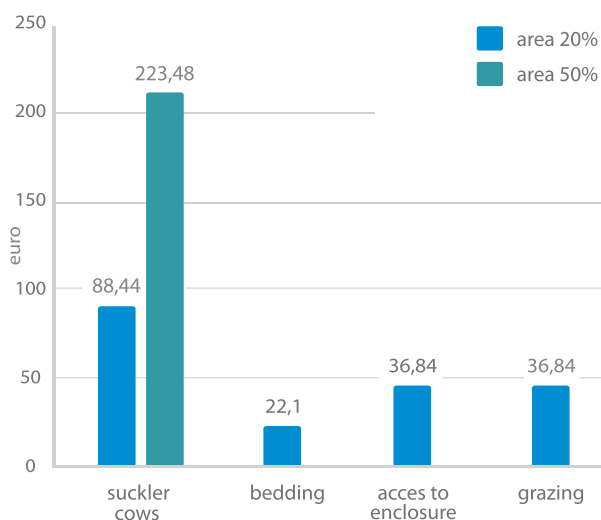
- ☒ untethered grazing of all dairy cows for at least 120 days during the growing season (min. 6 hours per day); or
- ☒ providing dairy cows kept in groups, untethered, in free stalls with living space in premises/buildings larger by at least 20% (a condition for joining the eco-scheme) or by at least 50% (higher payment amount).

If dairy cows are provided with a larger living space, the farmer will be able to receive an additional payment provided that he will:

- ☒ keep dairy cows on a bedding of straw or other similar material, or a separate section with a bedding of straw or a similar material with an area that allows the cows to rest at the same time;
- ☒ provide access to an enclosure for at least 4 hours a day during the entire year;
- ☒ wean calves no earlier than on the 5<sup>th</sup> day after their birth.

**Suckler cows (the requirements apply to suckler cows, calves, fattening cattle weighing up to 300 kg, and heifers used for meat):**

- ☒ the animals must be kept untethered;
- ☒ providing the animals with living space in premises/buildings larger by at least 20% (a condition for joining the eco-scheme) or by at least 50% (higher payment amount).

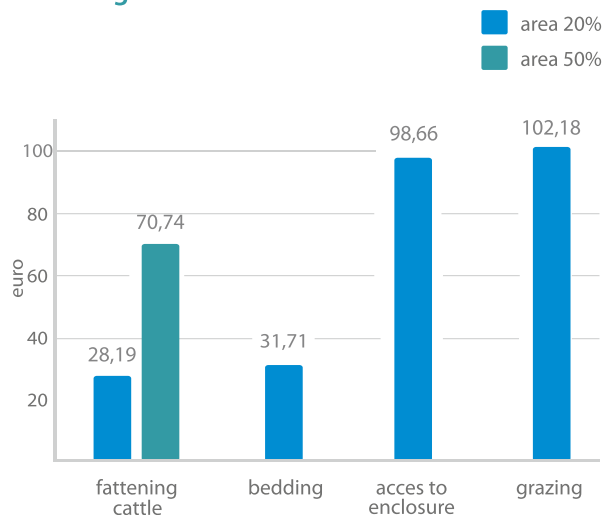


If the above requirements are met, the farmer will be able to receive an additional payment provided that he ensures:

- ☑ keeping suckler cows on a bedding of straw or other similar material, or a separate section with a bedding of straw or a similar material with an

- area that allows the animals to rest at the same time; or
- ☑ access to an enclosure for at least 4 hours a day during the entire year;
- ☑ grazing for at least 120 days during the growing season (for a minimum of 6 hours per day).

### Fattening cattle



Technology group practice	Sows	Fattening pigs	Dairy cows	Suckler cows	Fattening cattle
increased living space in buildings/ premises by at least 20%	3,9	0,4	6,9	3,6	0,8
keeping on bedding	1,6	0,6	1,0	0,9	0,9
weaning of young animals after a longer period	2,7	n/a	1,7	n/a	n/a
closed cycle	n/a	0,3	n/a	n/a	n/a
access to an enclosure	n/a	n/a	2,0	1,5	2,8
grazing	n/a	n/a	3,1	1,5	2,9
increased living space in buildings/ premises by at least 50%	9,3	0,6	10,0	9,1	2,0

Table 1. Pigs and cows – a point system

1pt ≅ 22,47 EUR ≅ 100 PLN



## Fattening cattle

- ☒ in the case of fattening cattle not from suckler cows – animals from the age of 4 months to the age of 18 months, kept on the farm during this period for at least 120 days, are eligible for payment;
- ☒ in the case of fattening cattle from suckler cows – animals weighing more than 300 kg from the age of 18 months, kept on the farm during this period for at least 120 days, are eligible for payment;
- ☒ keeping the animals untethered;
- ☒ providing fattening cattle with living space in premises/buildings larger by at least 20% (a condition for joining the eco-scheme) or by at least 50% (higher payment amount).

If the above requirements are met, the farmer will be able to receive an additional payment provided that he ensures:

- ☒ keeping animals on a bedding of straw or other similar material, or a separate section with a bedding of straw or a similar material with an area that allows the animals to rest at the same time; or
- ☒ access to an enclosure for at least 4 hours a day during the entire year;
- ☒ grazing for at least 120 days during the growing season (for a minimum of 6 hours per day).

## OPTION SYSTEM – payment for implementation, requirement packages for a specific animal species/technology group

### Sheep (34.72 EUR/head)

Providing to all technology groups of animals of the sheep species:

- ☒ grazing or access to an enclosure for at least 120 days during the growing season;
- ☒ increased living space in premises/buildings by at least 20%.

### Goats (33.53/head)

Providing to all technology groups of animals of the domestic goat species:

- ☒ keeping the animals untethered;
- ☒ increased living space in premises/buildings by at least 20%;
- ☒ access to an enclosure with an area increased by at least 20% during the entire year;
- ☒ grazing for at least 120 days during the growing season.

### Horses

- ☒ minimum number of animals owned – 2 horses at least 24 months old or a mare with a foal reported to the ARMA;
- ☒ horses kept in wild or semi-wild conditions, coming from areas of a national park or a landscape park designated in accordance with the regulations on the animal identification and registration system are not eligible for payments.

Horses kept in premises/buildings (**97.22 EUR/head**):

- ☒ keeping the animals untethered;
- ☒ providing grazing or access to outdoor areas for at least 140 days during the growing season (for a minimum of 6 hours per day);
- ☒ providing access to outdoor areas or run pens with an expanded area for min. 2 hours per day outside the growing season;
- ☒ providing stall areas or, if the animals are kept in free stalls in premises/buildings, areas increased by at least 20%.

Horses kept in an open system (**44.02 EUR/head**):

- ☒ providing a roof with an area that allows all horses to be under that roof at the same time;
- ☒ providing bedding under the roof;
- ☒ providing an outdoor area increased by at least 20% over the area required for an open system.

**Laying hens (3.18 EUR/head)**

- ☒ having a veterinary number assigned;
- ☒ the minimum number of spots on the farm in accordance with generally applicable regulations is equal to 350;
- ☒ prohibition of beak trimming;
- ☒ ensuring that the animals are kept without cages on a bedding;
- ☒ providing increased living space in the poultry house – stocking rate of no more than 7 animals/m<sup>2</sup> of floor space;
- ☒ ensuring increased nest accessibility: when using single nests – no more than 5 laying hens/nest; for group nests – no more than 96 laying hens/m<sup>2</sup> of the nest area;
- ☒ providing a perch with a minimum length of 0.2 m/laying hen;
- ☒ ensuring constant access to attention-absorbing materials or objects of a quality that does not have harmful effects on health.

**Broiler chickens (0.04 EUR/head)**

- ☒ entities keeping broiler chickens are registered in accordance with the regulations on the protection of animal health and the control of contagious animal diseases;
- ☒ the minimum number of spots on the farm in accordance with generally applicable regulations is equal to 500;
- ☒ providing increased living space in the poultry house – maximum stocking density of no more than 30 kg/m<sup>2</sup> and at the same time no more than 20 animals/m<sup>2</sup>;
- ☒ providing a minimum of 6 hours of dark phase/day following the light phase of lighting;
- ☒ ensuring constant access to attention-absorbing materials or objects of a quality that does not have harmful effects on health.

**Turkeys kept for meat production (0.67 EUR/head)**

- ☒ entities keeping turkeys are registered in accordance with the regulations on the protection of animal health and the control of contagious animal diseases;

- ☒ the minimum number of spots on the farm in accordance with generally applicable regulations is equal to 100;
- ☒ providing increased living space in the premise/building – maximum stocking density of no more than 50 kg/m<sup>2</sup>;
- ☒ providing 8 hours of dark phase/day following the light phase of lighting;
- ☒ ensuring constant access to attention-absorbing materials or objects of a quality that does not have harmful effects on health.

**Carbon farming and nutrient management**

The intervention will support 8 practices, which will be awarded points according to the table below. Only those farms that receive a minimum of 5 points will be able to implement it.

No.	Practices under the 'Carbon Farming' eco-scheme	Recommended number of points (1 point = PLN 100)
1	Extensive use of permanent grassland with livestock farming	5
2	Winter intercrops/catch crops	5
3a	Developing and following a fertilization plan – baseline option	1
3b	Developing and following a fertilization plan – option with lime application	3
4	Diversified crop structure	3
5	Mixing manure on arable land within 12 hours of application	2
6	Application of liquid natural fertilizers by methods other than spraying	3
7	Simplified farming systems	4
8	Mixing the straw into the soil	2

## 1. Extensive use of permanent grassland with livestock farming

The goal is to protect biodiversity through the proper management of permanent grassland (PG) with low production value, conducting rational grazing of animals, counteracting the negative trend of cessation of keeping grassland animals on farms with PG.

### Requirements for the intervention:

Stocking rate of ruminants<sup>1</sup> on the farm is equal to at least 0.3 LSU/ha of permanent grassland and a maximum of 2 LSU/ha of permanent grassland during the growing season; prohibition of plowing of permanent grassland during the implementation period of the eco-scheme.

Estimated rate: 235.95 EUR/ha

## 2. Winter intercrops/catch crops

The goal is to improve and protect the soil. A vegetation cover on the soil reduces leaching of minerals into groundwater. Protecting the natural resources of soils, particularly by increasing the content of organic matter in soil. Absorption of carbon dioxide in agriculture, by binding it in organic matter.

### Requirements for the intervention:

1) maintaining plants in the following forms:

- ☒ plants or mixtures with small-seeded field bean plants in the main crop; or
- ☒ winter intercrops in the form of mixtures of at least 2 plant species by October 1 and maintained until at least February 15 of the following year. During the maintenance period of the winter intercrop, mulching is allowed, but not earlier than after November 15.

2) banning the use of plant protection products:

- ☒ for winter intercrops – for the duration of their maintenance;

- ☒ for intercrops – from the harvest of the main crop, for at least 8 weeks or until the sowing of the next main crop.

Estimated rate: 176.63 EUR/ha

## 3. Development and adherence to a fertilization plan – basic option with lime application

The goal is to properly manage fertilization tailored to the soil's content of nitrogen, phosphorus, potassium, magnesium, and calcium, and to plant needs, using soil analysis and fertilization decision support systems. The intervention includes a lime application option. This measure is intended to counteract soil acidification, which poses a significant threat to the environment.

### Requirements for the intervention:

- ☒ development and adherence to a fertilization plan for the farm's arable land and permanent grassland area, which is based on nitrogen balance and chemical analysis of the soil and specifies nutrient doses;
- ☒ the option with lime application – extended by the application of lime, the need for which is determined in soil tests conducted as part of the basic option, whereby support for lime application is allowed for a farm's area with pH lower than or equal to 5.5 where lime application is carried out. Support for lime application for individual plots of farmland is allowed no more than once every 4 years.

Estimated rate:

1. Basic option: 28.99 EUR/ha
2. Option with lime application: 145.84 EUR/ha

## 4. A diversified crop structure

Aimed to improve soil quality and restore organic matter by enriching the crop structure with plant species that contribute to both a positive balance of organic matter and an increase in biodiversity.

<sup>1</sup> The list of ruminants has not yet been defined

## Requirements for the intervention:

- ☒ cultivation of at least 3 different crops on the farm's arable land, whereby:
  - the share of the main crop in the sowing structure may not exceed 65% and the share of the smallest crop may not be less than 10%;
  - at least 20% of the sowing structure must be crops of plant species that have a positive impact on the balance of organic matter in soil (including Fabaceae plants);
  - the combined share of cereals and rapeseed in the sowing structure may not exceed 65%;
  - the share of crops that have a negative impact on the balance of organic matter (including root crops) may not exceed 30%.

Estimated rate: 76.18 EUR/ha

## 5. Mixing manure on areable land within 12 hours of application

Reduces ammonia emissions into the atmosphere by mixing a certain amount of manure into the soil within a maximum of 12 hours of application on arable land. The implementation of this practice will be confirmed by a geotagged photo made using the application provided by ARMA.

Estimated rate: 96.18 EUR/ha

## 6. Application of liquid natural fertilizers by methods other than spraying

The goal is to reduce ammonia emissions into the atmosphere by applying a certain amount of liquid

manure by methods other than spraying on arable land and permanent grassland.

Estimated rate: 65.39 EUR/ha

## 7. Simplified farming systems

Support for conservation tillage, the main goal of which is to preserve nature's natural resources while achieving satisfactory yields.

Requirements for the intervention:

- ☒ on arable land, crop cultivation is carried out in the form of conservation tillage without plowing or strip-till, whereby:
  - tillage operations are carried out without plow tillage in the complex of post-harvest and pre-sowing tillage;
  - after the crop is harvested, all crop residue is left on the field in the form of mulch;
  - the practice does not include zero tillage.

Estimated rate: 135.05 EUR/ha

## 8. Mixing straw into the soil

Use of straw to maintain or increase the levels of organic matter and nutrients in soils by fragmenting and mixing all the straw into the soil or plowing it in after harvesting the main crop on arable land. A 1% increase in humus content increases water retention of soils by 30%.

Any number of practices are possible on a given agricultural plot, but with the following exceptions:

Intervention	Areas with honey plants	Carbon farming										Water retention on permanent grassland	Plant production in an Integrated Production system	Biological crop protection				
		1	2	3	4	5	6	7	8	9	10				11	12		
Carbon farming	Areas with honey plants	N	N	N	N	Y*	N	N	N	N	N	N	N	N	N	N	N	
	Extensive use of permanent grassland with livestock farming	N	N	N	Y	N	N	Y	N	N	N	Y	N	N	N	N	N	Y
	Winter intercrops/catch crops	N	N	N	Y	Y	N	Y	N	N	N	Y	N	N	N	N	N	Y
	Developing and following a fertilization plan	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	Y
	Diversified crop structure	Y*	N	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y
	Mixing manure on arable land within 12 hours of application	N	N	N	Y	Y	N	Y	Y	N	N	N	N	Y	Y	N	Y	Y
	Application of liquid natural fertilizers by methods other than spraying	N	Y	N	Y	Y	N	Y	Y	N	N	N	Y	Y	N	N	Y	Y
	Simplified farming systems	N	N	N	Y	Y	N	Y	Y	N	N	Y	N	N	N	N	Y	Y
	Mixing straw into the soil	N	N	N	Y	Y	N	Y	Y	N	N	N	N	N	N	N	Y	Y
	Water retention on permanent grassland	N	C	N	Y	N	N	Y	N	N	N	N	N	N	N	N	N	N
Plant production in an Integrated Plant Production system	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	N	N	
Biological crop protection	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N	

**Legend:**

Y – yes, interventions may be combined on a single plot of farmland

Y\* – yes, interventions may be combined on a single plot, but they may not be one of the three required crops (in the case of the Diversified crop structure eco-scheme)

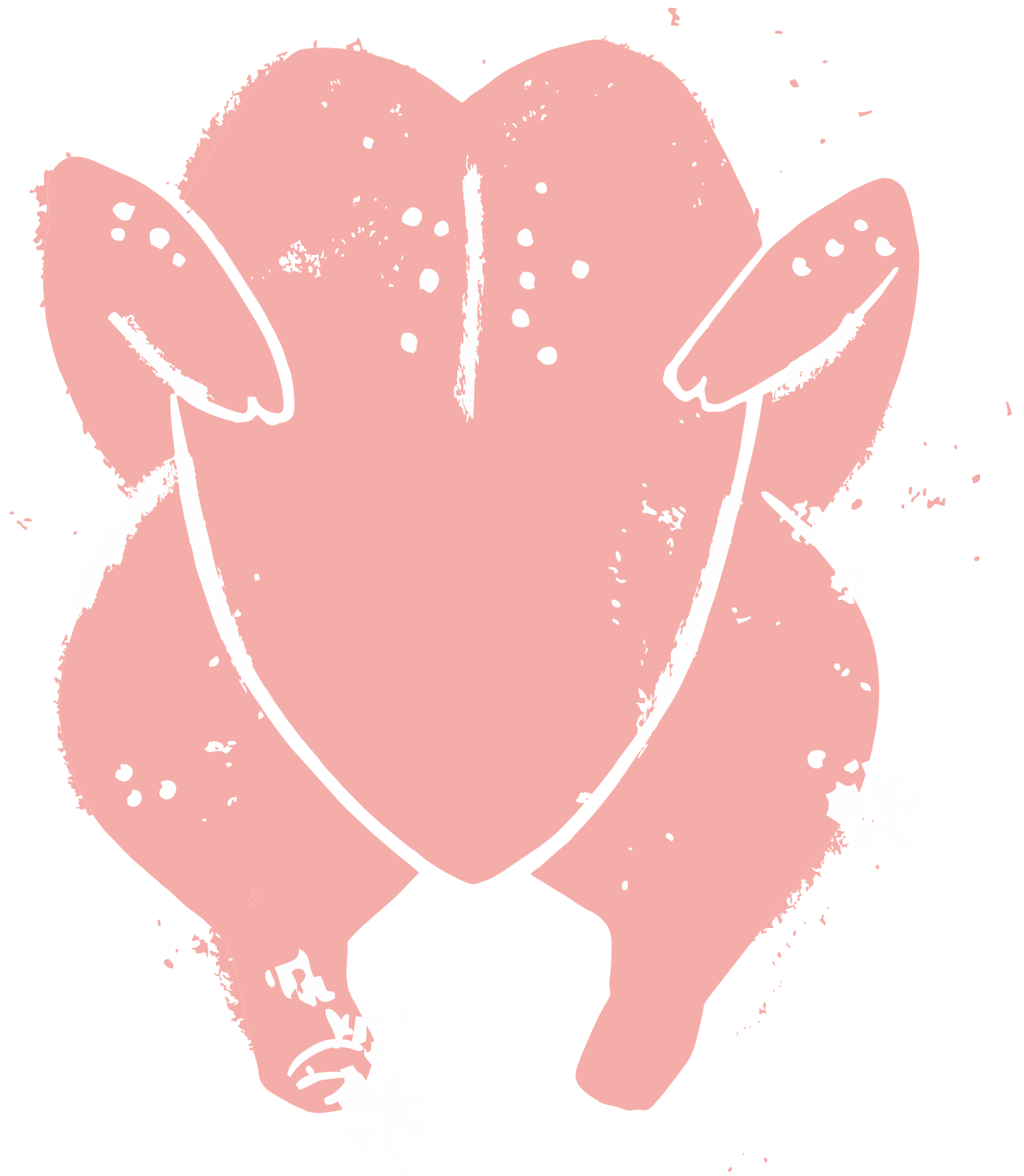
N – no, it is not possible to apply for these interventions for a single plot of farmland

C – participation in at least one of the interventions marked with “C” is a condition for applying for the Water retention on permanent grassland eco-scheme



**In this section you will read:**

- > Green Transition – Wipasz S.A. invest in Renewable Energy Sources
- > Transformation of the Green Farms toward compliance with the European Green Deal
- > Best Available Techniques for intensive poultry farming vs. technologies used in the Green Farms
- > Zero waste – many areas, one goal!
- > Wipasz – more than a company: our common safety



# Green Transition – Wipasz S.A. invest in Renewable Energy Sources

**Piotr Rudnicki – Purchasing Specialist, Meat Division Wipasz S.A.**

The European Green Deal is a development strategy aimed to transform the European Union into a climate-neutral area. It is a response to the current climate crisis and intensive environmental degradation processes. The future of Europe depends on the condition of our planet. EU Member States have pledged to achieve climate neutrality by 2050 and thus to fulfill their obligations under the Paris Agreement. The European Green Deal is the EU's strategy for achieving this goal by 2050. Since 75% of the EU's greenhouse gas emissions come from energy use and production, decarbonization of the energy sector – the supply of clean and safe electricity – plays a key role in the EU's quest for climate neutrality. For Poland, the Green Deal is an opportunity to make the transition to a low-carbon economy and move away from an economy that consumes non-renewable natural resources.

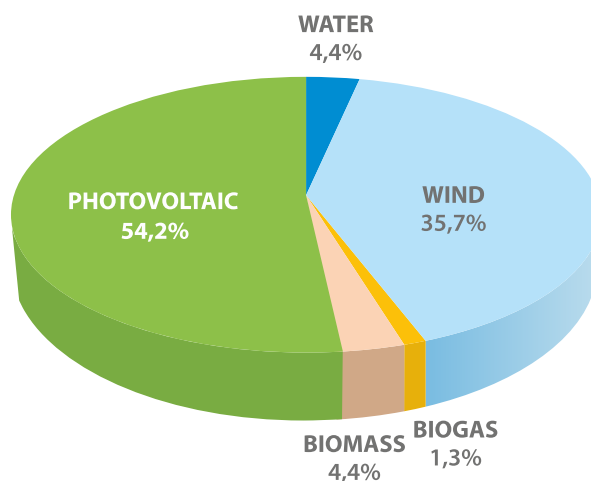
Wipasz S.A. implements the objectives of the European Green Deal strategy and focuses on energy security by investing in the development of RES in the area of its operations. The company built its first photovoltaic system at the Polish Chicken Research Center in Drelów. In 2022, another investment project was launched for the construction of a photovoltaic farm at the Poultry Plant in Międzyrzec Podlaski. The capacity of the PV system will be equal to 4.5 MW and the farm will be supplied in an off-grid arrangement without connection to an external power grid. Once the investment project in Międzyrzec Podlaski is commissioned, the capacity of the photovoltaic system will cover about 26% of the poultry plant's annual electricity needs. The scale of our investment in RES is increasing every year. Thanks to the development of photovoltaics and combined heat and power production, we can gradually increase the share of RES in our energy balance and become increasingly independent of external energy sources. We estimate that once our investment projects are completed in 2023, the share of energy from RES in Wipasz S.A.

will be equal to 10% of annual demand for electricity.

## Unexpected growth of renewable energy sources

Renewable energy sources have grown rapidly over the years, but the current global energy crisis has caused them to enter a phase of even faster growth as countries seek to capitalize on the benefits of energy security. This proves that the current energy crisis could become a historic turning point toward a cleaner and safer energy system. Rising energy prices are causing more and more companies to opt for this type of investments.

Photovoltaics in Poland is one of the fastest growing RES sectors. Poland's Energy Policy for 2021–2040, adopted in February 2021, provides that „photovoltaic sources are estimated to reach economic and technical maturity after 2022. In 2030, the installed capacity could reach approx. 5–7 GW in total in micro- and large systems, while in 2040 it could be as high as 10–16 GW.”



**Figure 1. Installed capacity of photovoltaic systems compared to all RES in November 2022**





Poland reached the first of these thresholds almost 20 years ahead. At the end of November 2022, the installed capacity of photovoltaic systems in Poland reached almost 12 GW, which is 67% more than in November of the previous year. In November 2022, the installed electrical capacity for all types of sources (conventional and renewable) was 60 GW, with renewable energy sources accounting for almost 36.6% of that value (22 GW). In the RES sector, photovoltaics rank first, with a share of more than 54%.

**The world will move towards RES**

In 2022, the capacity of photovoltaic systems in the European Union increased by 41.4 GW. This is a record increase: as much as 47% more than in the previous year. Moreover, it was the first year when Poland was the leader in the increase of PV system capacity among all the EU Member States. This amount is enough to power 12.4 MLN households, thus replacing 102 LNG tankers. The EU has set a record, as the increase of photovoltaic capacity reached nearly 50% compared to 2021. In 2022, total photovoltaic capacity in the EU reached as much as 208.9 GW. Electricity from photovoltaic systems is a lifeline for Europe during the current energy and climate crises. No other energy source is developing as quickly and reliably as photo-

voltaic energy. We are building a safe, green and prosperous Europe on the foundation of photovoltaic energy.

Germany once again emerged as the market leader in photovoltaic energy, with 7.9 GW of capacity added to the power grid in 2022. The country's total photovoltaic capacity is already as high as 68.5 GW. This allows Germany to continue to be the largest photovoltaic operator in the EU responsible for as much as 33% of the total installed capacity in all member countries. Germany was followed by Spain with a slightly smaller increase by 7.5 GW. The third place was taken by Poland, which installed 4.9 GW of photovoltaic capacity last year, which was 29% more than in 2021. This is the first time that Poland has been ranked among the top five countries.

China is already a leader in RES, and according to IEA (International Energy Agency) estimates, the implementation of its next five-year plan will allow China to account for nearly a half of new global RES capacity between 2022 and 2027. Meanwhile, in the US, the Inflation Reduction Act, which also provides support for low-carbon projects, will contribute for RES growth. Industrial-scale photovoltaic and onshore wind systems are the most cost-effective options for new electricity production in most countries around the world.

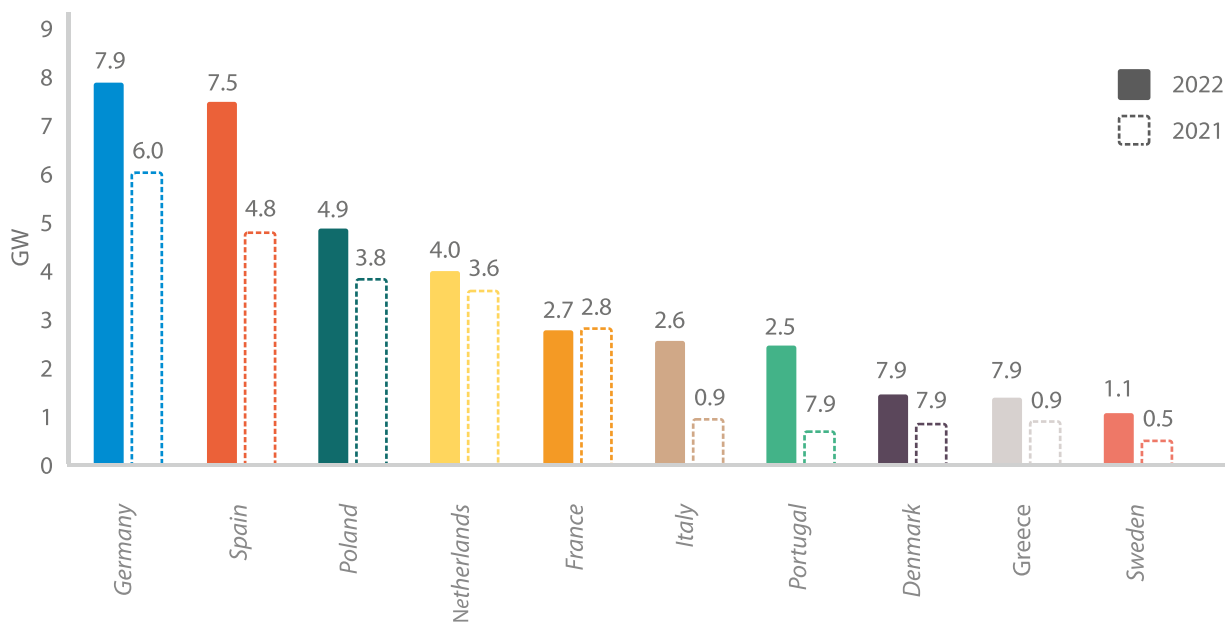


Figure 2. Ranking of EU Member States with the highest growth in photovoltaic capacity in 2022. Source: solarpowereurope.org



# Transformation of the Green Farms toward compliance with the European Green Deal

Ryszard Bochenek – Polish Chicken Research Center in Drelów

The challenge faced by the industry in the coming years is to transform the economy toward compliance with the European Green Deal. The main goal is to achieve climate neutrality through sustainable agriculture and food production system, protection of ecosystems and biodiversity, elimination of pollution, and development of Renewable Energy Sources, among other things. This means that by mid-century, the economy of the EU is expected to emit only as much greenhouse gases as it is able to neutralize.

The Green Farms project is a long-term investment by Wipasz that sets the only right direction for the development of animal farming. It was developed through a combination of our years of experience, the knowledge of industry professionals, and the support of our Polish Chicken Research Center.

The Green Farms' standard combines animal welfare, care for the environment, and concern for consumer health, which makes it compliant with the objectives of the European Green Deal. We aim to reduce the carbon footprint, shorten the supply chain, and eliminate the use of antibiotics and chemotherapeutic products in poultry farming.

The basis for achieving these objectives is to ensure the welfare of the animals. This term refers not only to health and physical conditions, but also to mental well-being and the ability to express natural behavior. A measure of proper animal care is the preservation of the five freedoms contained in the Animal Welfare Code:

**1. Freedom from hunger, thirst, and malnutrition** by providing access to fresh water and food to

keep animals healthy and strong.

**2. Freedom from mental trauma and pain** by providing adequate shelter and a place of rest.

**3. Freedom from pain, wounds and disease** through prevention, rapid diagnosis, and treatment, as well as maintenance of hygiene and proper microclimate in premises.

**4. Freedom to express natural behavior** by providing adequate space, conditions, lighting, and the company of other animals of the same species.

**5. Freedom from fear** by providing care and treatment that does not cause mental suffering to animals. The term also covers the conditions under which animals are transported and humanely slaughtered.

What determines the highest quality of Green Farms chicken meat is welfare during the growth of the birds, and adherence to these principles ensures that the birds are comfortable from the moment they are placed in the poultry house until the last day of their lives. Good digestion of nutrients means less excretion of chemicals and less gas emissions into the atmosphere.

By ensuring welfare and using the latest available technologies for bird breeding and climate management in the course of breeding, as well as by properly training employees, it is possible to eliminate the factors that cause physiological stress in animals, namely:



- ☒ improper lighting;
- ☒ incorrect temperature;
- ☒ inability to express normal behavior;
- ☒ insufficient air exchange (e.g. little oxygen);
- ☒ concentration of harmful gases (mainly NH<sub>3</sub>, CO<sub>2</sub>, and H<sub>2</sub>S);
- ☒ improperly balanced feed (in-house feed plants);
- ☒ too high bird density (at Green Farms, the maximum density is 38 kg/m<sup>2</sup>, the acceptable standard is 42 kg/m<sup>2</sup>);
- ☒ carrying out zootechnical procedures, catching and loading birds for slaughter in an improper manner.

Our integrated production system allows full control of the products – from the field to the table. Highest-quality ingredients supplied mostly by Polish farmers are used to produce compound feeds, concentrates, and mineral additives of world-class quality, which help animals grow properly and naturally. Our poultry plants, which are the final stage in the poultry meat production process, are some of the most modern poultry plants in Europe thanks to the advanced technology they use. The ability to track every stage of production allows us to provide meat that is of the highest quality and is therefore healthy and safe for the consumer.

### Green Farms welfare

**Feeding** – constant access to feeders, vegetable feed from own feed plants. The composition of the feed is balanced on an ongoing basis according to the parameters of the nutrients used. The dietary ration is stable, which prevents food shock. Feed consumption is monitored online.

**Watering** – each facility has its own water intake (well) with a water treatment plant. The birds have constant access to drinking troughs. Water consumption and the daily ratio of feed to water are monitored online.

**Living space and company of other birds** – spacious and glazed buildings with a breeding area of 3,000 m<sup>2</sup> and a volume of 11 000 m<sup>3</sup>. During the breeding period, the birds live and move through-

out the entire surface of the livestock building with bedding of heat-treated straw pellets.

**Veterinary treatment** – veterinary monitoring and care are provided by the company's own veterinary clinic. The veterinarians are tasked with the prevention of diseases in the herds they supervise and monitoring of the epizootic situation in the field. On this basis, appropriate vaccines are selected to avoid immune stress. Well-conducted prophylaxis eliminates the need for treatment with pharmacological products (including antibiotics and chemotherapeutic products).

**Indoor microclimate hygiene** – microclimate management in the Green Farms' breeding space is programmed and monitored by the SKOV computer system. The breeding space parameters measured (online) in the system are temperature, humidity, and CO<sub>2</sub>. In addition, the employees check oxygen content, ammonia concentration, hydrogen sulfide concentration, and air velocity with mobile devices during routine zootechnical procedures. The thermal comfort in the breeding space is ensured by providing the so-called 'effective temperature', which is a subjective climate that results from the right values of mainly temperature, humidity, and air movement.

**Lighting** – properly selected lighting from the time of bird placement to the day of slaughter is one of the indicators of the welfare of birds. Good lighting stimulates birds to undertake vital functions, improves their orientation, and facilitates their access to food. The intensity of artificial light and access to natural light are adjusted according to the age, condition, and temperament of the birds. All Green Farms facilities have windows with adjustable shutters. The glazed area accounts for 3% of the breeding area.

**Behaviour** – observation of behavioral responses is a reliable determinant of well-being. To allow the natural behavior of birds, additional equipment, such as perches, platforms, foraging equipment, and pecking accessories, is installed.

**Bio-assurance** (biological protection of the farm) – the recommendations and rules aimed to protect birds from transmission of infectious agents in Wipasz Green Farms are described in the ‘Biological Safety Plan’ for each farm separately. These are official documents of the State Veterinary Inspection compliant with EU and General Veterinary Inspectorate’s guidelines.

The rapidly advancing climate changes and environmental degradation are currently the key challenges faced by the modern world. Halting

the ongoing changes requires radical processes. The European Green Deal entails implementing a series of measures that will help transform Europe into a modern, resource-efficient, and competitive economy. In addition to climate policy, the Green Deal also includes proposals related to agriculture, a circular economy, biodiversity, and combating pollution. The Green Farms are meeting these demands through innovation, introduction of the latest technologies in poultry farming, and improving the production performance while enhancing animal welfare.



# Best Available Techniques for intensive poultry farming vs. technologies used in the Green Farms

**Małgorzata Zaniewska – Environmental Protection Manager Wipasz S.A.**

The European agricultural sector must operate in the global food market, taking into account technological advances that serve to simultaneously achieve economic efficiency, protect animal and consumer health, and protect the environment.

The definition of Best Available Techniques (BAT) is set out in Article 2(11) of Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control. According to that definition, BAT is a document that summarizes the best available techniques that can be used in a given sector. BAT conclusions include descriptions of each technique, data to assess its suitability, the emission levels that are associated with the BAT, and the associated consumption levels. BAT conclusions are identified on the basis of BREF reference documents, which in turn are prepared by the European Integrated Pollution Prevention and Control Bureau (IPPCB). The BREF, prepared for specific activities, identifies the techniques currently in use, the levels of emissions and consumption, and the techniques that are considered the best available at the time.

The overarching goal of drafting and implementing BAT conclusions is to reduce the adverse impact of an industry on the environment or its various elements by using the best possible techniques and installations with the lowest possible emissions of harmful substances. Based on the provisions in the Environmental Protection Law, the Regulation of the Minister of the Environment dated August 27,

2014 on the types of installations that may cause significant pollution of specific elements of the nature or the environment as a whole was promulgated, which includes a list of industries that require an integrated permit; intensive poultry farming is one of those industries. An integrated permit can be described as an administrative decision that constitutes a type of license. It allows legal operation of an installation, the operation of which may adversely affect the environment.

Taking into account the principle of a sustainable development policy that assumes conscious and properly formed relations between care for the environment, animal welfare, human health, and achievement of production and economic objectives, Wipasz S.A. implements processes aimed at improving methods of preventing negative impacts on the environment and compliance with regulations.

The guidelines concerning BAT conclusions for intensive poultry farming were promulgated in Commission Implementing Decision (EU) 2017/302 of 15 February 2017 in compliance with Directive 2010/75/EU of the European Parliament and of the Council. In order to increase the care for the environment, Wipasz S.A. has implemented BAT conclusions in all its poultry rearing facilities, as well as its slaughterhouses and feed plants. In addition, the provisions of the Code for the Prevention of Odor Nuisance are taken into account at the design stage of new installations.



BAT Conclusions	Compliance with BAT requirements at installations Green Farms
<p><b>BAT 1</b> ENVIRONMENTAL MANAGEMENT SYSTEMS</p>	<p>An environmental management system incorporating the following features is being followed at Green Farms to improve overall environmental performance:</p> <ol style="list-style-type: none"> <li>1. Commitment of the management, including senior management.</li> <li>2. Planning and establishing the necessary procedures, goals, and objectives in conjunction with financial plans and investments.</li> <li>3. Implementation of procedures with special attention to:               <ol style="list-style-type: none"> <li>a. the structure and accountability;</li> <li>b. training, awareness raising, and competence;</li> <li>c. communication;</li> <li>d. employee engagement;</li> <li>e. documentation;</li> <li>f. efficient process control;</li> <li>g. maintenance programs;</li> <li>h. emergency preparedness and response; and</li> <li>i. ensuring compliance with environmental regulations.</li> </ol> </li> <li>4. Checking effectiveness and taking corrective actions, with particular attention to:               <ol style="list-style-type: none"> <li>a. monitoring and measurement;</li> <li>b. corrective and preventive actions;</li> <li>c. record keeping; and</li> </ol> </li> <li>5. keeping up with the development of cleaner technologies.</li> </ol> <p>In connection with the ongoing cooperation with third-party entities, the operator has implemented aspects of an environmental management system based on procedures that allow the plant to operate in compliance with environmental standards.</p> <p>THE GREEN FARMS COMPLY WITH BAT REQUIREMENTS FOR ENVIRONMENTAL MANAGEMENT SYSTEMS.</p>
<p><b>BAT 2</b> GOOD HOUSEKEEPING</p>	<p>The individual Green Farms facilities are located in a way that allows the production process to be carried out optimally, taking into account the terrain conditions, including the location of the nearest water reservoirs and watercourses. The installations in question are located at a safe distance from inhabited residential buildings, which mitigates the negative impacts in terms of air emissions and noise.</p>

BAT Conclusions	Compliance with BAT requirements at installations Green Farms
	<p>A number of measures have been adopted to reduce the impact of the installations on surface water and groundwater to reduce water pollution:</p> <ul style="list-style-type: none"> <li>☒ use of automatic, high-efficiency watering systems;</li> <li>☒ constant control of the technical condition of vehicles that travel; within the installation site and constitute a potential source of contamination of the ground and water with petroleum-based substances;</li> <li>☒ periodic inspections for leaks in the water supply system;</li> <li>☒ cleaning of livestock premises with a pressure washer;</li> <li>☒ collection of industrial wastewater in watertight septic tanks; determination of the places for loading manure onto trailers in areas with sealed pavement;</li> <li>☒ constant monitoring of the filling level of septic tanks located at the farms, i.e. tanks for industrial wastewater and domestic sewage; and</li> <li>☒ storage of hazardous waste in a manner that prevents spillage, on a sealed floor in the building, in places inaccessible to the public.</li> </ul> <p>Green Farms' employees have the necessary qualifications and skills to carry out their assigned tasks. The installations are subject to regular inspections and repairs to keep all facilities and equipment in proper working order.</p> <p>THE GREEN FARMS COMPLY WITH BAT REQUIREMENTS FOR GOOD HOUSEKEEPING.</p>
<p><b>BAT 3 and 4</b> FEEDING SYSTEM</p>	<p>In order to minimize the impact on the environment, the Green Farms use a phased feeding system for poultry. Mixed feeds are supplied from the company's own plants, where special attention is paid to the quality of the feedstocks used in the production of feeds, as well as the selection of plant additives, which results in adequate absorption of nutrients by birds and reduces the excretion of nitrogen and phosphorus.</p> <p>THE GREEN FARMS COMPLY WITH BAT REQUIREMENTS FOR THE FEEDING SYSTEM.</p>

BAT Conclusions	Compliance with BAT requirements at installations Green Farms
<p><b>BAT 5</b> EFFICIENT WATER USE</p>	<p>Operators of Green Farms ensure efficient water use by using a variety of techniques, as indicated in the BAT conclusions, including:</p> <ul style="list-style-type: none"> <li>☒ by cleaning poultry premises at the end of the poultry growing cycle with pressure washers, which significantly reduces the amount of water used;</li> <li>☒ by using automatic, high-efficiency watering systems, using nipple drinkers with drip bowls to prevent water spillage</li> </ul> <p>THE GREEN FARMS COMPLY WITH BAT REQUIREMENTS FOR EFFICIENT WATER USE.</p>
<p><b>BAT 6 and 7</b> EMISSIONS FROM WASTEWATER</p>	<p>In order to reduce the amount of industrial wastewater generated in the cleaning of livestock facilities at the end of the growing cycle, the buildings are pre-cleaned without water using high-efficiency machinery and equipment. Then they are vacuumed to remove dust pollution. After these preparations, the facility is then washed using pressure washers, which use small amounts of water. The industrial wastewater that is generated is drained to septic tanks and then taken to a wastewater treatment plant.</p> <p>THE GREEN FARMS COMPLY WITH BAT REQUIREMENTS FOR WASTEWATER EMISSIONS.</p>
<p><b>BAT 8</b> EFFECTIVE ENERGY USE</p>	<p>In order to ensure efficient energy management at Green Farms, photovoltaic panels are installed to provide green energy for poultry growing facilities. In addition, high-efficiency heating and ventilation systems are operated in compliance with the requirements of the BAT conclusions. Livestock buildings use automatic ventilation, heating, and cooling systems that operates depending on the prevailing indoor temperature, CO<sub>2</sub> concentration, and humidity. In addition, by performing inspections and maintenance of equipment on schedule, Green Farms ensure its proper operation and eliminate unjustified excessive energy consumption.</p> <p>THE GREEN FARMS COMPLY WITH BAT REQUIREMENTS FOR EFFICIENT ENERGY USE.</p>

BAT Conclusions	Compliance with BAT requirements at installations Green Farms
<p><b>BAT 9 and 10</b> NOISE EMISSION</p>	<p>Good practices are established in order to reduce noise emissions, which include:</p> <ul style="list-style-type: none"> <li>☒ conducting poultry growing in closed premises;</li> <li>☒ using high-efficiency, low-noise fans;</li> <li>☒ using soundproof housing for generator sets;</li> <li>☒ planting isolating vegetation strips on the side of the nearest residential buildings.</li> </ul> <p>In order to confirm the assumed effects, periodic noise measurements are carried out once every two years at the locations of the nearest residential buildings.</p> <p>THE GREEN FARMS COMPLY WITH BAT REQUIREMENTS FOR NOISE EMISSIONS.</p>
<p><b>BAT 11</b> PARTICULATE MATTER EMISSIONS</p>	<p>In order to minimize particulate matter emissions, the operator of the installations has applied a number of modern technical and technological solutions:</p> <ul style="list-style-type: none"> <li>☒ using straw pellets as mulch;</li> <li>☒ using water fogging systems for poultry growing premises; and</li> <li>☒ ensuring airtightness in the process of unloading feed from feed trucks.</li> </ul>
<p><b>BAT 12 and 13</b> ODOUR EMISSIONS</p>	<p>Due to the classification of odour as one of the key factors affecting the assessment of the nuisance of installations related to poultry farming, Wipasz S.A. pays special attention to the prevention of the formation of odor-forming compounds by applying the following solutions:</p> <ul style="list-style-type: none"> <li>☒ increased bioassurance;</li> <li>☒ ensuring a high degree of poultry growing hygiene;</li> <li>☒ an advanced phased feeding system based on low-protein feeds;</li> <li>☒ a computerized ventilation system based on continuous measurements of air composition in livestock premises, which ensures optimal air change rate;</li> </ul>

BAT Conclusions	Compliance with BAT requirements at installations Green Farms
	<ul style="list-style-type: none"> <li>☒ keeping the bedding dry, which reduces decay processes;</li> <li>☒ planting vegetation strips as areas that adsorb odor compounds; transfer of manure directly to recipients, without storage at the farm.</li> </ul> <p>THE GREEN FARMS COMPLY WITH BAT REQUIREMENTS FOR POSSIBLE ODOUR EMISSIONS</p>
<p><b>BAT 14, 15, 16, 17, 18, 19, 20, 21, and 22</b> EMISSIONS TO AIR FROM STORAGE AND AGRICULTURAL USE OF NATURAL FERTILIZES</p>	<p>Not applicable. Manure is not stored at Green Farms. Manure is removed directly, at the end of the production cycle, from livestock buildings and transferred for direct use.</p>
<p><b>BAT 23, 24, 25, 26, 27, 28, and 29</b> EMISSIONS AND PROCESS PARAMETERS MONITORING</p>	<p>The operator of the installation monitors the level of pollutant concentrations in the air on an ongoing basis by measuring the basic compounds. In addition, the amount of nitrogen and phosphorus generated is estimated once a year based on tests of the manure produced. Also, monitoring of the parameters of the growing processes is carried out on an ongoing basis.</p>

**Table 1. BAT requirements met in the Green Farms area**

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# Zero waste — many areas, one goal!

**Maciej Stawicki – Deputy Sales Director, Meat Division Wipasz S.A.**  
**Anna Szmyglewska-Wrzecion – Office Manager Wipasz S.A.**

Over the past few years, the trend of changing consumer awareness has become noticeable. A responsible customer is aware of the costs to the planet that occur in the process of food production. These costs are not only carbon footprint and water and energy consumption, but also greenhouse gas emissions during the food disposal process. According to studies, more than 40% of food waste is generated in households and each kilogram of wasted food generates about 0.7 kg of CO<sub>2</sub> that is released into the atmosphere.

Retail store chains support consumers in implementing the necessary changes and adjust their offer to meet the requirements imposed by the market. The food industry is environmentally aware and wants to do business in a sustainable way by becoming an environmental trend setter.

More and more chain stores, but also local bakeries, restaurants, and even fuel stations, introduce solutions aimed to reduce food waste. They have a wide range of possibilities in this area, from discounting goods with short expiration dates on store shelves to making ready-made food packages available for purchase with smartphone applications.

Żabka, a popular retail chain in Poland, has launched the Dobra Paczka campaign, which involves offering surprise packages, the selection of which is made through the store's app. Before buying, the consumer only learns about the category of products that the package will contain. The package content includes three full-value products, which are most often ready-made lunch dishes, sandwiches, or salads. The packages contain products that expire on the next day. A Dobra Paczka package can be bought with a discount of 50% off the standard price.

The Carrefour store chain has also launched a similar program. In cooperation with the company that offers the Too Good To Go app, Carrefour has saved half a million packages of surplus food from being disposed in the past two years. The users of the app are provided with a simple tool for finding where they can buy the day's unsold surplus food. Thanks to the app, they can also learn how the food packages they bought contributed to reducing the emission of CO<sub>2</sub>e (carbon dioxide equivalent) into the atmosphere.

The popularity of food sharing apps continues to grow among consumers, but also among businesses, for whom it is one of the few possibilities to reduce food waste and partially recover the costs of the products that would otherwise not be sold at regular prices. However, retail chains have found another solution to this problem: unsold surplus food is very often donated to aid organizations.

However, the implementation of the concept of corporate social responsibility has not always received adequate support in existing legislation. We remember the high-profile situations reported by the media about a dozen years ago where business owners who donated food products free of charge were required to pay VAT for the products they donated.

Today, being a donor, i.e. meeting the conditions for being considered a food sector company according to the broad definition provided in European regulations on the general principles and requirements of the food law of 2002, not only makes a company exempt from paying VAT on its donations, but also allows it to report the value of its food donation as a deductible expense.

The condition for the donation to be exempt from VAT is that it be made to a public benefit organization, as defined in the Act of 2014 on public benefit activities and volunteerism, and that the donation be used for the charitable activities carried out by such an organization. The current legislation thus ensures legal safety of the donor's decision to donate food.

On the other hand, universally applicable regulations require specific entities to donate food. The Act of 2019 on food waste prevention mandates large stores (with the area of over 250 m<sup>2</sup>) to donate unsold but good-quality food items to charitable organizations. Business owners are obliged to sign contracts with such organizations. Moreover, if food is not donated, stores must pay a fee of PLN 0.10 for each kilogram of food wasted. Additional responsibilities include conducting information and education campaigns, submitting annual reports on the amount of food wasted, posting information on the amount of the food waste fee due or the value of the food donated to NGOs in the financial reports and on the retail companies' websites, if they have them.

The zero waste concept is increasingly beginning to include the issue of packaging as well, where the goal is to generate less waste and use reusable and recycled packaging. In addition, retail chains commonly use appropriate labeling to help customers sort waste correctly. New packaging solutions appear in increasing numbers on store shelves. We are proud that Wipasz S.A. is also involved in these efforts. Thanks to our close cooperation with the LIDL retail chain, we have been able to offer Polish consumers meat in a paper trays packed in a protective atmosphere. This tray reduces the use of plastic by as much as 80%, but also allows recycled materials to be used in its production. We

use this solution to package our Green Farms brand products. However the Green Farms are about more than just packaging: they are a coherent philosophy that consists of an elaborate idea of modern poultry production.

When it comes to packaging frozen products, we are looking for alternatives to the commonly used plastic film packaging. In this case, the Functional Barrier Paper Packaging for Frozen Food may be the solution, as it allows food to have the same shelf life as traditional packaging.

Such packaging is starting to become available in the Iceland retail chain in the UK, which should be seen as a step toward achievement of the chain's goal of eliminating plastic packaging from private label products by the end of 2023. The #TooCool ForPlastic awareness campaign has effectively reached a wide range of current and prospective customers of the chain. The campaign is just one example of an activity that can raise consumer awareness and there is no doubt that the entire sector is now going in the same direction. In addition to introducing new packaging solutions to reduce plastic use, many retail chains promote environmentally friendly shopping habits by allowing their customers to purchase loose products that they put in their own reusable packaging. Special reusable bags can be found in vegetable and fruit departments. This serves one purpose: to effectively reduce the use of disposable bags and properly manage plastic waste.

The road to zero waste leads through many areas: combating all forms of waste, thoughtful consumer choices, and turning away from mindless consumerism. We can achieve all these goals through a synergy of the efforts made by both companies and consumers.

# CHICKEN FROM THE GREEN FARMS

We care about the natural environment, which is why we have replaced plastic packaging with easily recyclable paper trays.

Each of our trays has as much as 80% less plastic!

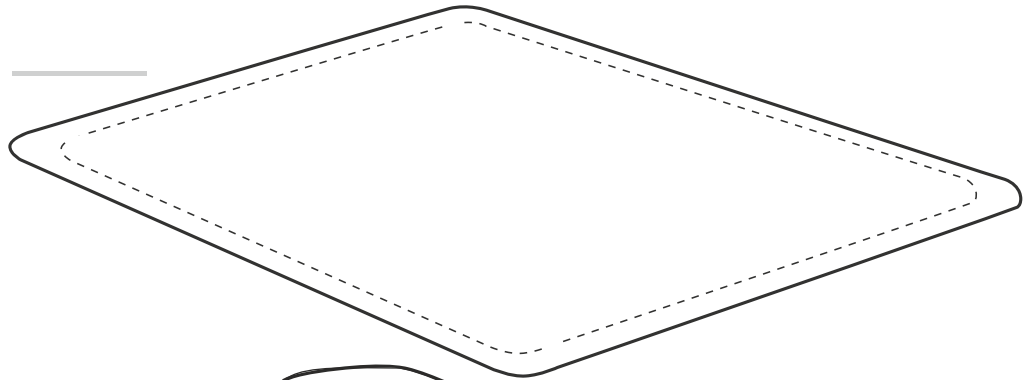
Interestingly, the tray itself was also made of recycled materials.





# Let's create a good climate

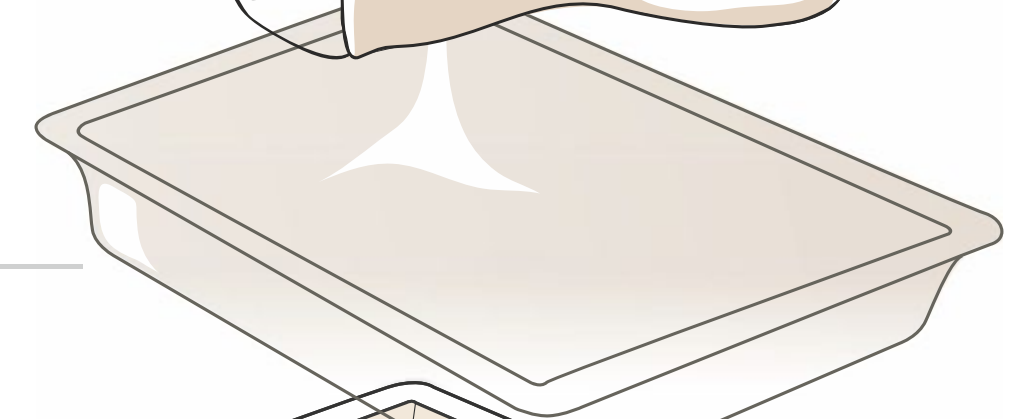
UPPER FOIL  
Throw it in  
the yellow container



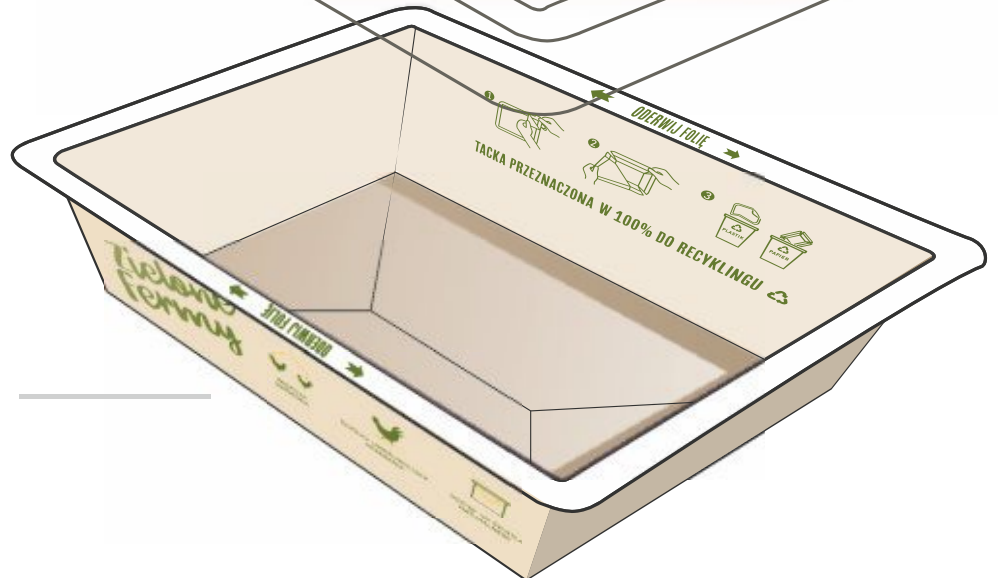
CHICKEN MEAT  
Prepare your  
favorite dish



TRAY LINER FOIL  
Throw it in  
the yellow container



PAPER TRAY  
Throw it in  
the blue container



# WIPASZ — more than a company: our common safety

**Dawid Dudek – Vice President, Sales&Logistics Meat Division Wipasz S.A.**

In our conversations, many customers ask us where the name Wipasz comes from and what it means. Due to language differences, when foreign customers hear the name Wipasz, they think it is spelled as 'Wipas' or 'Wipax'. However, after a brief conversation about the company and its owner and founder Józef Wiśniewski, they easily guess the answer. Another question asked is why the company's name is not associated with chicken, since we produce almost 1 000 tons of meat a day. The answer is that Wipasz S.A. is both a leader in the production of fresh chicken meat and the largest Polish producer of feed. Thanks to the full integration of the production process and the use of innovative technologies, we provide our customers with products that meet the highest quality standards from the field to the table.

We work on many levels to ensure the company's continuous development in the feed and meat divisions. Last year, we opened a modern Feed Plant in Międzyrzec Podlaski and a new premix line in Koło. We are currently expanding a new line of business in the meat division, namely processing, while at the same time developing the Green Farms – a project to build high-quality in-house feedstock facilities. The Green Farms will allow Wipasz to improve its operations in terms of production safety, vertical integration, and a guarantee of best quality – a testament to our greatness.

As part of our extensive cooperation with our customers, we currently offer not only fresh and frozen meat, but also a growing range of processed products in the convenience category. We are not limited to the fundamental certifications **IFS**, **BRC**, and **QS**. For the past few months, we have also been producing meat in compliance with the **ITW2** standard, we are a regular supplier to **KFC**, and we have recently joined the ranks of suppliers to

**McDonald's**. We face new challenges associated with obtaining more certifications and capturing the market share with our premium brand, the Green Farms Chicken. The brand has been sold successfully in Lidl stores throughout Poland for a year, but we also want it to become an export product line.

Exports are the main domain of Wipasz S.A.'s Meat Division and currently correspond to 80% of our production. We are happy about the growing interest in our products on the European market, as well as in other parts of the world. Contacts and building long-lasting relationships with our customers are key to the implementation of the sales strategy we have adopted. We work with our customers on a regular basis and appreciate those who have just become our new customers. The door of Wipasz S.A. is open to any potential business partner who really cares about reliable cooperation and appreciates the values that guide us.

The strategies we follow are based on almost 30 years of experience, as well as on our commitment and, most importantly, on close cooperation. We focus on the present and the future at the same time: in addition to current tasks, we develop plans for the company's development. Recent events, such as the outbreak of the avian flu, the COVID-19 pandemic, and the ongoing war in Ukraine have deepened our concern about the safety of our company, as well as all our employees.

Working at Wipasz S.A. involves a great deal of responsibility for those performing duties at every level. Currently, our company employs 3 500 people, who proudly call themselves a team. Everyone has a specific role and strives to achieve the set objectives. We emphasize the importance of cooperation among our employees and the importance



QS. Ihr Prüfsystem für Lebensmittel.



of good communication with our customers and business partners. It is all related to the safety of Wipasz and all our employees, as well as daily work for the company's development and investments.

The year 2023 is a time when, in order to raise the standards of customer service, we want to expand our Sales Department with more people who speak various languages. Today we can easily serve customers in English, Spanish, and French. The door to Wipasz is always open to ambitious, committed people who are not afraid of challenges. I also believe that, first and foremost, the willingness to learn how to work in our sales team is the most important quality for candidates who are planning to join us.

If you would like to join our team, email us at: [joinsales@wipasz.pl](mailto:joinsales@wipasz.pl)

Wipasz is more than a business. We go beyond the regular framework of production, marketing, and

trade. We are a manufacturer distinguished by our high quality and experience in exports. We currently sell our products to 79 countries using most of the existing sales channels. What is important is that in all the above-mentioned areas of our business we rely on passionate professionals, who are our key resource and strength, so we do everything to make them feel safe working with us and to instill their trust in us. All of our decisions are made based on an in-depth analysis with the future and stability of the company in mind. Without these fundamentals, we would not achieve high efficiency and outstanding results. The modern consumer wants to know more and more about animal breeding conditions and the environmental impact of food production. As a responsible company, we raise awareness among breeders about animal welfare. We are transparent and share our knowledge and information about modern solutions used in production, which we want to convey to consumers in Europe in an understandable way.



# Come & Join Our Team of Meat & Convenience Foods Sales!

We are recruiting:

- KEY ACCOUNT MANAGER
- NPD MANAGER
- NEW BUSINESS MANAGER

Interested? Email Your CV:

[joinsales@wipasz.pl](mailto:joinsales@wipasz.pl)



A handwritten signature in white ink that reads 'D. Dudek'.

V-ce President  
Wipasz S.A.

## ANUGA 2023 trade fair – looking forward to meeting you there!

For many years we have been inviting all potential customers to work with us. We want to get in touch with you, get you acquainted with Wipasz, and make our first deals. We encourage you to look for us too. We are planning to intensify our marketing as well as sales activities and will be present at many trade fairs, especially in Europe. We would love to meet our customers in person, as this is what we have missed the most since the outbreak of the Covid-19 pandemic.

Trade fairs outside of Poland are playing a key role for Wipasz in 2023: first, we are returning there after a period of absence and second, we are increasing our presence in places where we have not been before. We have already been present in France at the Sirha exhibition in Lyon, in Madrid

at the Meat Attraction, and in London at the IFE, where we had our own exhibition booth. We will also visit Tutto Food in Milan, the PLMA in Amsterdam, Halal Food in Manchester and London, Meat Expo in Belgium, as well as more remote destinations like VietFood&Beverage in Vietnam.

The most important event planned for this year, however, is the ANUGA trade fair in Cologne, where, as a major exhibitor, we would be delighted to meet with you. Our presence will be much broader than before! We will present a completely new idea of premium production. We will also show our new products, including the latest in the Convenience line. You are cordially invited to visit us and taste our delicacies prepared using only our own products from the Green Farms! Find us in **Hall 9.1 stand D-058**. We will talk, discuss many issues, and get to know each other better. We are looking forward to meeting you there!



# ANUGA 2023

HALL 9.1, STAND D-058

VISIT US!



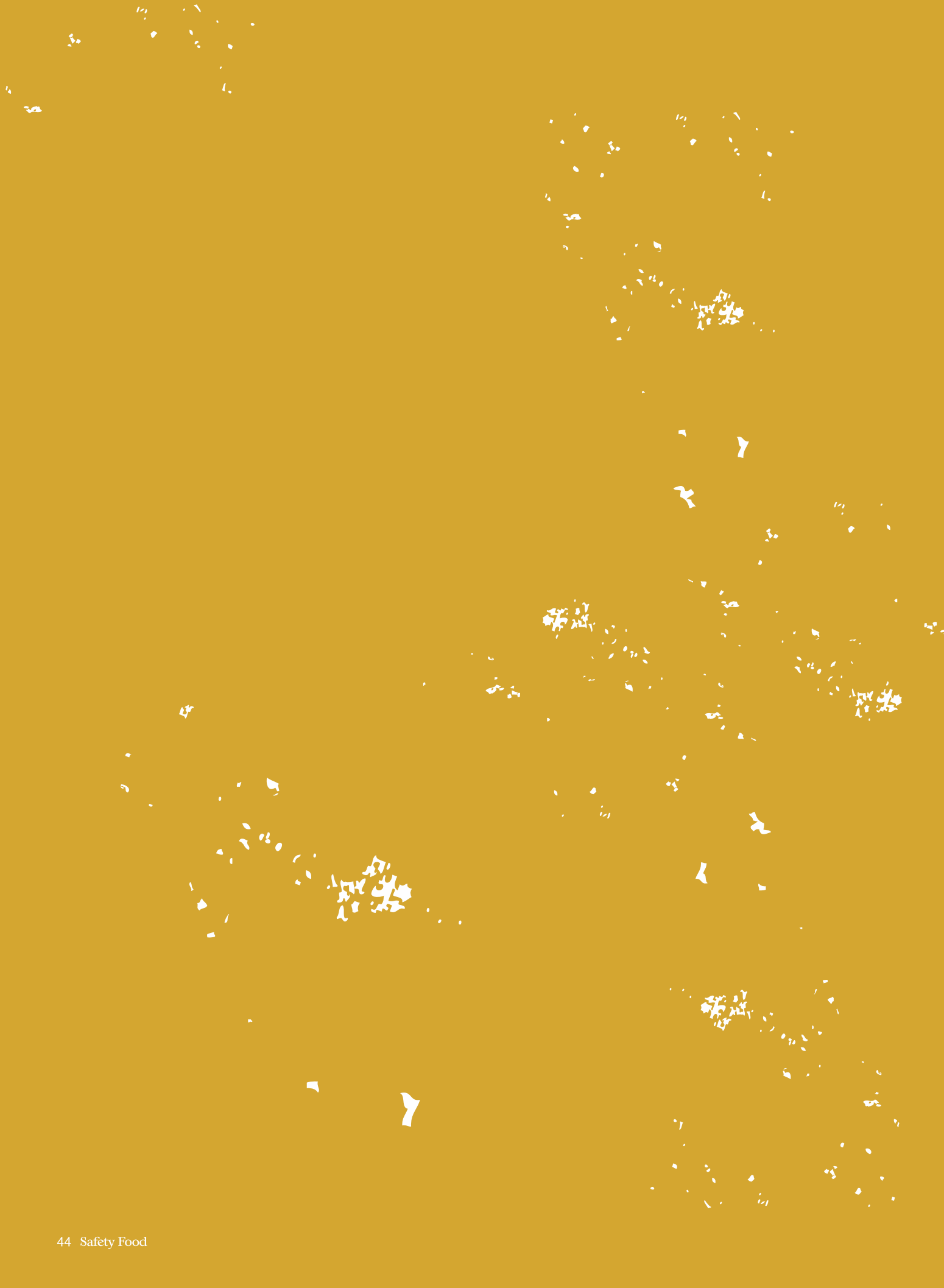
OCTOBER  
7-11, 2023



Cologne, Germany

# TASTE THE FUTURE





**In this section you will read:**

- How to reduce the carbon footprint in broiler production?



# How to reduce the carbon footprint in broiler production?

Enrique GONZALO – Innovation and solution manager | Innovation and Customer Solutions, METEX Animal Nutrition

William LAMBERT – Scientific & Technical Manager | Innovation and Customer Solutions, METEX Animal Nutrition

Stéphanie LECUELLE – NØØV-CS Business Manager | Innovation and Customer Success, METEX Animal Nutrition

Aneta ZIELENKIEWICZ-ZAWÓŁ – Area Sales Manager | Business, METEX Animal Nutrition

## Reduce environmental impact – a big challenge for poultry feed production

The European Commission aims to reduce by 50% the greenhouse gas (GHG) emissions from the EU by 2030, achieving to produce 'net-zero' emissions by 2050 (Vieira et al., 2021). This topic is especially important for Poland considering that it generates 10.5% of the EU's total GHG emissions [third place in Europe behind Germany (24%) and Italy (11%)] (Erbach, 2021). Moreover, Poland is the biggest producer and exporter of poultry products in the UE with nearly 3 million tons of poultry meat produced in 2022 (AVEC, 2022), where the feed represents 80% of the carbon footprint for broiler production. The excess dietary crude protein (CP) in broiler feeds related with the inclusion of soybean meal (SBM) may be linked to land-use change and therefore increase the carbon footprint through the increase of GHG emissions into the environment. Additionally, poultry sector represents 51% of SBM usage for animal feed consumption in Europe (FAOSTAT, 2020). Then, developing nutritional strategies that maximize the usage and efficiency of dietary protein resources represent a major objective to ensure sustainability of the poultry sector.

## Reducing dietary crude protein – a good tool to limit the inclusion of soya and maintain performances

Low-CP diets (LCP) are usually formulated by replacing protein sources, generally SBM, with cereals and feed-grade amino acids (AA) and possibly alternative protein sources and coproducts. Several studies have shown that a LCP

diet, when supplied with a balanced AA profile, can reduce dietary supply of SBM while maintaining the growth performance of the animals. A meta-analysis of 29 trials (n = 87 diets) was performed by METEX Animal Nutrition to evaluate the effects of dietary CP reduction on the dietary SBM content and the growth performance of broiler chickens, for which diets had to be run by companies from the poultry sector; iso-energetic and iso-digestible lysine within the same trial; at least at the assumed requirements for all dietary indispensable AA. The results of the meta-analysis showed that, per point of protein reduction, SBM inclusion was reduced (figure 1A), with at least similar growth performance, as shown by a constant average daily gain (figure 1B). Considering that Poland produced around 3.1 MT of broiler feeds in 2021, applying a dietary CP reduction of 1% point in all the diets would represent a saving of almost 230 kT of SBM/year, corresponding to 8% of the SBM imported in Poland (FEFAC, 2021).

## Reducing dietary crude protein with European AA – a beneficial impact on carbon footprint

In this meta-analysis, the impact of the dietary CP level on the carbon footprint of the animal feeds was also calculated using the feedstuffs inclusion of the diets multiplied by the carbon footprint of each feedstuff based on public databases such as GFLI (2019) and Agribalyse. As expected, the results showed that reducing CP in broiler diets had a great beneficial effect on carbon footprint, which was reduced by 5% on average per point of dietary CP reduction. Additionally, results also showed that the environmental impact varies according to the origin of production of feed-grade AA. Concerning



the origin of production, the AA from EU origin are lower in carbon footprint, considering that the CO<sub>2</sub> emitted per unit of AA produced is divided by 3–5 compared to non-EU country producers. As an example, 75% of the carbon footprint impact for L-Lysine of EU origin, is explained by the source of energy, sugar, and ammonia. Those ingredients

vary considerably between the different contexts of production. Then, the results of the meta-analysis showed that the positive effect on carbon footprint by reducing dietary CP is even more remarkable when using AA from EU sourcing (figure 2A), while the impact is much lower when feeds are using AA from a non-EU sourcing (figure 2B).

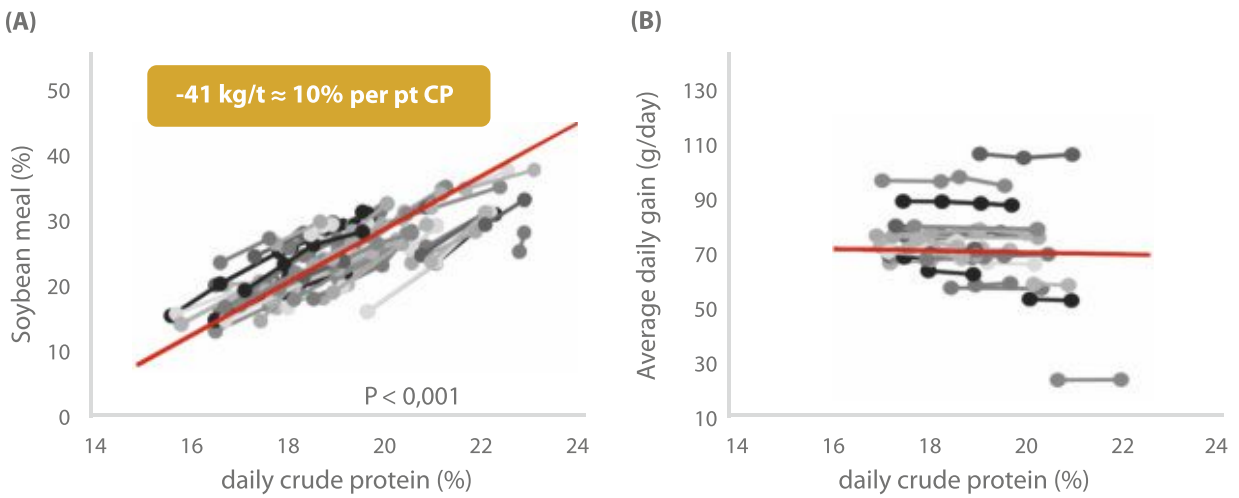


Figure 1. Effect of lowering dietary crude protein on soybean meal inclusion in the diets (A) and on the average daily gain of broilers (B). The red lines represent the model estimated by the meta-analyses (n = 87 diets; Nozeran et al., 2022)

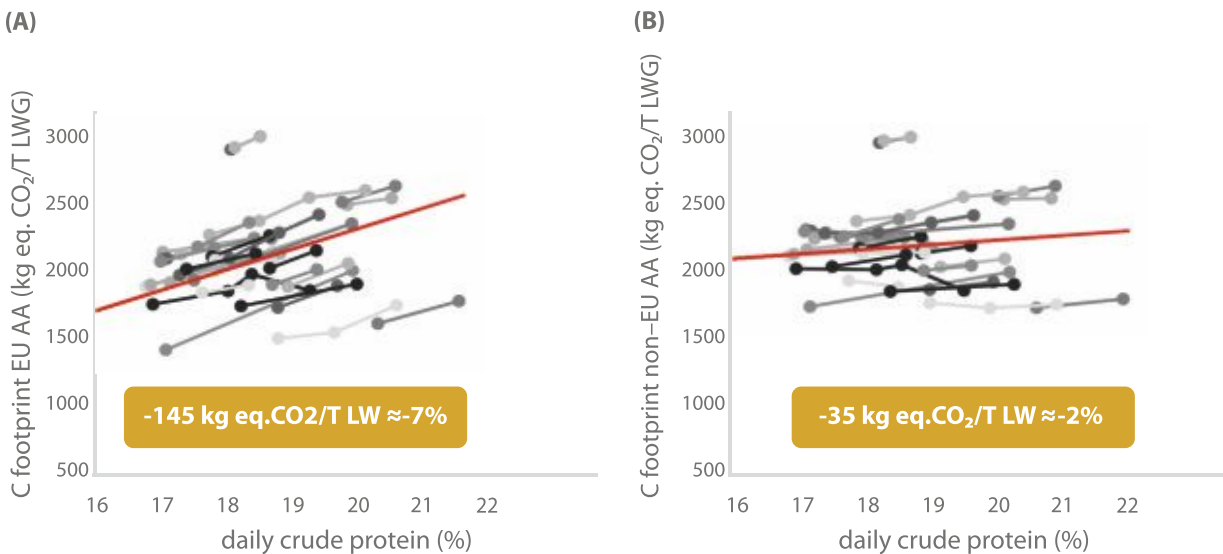


Figure 2. Effect of lowering dietary crude protein on carbon footprint (kg CO<sub>2</sub>-eq per T of body live weight gain of birds) for AA from EU sourcing (A) and non-EU sourcing (B). The red lines represent the model estimated by the meta-analyses (n = 29 experiments; Nozeran et al., 2022)

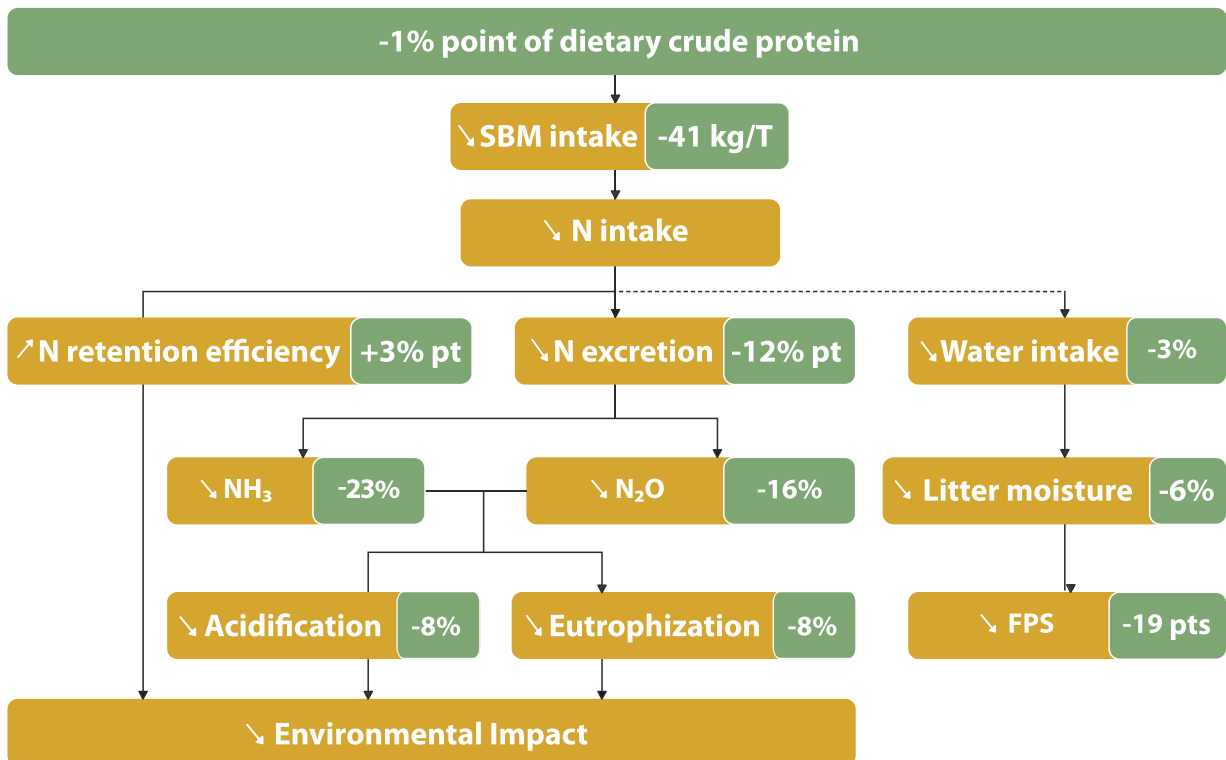
**Additional benefits by reducing dietary crude protein**

This reduction of dietary CP also resulted in additional benefits on the carbon footprint. In fact, results of the meta analysis showed that lowering dietary SBM consequently reduced dietary N intake, which had a two-fold beneficial effect. Firstly, N retention efficiency was increased by 3.3% per point of protein reduction. Secondly, the N excretion was reduced by 12%, which consequently reduced NH<sub>3</sub> by 23% and N<sub>2</sub>O by 6% per reduction point of CP, reducing by 8% both the terrestrial eutrophication and acidification. In addition to these benefits on the environmental parameters, the LCP strategy also presented a positive impact on animal welfare. In fact, results also showed that water intake was reduced by 3.1%, which entailed a reduction of litter moisture by 16%. Footpad score (FPS) is the reference scoring

(Minussi et al., 2020) to measure both incidence and severity of footpad dermatitis (FPD) in a flock. Then, the lower litter moisture entailed a reduction of footpad score (FPS) by 19 points per point of protein reduction.

A summary of these results are shown in figure 3.

In conclusion, these new results highlighted that lowering dietary CP, when using a balanced AA profile, is a successful strategy to mitigate the environmental impact in broiler production, while maintaining growth performance of the animals. The origin source of AA played an important role on climate change, where EU AA had a greater beneficial impact compared to non-EU AA, especially in the LCP scenario. These data represent a new leverage to maximize the carbon footprint for a sustainable poultry production and highlighted the value of a European AA based production.

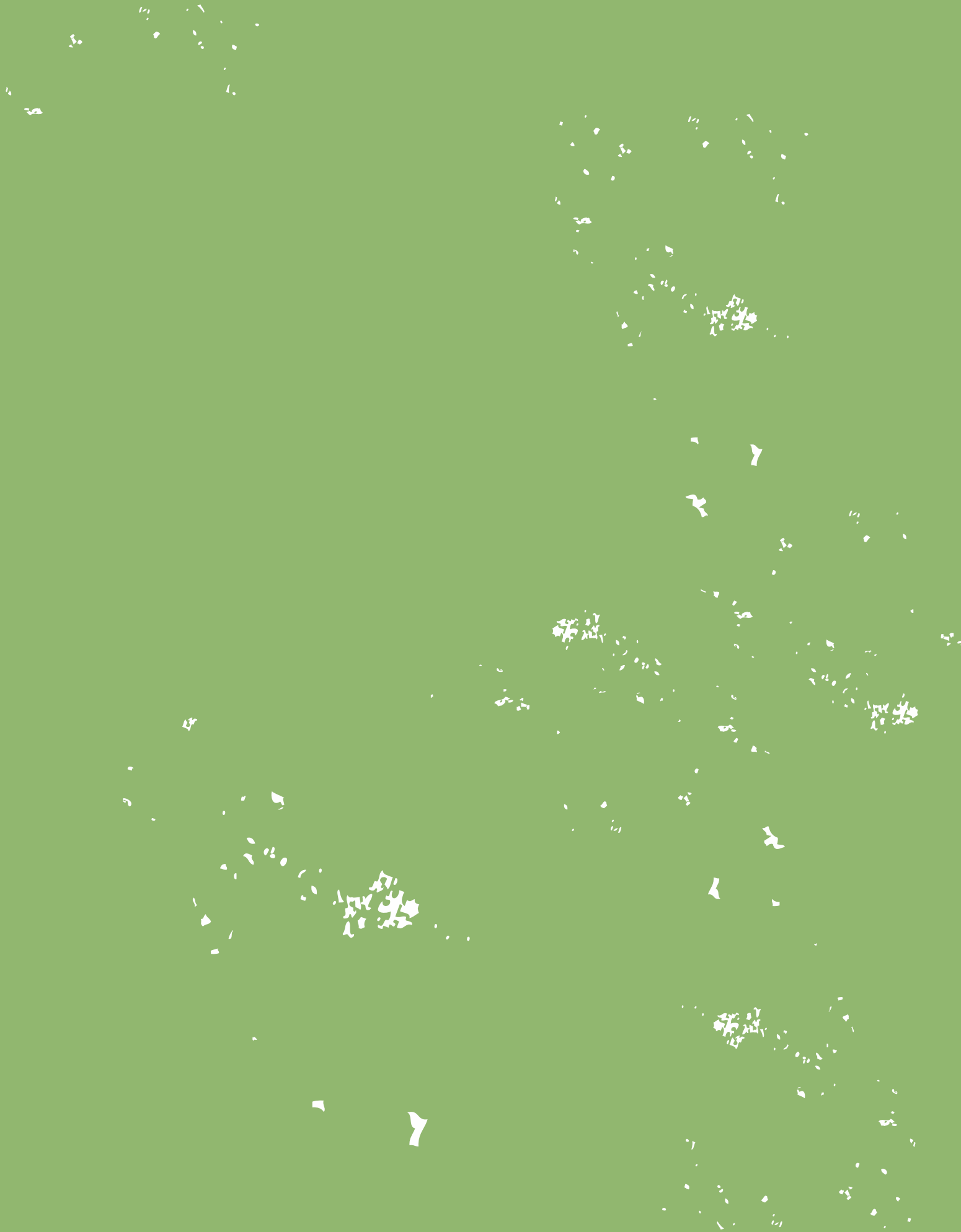


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**In this section you will read:**

- Polish protein – growing legumes in Poland



# Polish protein – growing legumes in Poland

**Sebastian Węgiński – Purchasing and Market Analysis Specialist Wipasz S.A.**

Plant proteins are a source of amino acids for livestock and are therefore an important component of feed and of vital importance to agriculture both in Poland and throughout the European Union. They are also increasingly consumed by people, with an annual increase of nearly 7% in their consumption worldwide. However, because there is a significant shortage of plant proteins in the European Union, most of the EU agricultural sector's needs are met through imports, among others of soybean meal. However, Polish farmers are able to replace 40% of currently imported soybean meal with Polish protein crops. The most common protein crops that are easy to grow in Poland are lupin, field bean, pea, and soya. To cover such a demand for soybean meal, it is necessary to produce 1.5 MLN tonnes of Polish protein by cultivating 400 000 hectares of crops!

However, the growth of the legume sector in the EU is hampered by several factors, including:

- ☒ the competition for arable land;
- ☒ the economic viability of these crops in Europe;
- ☒ the insufficient research on breeding, agronomic practices, and various applications;
- ☒ the competitiveness of EU protein crops in comparison with imported plant proteins;
- ☒ the agronomic conditions prevailing in Europe, which are not particularly conducive to large-scale production of plant proteins.

The European Green Deal (EGD) is a plan to remodel the European Union's economy to minimize the scale of consumption of natural resources

while maintaining international competitiveness. It also includes proposals for measures that will significantly affect the agricultural sector in the EU. These include restrictions on the use of plant protection products, fertilizers, and antimicrobial products, and are expected to stimulate the development of organic farming, to change the eating habits of Europeans, to protect and restore ecosystems, and to increase the biodiversity of natural resources. Adaptation of agriculture to comply with the requirements of the EGD, especially the 'farm-to-table' and 'biodiversity' strategies, which are key from the sector's perspective, the need to reduce the EU's dependence on imports of feed protein has been identified as fundamental to food security. Preparation of the ground to reduce imports of feed protein by about 50% was also the main goal of the programme 'Increasing the use of domestic feed protein for the production of high-quality livestock products in sustainable conditions' carried out in 2016–2020. This programme was a continuation of the programme 'Improving domestic plant protein sources, their production, marketing system, and use in feed', implemented from 2011–2015.

In both strategies, research was conducted on legume varieties, the agrotechnology of their cultivation, and the principles of feeding poultry and pigs using these crops. An analysis was carried out of the production and marketing of seeds of domestic protein crops, and, on this basis, the possibilities for shaping the legume market were estimated. In addition, the potential of permanent grassland (PGR) in protein production for ruminants was evaluated. The results were transferred to

breeders and farmers on an ongoing basis. The debate regarding the usefulness of the results of the two programmes mainly centers around the actual feasibility of using domestic feed protein in poultry and pig nutrition, as these are the animal groups most dependent on foreign supplies of feed protein.

The studies conducted in the course of the programme evaluated the nutritional value of domestic materials (field bean, soya, lupin, pea), including their energy content, digestibility, and content of macro- and micronutrients. Formulations of high-protein concentrates based on domestic protein sources and formulations of complete feed mixtures have been developed. The implementation

studies conducted with individual farmers and smaller farms have shown that Polish protein guarantees greater stability in terms of feed production costs compared to imported feed materials. Similar observations would have to be made on the volumes of large-scale production in order to speak with certainty about the potential of legumes.

Moreover, the implementation of plant protein production in the EU can not only bring economic benefits to farmers and food and feed producers in the long run, but also have a positive impact on the environment and climate. It is worth noting that high-protein crops contribute to the fixation of nitrogen from the air in the soil, and thus to a more balanced nitrogen cycle in the nature.

# Polish proteins

Protein crops that are easy to grow in Poland are **field beans, peas and soybeans.**



## Our commodity buying stations:

**Commodity buying station: Galwuny**  
Galwuny 19 A, 11-400 Kętrzyn  
tel. +48 89 751 04 47,  
kom. 661 605 108, 669 997 884  
woj. warmińsko-mazurskie

**Commodity buying station: Witkowo**  
Małachowo Kepe, 62-230 Witkowo  
+48 605 103 120  
woj. wielkopolskie


**Commodity buying station: Morąg**  
Al. Wojska Polskiego 35, 14-300 Morąg  
tel. +48 89 757 29 17,  
kom. 605-106-934  
woj. warmińsko-mazurskie


**Commodity buying station: Międzyrzec Podlaski**  
ul. Kościuszki 103 A  
21-560 Międzyrzec Podlaski  
tel. +48 83 371 59 93  
kom. 605-287-855, 887-076-036  
woj. lubelskie

**Commodity buying station: Krosno**  
Krosno 34, 14-400 Pasłęk  
tel. +48 55 248 20 37  
kom. 669-994-471  
woj. warmińsko-mazurskie

**Grain buying station: grain elevator Zadąbrowie**  
Zadąbrowie 301  
37-716 Orty  
kom. 669 994 479, 663 992 843  
woj. podkarpackie

**Commodity buying station: Kolo**  
ul. Składowa 21, 62-600 Kolo  
tel. +48 63 272 03 26  
kom. 661-605-107  
woj. wielkopolskie

 We recommend growing the determinate field bean varieties with light-colored seed shells due to their high content of nutrients and low content of anti-nutrients.

 Wipasz S.A. accepts only white pea seeds.

More on:  [www.wipasz.pl](http://www.wipasz.pl)

Despite very promising results, domestic protein still occupies second place as the basic source of protein in feed. It is true that in the last 10 years there has been an upward trend in the area of fodder legumes cultivation, but this has not translated into a satisfactory increase in the volume of production of this material. Observations have shown that farmers chose to grow legumes to improve soil structure and prepare a suitable site for the main crop, rather than for the sake of large-scale production of legume seeds.

A major obstacle associated with the large-scale use of this group of plants in the feed industry is financial and technological issues. For the feed industry, which supplies about 70% of the domestic market with feed, domestic protein is losing the competition to standardized soybean meal. There is still a shortage of large, uniform batches of seed that can be used by producers, thus ensuring balance and continuity in production. Small deliveries, an unorganized market, and non-uniform seed batches make the feed industry unwilling to accept the risks associated with their use in large-scale production for technological reasons. Legumes are mainly used in local processing and at the farms where they are grown. Currently, a key factor in the development of legume seed production is the creation of mechanisms and a market structure to ensure easy sales. The success of the legume seed market trade models proposed in the multi-year programme depends on whether other supporting measures are initiated, such as changes to legislation that will govern mandatory shares of domestic protein materials in feed.

An increase in seed production and sales can be influenced to a much greater extent by an increase in the area under cultivation for feed purposes, which is a prerequisite for improving self-sufficiency in plant protein production. A cooperation between the science community and the industry is necessary. The Ministry of Agriculture supports the cultivation of protein crops through, among other things, subsidies for their production. It is possible that higher EU subsidies will apply in the

near future. In addition, a programme is being implemented to subsidize processing companies that would engage in production of Non-GMO feed. Past experience shows that without stimulating the demand for domestic raw materials on the part of processing companies, the country's protein security will not improve. The profitability of growing field bean, pea, soya, or other crops depends on a number of factors, the most important of which are the production costs incurred, the yield obtained, and the selling price. However, there is no doubt about the potential of legumes. Wipasz S.A., as one of the largest Polish feed producers, is aware of how important it is to support the development of Polish protein production. Therefore, it meets the expectations of producers who decide to grow legumes in Poland and guarantees long-term cooperation, logistical support, and purchase at competitive prices.

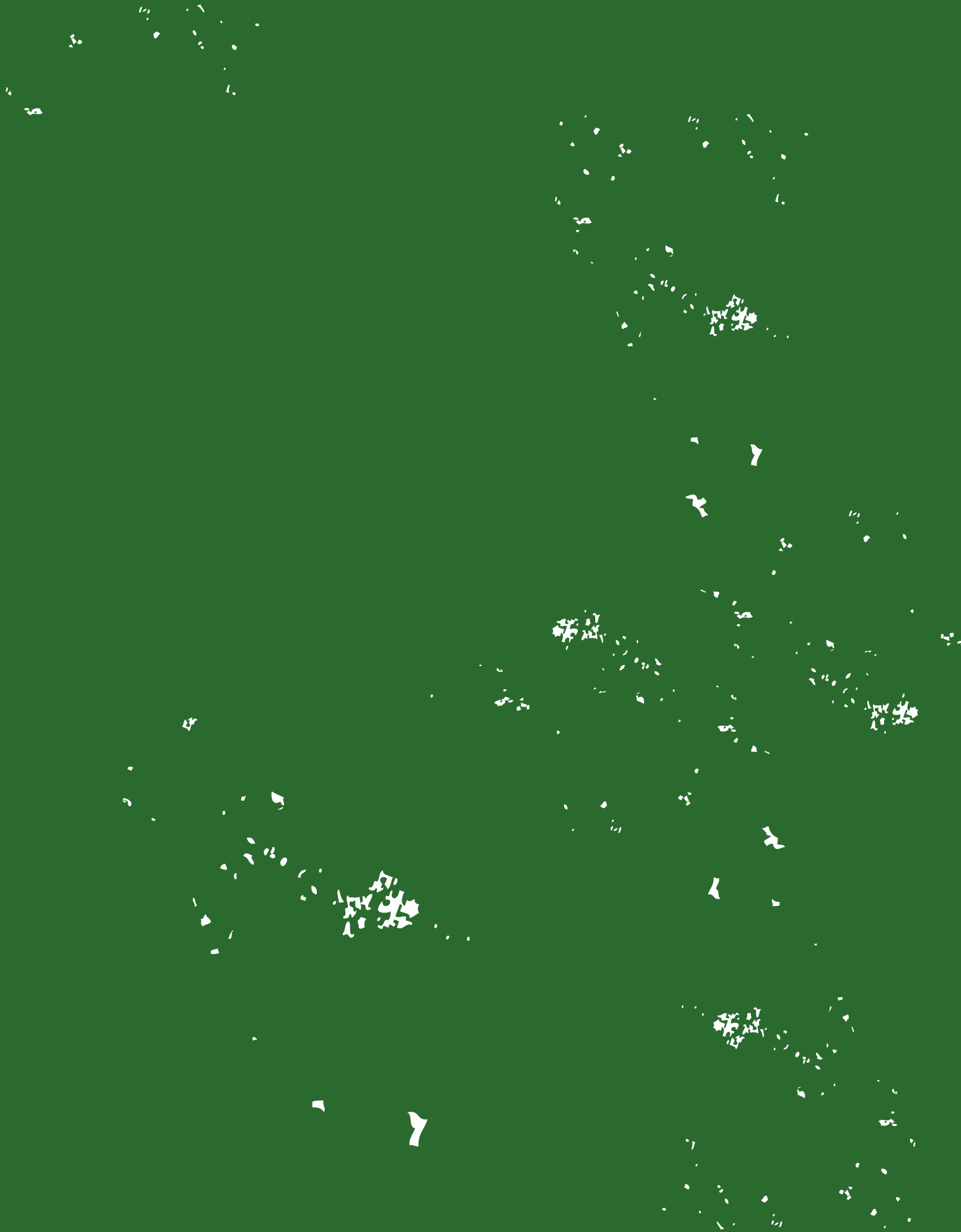
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**In this section you will read:**

- Animal welfare – a requirement or an opportunity to improve production results



# Animal welfare — a requirement or an opportunity to improve production results?

**Aleksandra Śmiałek, Natalia Orzechowska, Dominik Kuwerski – Veterinarians Wipasz S.A.**

Breeders' awareness of animal welfare is constantly improving and legally defined standards are stimulating changes in this area. However, one should look at animals' living conditions not through the lens of requirements, but as a basis for optimizing their potential and thus maximizing profits. The modern consumers not only attach great importance to the health safety of the food they consume, but also want to be sure that meat and other animal products come from farms where animals are treated with respect and provided with the best possible living conditions. The veterinarians working at Wipasz S.A.'s Veterinary Clinics have been cooperating closely with breeders for over a decade to minimize the possibility of diseases, stress, and injuries at their farms, among other things by improving the animal keeping system, proper disinfection, and attention to nutrition. Without special attention and expenditures to improve welfare, we would not be able to reduce or stop the use of antibiotics, or achieve satisfactory results.

**As a leader in poultry production, Wipasz has launched the Green Farms programme to meet consumer expectations and comply with the animal welfare policy of the European Green Deal.**

Due to the breadth of the topic, we will try to highlight selected problems that may result from deficiencies in various elements of broadly defined welfare on poultry and pig farms.

## **Stocking rate/density**

Due to economies of scale, breeding intensification and specialization allows for a more favorable distribution of production expenditures. Therefore, it only seemingly 'pays' to maximize the use of space in buildings by keeping there as many animals as possible. This approach is wrong as too high a density leads to losses.

According to various studies, increasing pig stocking rates from 0.8 to 0.6 m<sup>2</sup> per head results in a 15% increase in deaths and a 17% reduction in feed consumption. Keeping too many animals in a pen also prevents the formation of a permanent herd or flock hierarchy, thus increasing the likelihood of aggressive behavior.

Under current regulations, the stocking rate of broiler chickens in a chicken house is defined in kilograms of the weight of living chickens per square meter of usable area. The basic stocking density standard is 38 kg/m<sup>2</sup>. Nowadays, in order to improve the living conditions of broiler chickens, farmers often strive to ensure even lower stocking densities. In poultry facilities, platforms are set up to not only increase the usable area of the poultry house, but also satisfy the birds' natural need for safety, because being at a certain height, they do not feel the threat of potential predators.

Greater freedom also prevents the occurrence of aggressive behavior, scratches, and skin damage, which can be an 'entry gateway' for pathogenic microorganisms. Chickens have better access to feed and water, which makes the flock more balanced. Lower density also promotes better bedding quality, by allowing excessive moisture to evaporate and harmful gases to be released.

## **Animal keeping systems**

Currently, the law allows sows to be kept in individual pens for 4 weeks after insemination and until the 7<sup>th</sup> day before expected parturition. Pregnant sows should spend the remaining time in group pens, preferably with sows of the same weight. Although this system poses the risk of dominance and aggression from stronger sows, all studies indicate that it is more optimal as it reduces lameness, reproductive tract infections, and the MMA syndrome. Also, crateless farrowing pens,



despite the greater risk of crushing the piglets, may prove beneficial due to better access to the udder and thus higher weaning weights, as well as the overall better condition of sows after the weaning of the piglets.

In pig fattening, the no-bedding technology that uses openwork floors and manure tanks is very popular because of the limited labor requirements, as well as the ease of maintaining hygiene. Irrespective of these advantages, it is unfortunately not an optimal solution. As rooting animals, pigs are characterized by an ingrained behavioral need to manipulate their environment with their mouths. The lack of a suitable substrate in the form of soil or straw that would enable rooting does not allow for the expression of natural behavior, thus leading to mental disorders. These can take the form of biting tails, ears, or the sides of the body. To reduce this problem, animals should be provided with materials to manipulate in the form of straw baskets or suitable toys. Unfortunately, it has been proven that pigs lose interest after just 5 days of interacting with new objects, so it is a good idea to replace them periodically.

On broiler chicken farms, great attention should be paid to bedding to ensure animal welfare. There are many different types of bedding available on the market today, but the most important thing to bear in mind is that the cheapest and most readily available bedding can adversely affect the microclimate in the livestock building. A good bedding should perform 3 basic functions: insulation, water absorption, and dust control.

Bedding becomes moist in poultry houses for a variety of reasons, including:

- ☒ a leaky watering system;
- ☒ inadequate air circulation;
- ☒ insufficient air temperature;
- ☒ poorly balanced feed or health problems;
- ☒ excessive bird stocking per square meter.

Wet bedding contributes to a faster growth of pathogenic microorganisms and an increase in the concentration of ammonia in the air. Birds that stay constantly on such bedding suffer from ulcers of the foot pads and sores also on other parts of the body, i.e. legs or pectoral muscles.

One way to help prevent moist bedding is to spread for example cereal grains on its surface. The chickens' natural need to scratch the ground will cause the moisture to evaporate from the bedding, which will improve its condition. This will also provide the chickens with a material to focus their attention on, which will definitely reduce their stress level.

### Microclimate

Buildings and premises must be designed and equipped in such a way as to make it possible to ensure adequate temperature, air quality, and lighting for the animals. If the temperature is too low, the animals will expend more of the energy contained in the feed to warm up, which will reduce their growth. This is also particularly dangerous for young animals, as it leads to the occurrence of diarrhoea and, for example, edema in pigs, which results in a high death rate. Too high a temperature, on the other hand, causes heat stress, reduces feed intake, and increases the risk of aggression. High humidity (up to 70% for fattening pigs), as well as excessive content of gases in the air (carbon dioxide – 3 000 ppm, hydrogen sulfide – 5 ppm, and ammonia – 20 ppm) are an additional source of stress for pigs and also irritate the respiratory tract, thus contributing, along with microorganisms, to respiratory diseases. This results in losses due to poor growth, higher death rates, and medical costs.

Efficient ventilation of the building allows excess moisture and noxious gases to escape to the outside and ensures proper air composition. The smaller the difference between the composition of the atmospheric air and the air in the broiler house, the better the conditions for growing chickens.

The current regulations in this regard stipulate that a livestock building must be equipped with an effective ventilation system that provides a maximum concentration, measured at the level of the chickens' heads, of 20 ppm for ammonia and 3 000 ppm for carbon dioxide. The source of CO<sub>2</sub> in the building is the air exhaled by the animals and the fermenting bedding; when the stocking rates are exceeded or the bedding quality is poor, the level of CO<sub>2</sub> increases and the level of O<sub>2</sub> decreases.



Hypoxia leads to weakened immunity and deteriorated feed utilization because excess CO<sub>2</sub> in the air causes apathy and decreased appetite in birds.

Ammonia is a toxic gas for animals and humans, and has a negative impact on the environment. This colorless gas, with a characteristic strong odor, is formed as a result of decomposition of droppings and feed residues. The concentration of NH<sub>3</sub> increases with humidity and temperature in the building: the highest concentration can be found in the chickens' living area and its level depends on the efficiency of air change. This gas causes inflammation of the mucous membranes, the cornea, and the conjunctival sac, and lowers the birds' immunity, making them more susceptible to infectious agents. Excess ammonia leads to shortness of breath and even paralysis of the respiratory center. Maintaining the right microclimate in buildings where birds are kept is crucial for the proper functioning of the birds' bodies. The conditions in livestock buildings should be appropriate and suitable for the different stages of growth and development.

Birds, especially in the nestling period, are very sensitive to low temperature, which is due to the fact that they have not developed their thermoregulation centers yet. When the temperature is too low, hypothermia and reduced immunity result, with diseases and above-normal death rates as a consequence. The body begins to use energy to warm itself instead of using the nutrients in the feed. The result is an elevated FCR at the end of the production cycle. Therefore, at the time of chick placement, special care should be taken to ensure that the building is properly heated and thermally insulated.

If the ambient temperature is too high, birds are uncomfortable, which contributes to a decrease in their feed intake and growth rate. When the body is unable to release excess heat to the environment due to excessive temperature, dangerous overheating (heat stress) of birds occurs, which worsens the welfare and performance of poultry. It leads to rapid and numerous deaths in a short period of time.

The impacts of temperature and humidity on animals must be considered together. At the same

temperature, the body's response changes depending on the humidity. The perceived relative humidity is closely related to temperature: the optimal level of the former in a poultry house is 60–80%.

### **Feed and water availability**

It goes without saying that in order to achieve optimum performance, animals must be provided with food that covers their living and production needs. One must not forget to ensure free access to clean water, as its restriction would not only reduce feed intake, but would also cause additional stress and even aggression. Irregular feed intake promotes stomach ulcers and sudden deaths associated with anaerobic bacteria. In such a situation, it is worth considering whether the installed feeders are sufficient in relation to the number of pigs in the pen. The same is true of water, which provides the environment in which all reactions in life processes take place and plays an important role in, among other things, digestion and thermoregulation. The daily need for water depends primarily on the animal's body weight, age, and physiological state. The water flow rate is also important: if it is too low, this leads to impatience and intensifies competition for the drinking troughs, and if the water pressure is too high, especially in the case of young animals, this frightens and stresses them.

### **Stress – a common denominator**

In nature, stress is a natural response of animals to threats that stimulates them to fight or flee (an active response) or to stay motionless (a passive response). Farm conditions, if the needs of animals are not met, can lead to discomfort and be a source of prolonged stress. A prolonged passive response leads to an increase in the blood levels of corticosteroids, which are hormones produced by the adrenal cortex. If released in excess quantities, they weaken the body's immunity, thus increasing susceptibility to disease and reducing the effectiveness of treatment, and also having a negative impact on reproduction. In addition, stress promotes aggressive behavior that can lead to injuries. Wounds are easily infected, thus raising the rate of lameness, death, and carcass confiscation. Aggressive animals, as well as those bitten and in need of



care, should be isolated, which results in a shortage of space in separation pens when cannibalism is high. It is worth noting that the first signs of agitation among animals (excessive activity, surrounding and biting farm workers entering the pen) should be considered as a warning and may be the last moment to take effective corrective action.

**Future prospects**

In recent years, consumer preferences for the

products they choose have been changing. Food products are expected to come from farms that take care of the animals' living conditions and ensure their welfare during growth. Wipasz S.A., with consumers' health in mind, sets the only proper direction for animal husbandry, which testifies to the highest standards adopted by the company. Changes in European and national legislation also force breeders and meat producers to meet new expectations that affect the quality of their products.

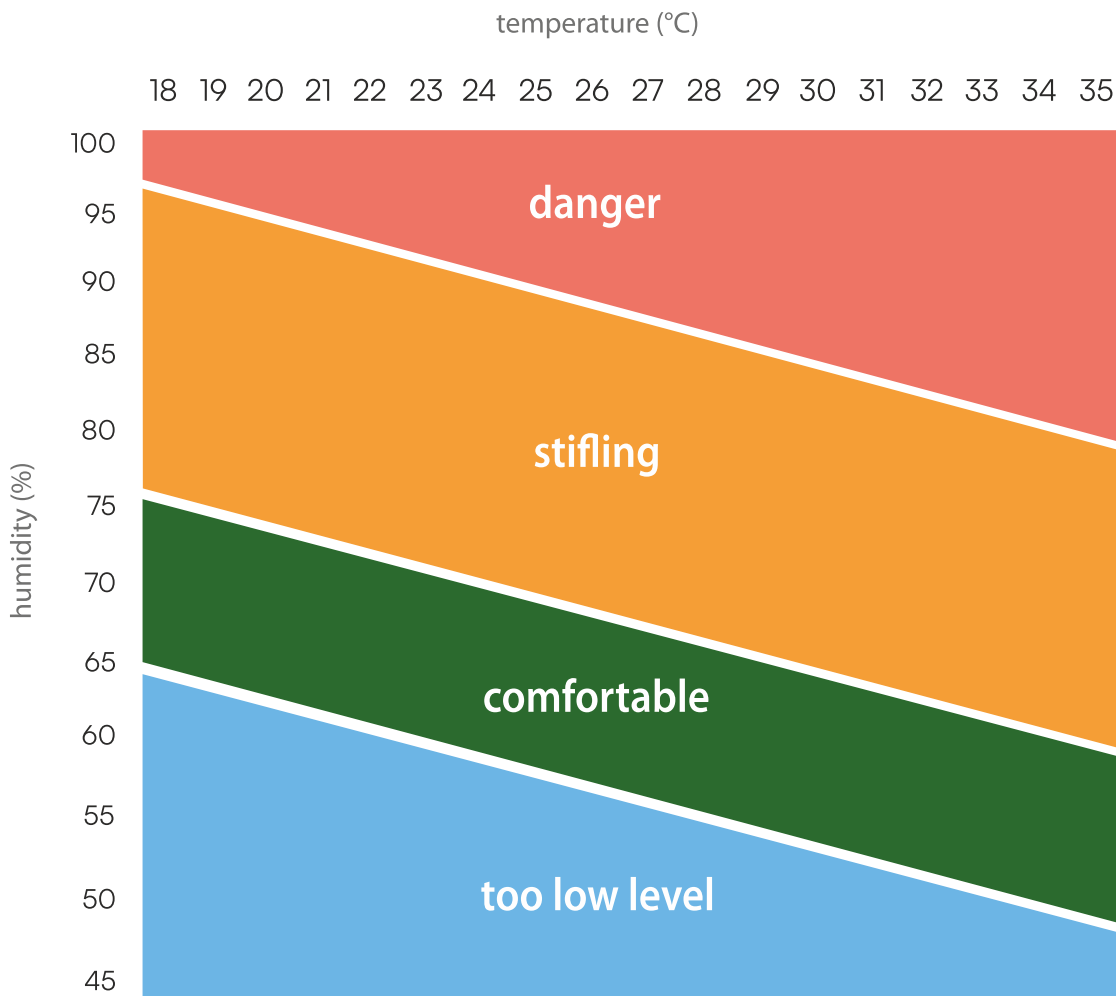
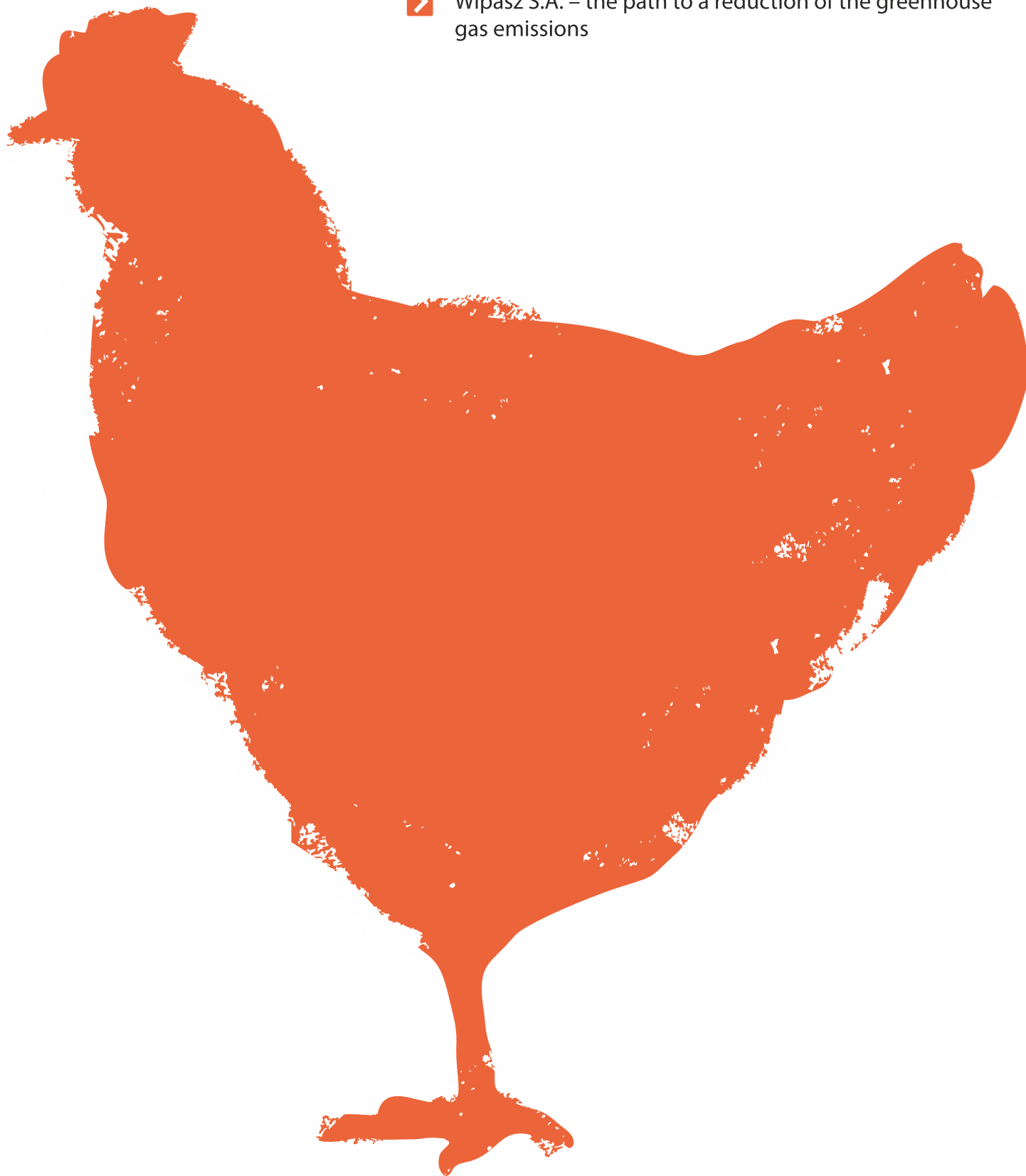


Figure 1. Optimum temperature and humidity levels in the livestock facility



**In this section you will read:**

- Water and its importance in poultry production
- Wipasz S.A. – the path to a reduction of the greenhouse gas emissions



# Water and its importance in poultry production

**Karolina Karbowska – Regional Director, Poultry Sales Department Wipasz S.A.**

Water undeniably plays a very important role in poultry production. Depending on the age and size of the chicken broiler, and the environment it is in, its body consists of 68–78% water, which is essential for its proper functioning. It is involved in such processes as transporting nutrients, maintaining normal body temperature, and removing metabolic products. Due to a number of functions water performs in the body, good water quality is essential for proper and efficient broiler production.

The amount of water consumed should be greater than the feed intake by about 1.6–2 times. This proportion can change if the temperature in the building fluctuates or depending on the health of the flock. The ideal water temperature should be 10–14°C and should not exceed 25°C. If the water temperature is so high, it is recommended to flush the watering line 3 times a day. On the other hand, too low a temperature can lead to hypothermia, and energy from feed will be used to heat the bird's body instead of increasing its weight.

The farmer must provide the birds with easy access to the watering line so they can drink as much as they need. The quality of drinking water is defined by EU Directive 83/90 on water quality for humans. In Poland, it is specified in the Regulation of the Minister of Health of December 7, 2017 on the quality of water intended for human consumption. However, a regulation on the quality of water for animal consumption has not been adopted.

The indicators of good drinking water quality are:

- ☒ purity;
- ☒ appropriate pH;
- ☒ no smell or taste;
- ☒ content of minerals;
- ☒ the degree of microbial contamination.

Birds are sensitive to the presence of components such as iron and magnesium, which cause the water to have a bitter aftertaste and, as a result, may reduce water intake. In addition, the presence of these minerals can promote bacterial growth. The use of appropriate filters or chlorination solves the problems caused by the presence of iron.

A test result that shows excess chlorides may indicate contamination with wastewater. Exceeding 75 mg of calcium in 1 liter of water negatively affects the absorption of nutrients, as well as medicines. Excessive magnesium content levels can cause indigestion and diarrhoea. Excess content of nitrates, nitrites, iron, and sulfur in drinking water are also dangerous. Water in which the permissible levels of macro- and micronutrients and their compounds are exceeded can also damage the watering system itself.

Water for chicken broilers must be free of contaminants and bacteria. In order to determine its purity, tests are carried out for the presence of pathogenic microorganisms, including the *E.coli* bacteria – high levels of these bacteria can cause disease in birds. The effectiveness of a decontamination programme can be estimated based on tests.

Water testing should be done regularly, at least once a year. The table below shows the organoleptic and physicochemical requirements that drinking water intended for farm use should meet. Water samples should be collected in sterile containers at both ends of the watering system and then analyzed in a laboratory accredited for this type of testing. When taking water samples, care should be taken not to contaminate them.

It is important that all animals have access to pure and fresh water, as water shortages can lead to

lower productivity, as well as an increased susceptibility to diseases. Lack of access to water can result in diarrhoea in animals. In the case of chicks placed in livestock facilities, lack of access to water is not acceptable. An insufficient amount of water leads to a slowdown in the process of transport of feed, which consequently leads to less feed intake and reduced growth.

The watering system must be cleaned, disinfected, and flushed before the next placement begins. Considering the problems occurring during rearing, such as a change of smell and taste, a decrease in appetite, a decrease in growth, defects in watering equipment, and formation of a biofilm, it is necessary to react immediately to restoring the efficiency and hygiene of the bird watering system.

Parameter	Parametric value	Unit
aluminum (Al)	200	µg/l
ammonium ion	0.50	µg/l
color	accepted by consumers and without abnormal changes	
chlorides	250	mg/l
manganese	50	mg/l
turbidity	accepted by consumers and without abnormal changes; recommended value range up to 1.0	NTU*
total organic carbon (TOC)	without abnormal changes	
hydrogen ion concentration (pH)	6.5–9.5	
electrical conductivity	2 500	µS/cm
sulfates	250	mg/l
taste	accepted by consumers and without abnormal changes	
sodium	200	mg/l
oxidizability with KMnO <sub>4</sub>	5.0	Mg/IO <sub>2</sub>
smell	accepted by consumers and without abnormal changes	
iron	200	µg/l

\*Nephelometric Turbidity Unit

**Table 1. Organoleptic and physicochemical requirements that must be met by drinking water intended for farm use (Journal of Laws of 2017, item 2294)**

# Wipasz S.A. – the path to a reduction of greenhouse gas emissions

**Dariusz Antończyk – Training and Improvement Services Manager, Central Europe, LRQA**

The topic of environmental protection and natural disaster prevention has been an extremely important and high-profile topic in the past few years. Environmentalists raise our awareness and encourage us to do even the simplest things, such as sorting waste and saving electricity. Manufacturing companies need to do more than households, due to the scale of their environmental impact. Wipasz S.A. met customer expectations and followed the latest market trends as early as in 2022 by calculating the carbon footprint of its poultry farm located in Kwasówka. A company's calculation and awareness of its carbon footprint is a key first step in the process of reduction of greenhouse gas emissions, which for Wipasz is a long-term goal consistent with European Union's policy and strategy for the years to come.

## What is carbon footprint and why should it be calculated?

Carbon footprint is a measure of the total greenhouse gas emissions during the full life cycle of a product: from the production of raw materials to shipping of the product to the consumer. Carbon footprint can also be calculated for companies. Also, every person affects his or her own carbon footprint with our daily decisions and actions. One's carbon footprint can be reduced, for example, by using environmentally friendly methods of transportation and heating, and by repairing products instead of buying new ones. Gas emissions can be divided into direct – emissions by an entity, and indirect – resulting from the actions of suppliers and partners.

Calculation of emissions builds awareness within organizations and across the industry of the environmental impact of the company and its products. The smaller the carbon footprint the bet-

ter. Poland, as a member of the European Union, is obliged to take measures to reduce greenhouse gas emissions by 55% by 2030 and to achieve zero emissions in 2050.

The calculation of carbon footprint is also a part of ESG (Environmental, Social and Corporate Governance) reporting, which will become mandatory for all entities in Poland in the next few years.

## The carbon footprint of Wipasz – Kwasówka plant

Wipasz has carried out a full calculation of its carbon footprint. Specifically, it has calculated the carbon footprint for the following three scopes:

- ☒ Scope 1 – direct emissions;
- ☒ Scope 2 – indirect emissions (purchased energy and steam);
- ☒ Scope 3 – all other indirect emissions generated in the supply chain.

The results are shown below:

Scopes	2021 [kgCO <sub>2</sub> e]
Scope 1	909 192
Scope 2	383 004
Scope 3	61 018
<b>Total emission GHG</b>	<b>1 353 214</b>

The above value should be compared with the quantity of the company's products. Therefore, the carbon footprint per unit of finished product was calculated for the entire product life cycle:

Product name	kgCO <sub>2</sub> e/kg 'From farm to slaughterhouse'
'Poultry livestock – chicken broiler'	<b>1.271</b>

On the basis of publicly available data, it can be concluded that this result makes Wipasz a leader in low-carbon production in its sector. The calculation was carried out with the participation of the international consulting and certification company LRQA (formerly Lloyd's Register). This ensures that the calculation was carried out in accordance with current requirements and regulations, and demonstrates Wipasz's professional approach to sustainability.

LRQA is a global service provider in the compliance assurance and certification sector. LRQA, which spun off from Lloyd's Register in 2021, provides services including certification, training, and consulting in the area of management systems and industry, legal, and normative regulations.

"The Wipasz team was very committed to diligently preparing all the information necessary to calculate the company's carbon footprint. The data we received allowed us to accurately calculate the emissions level of the Kwasówka plant. We are

proud to work with Wipasz as a leader in low-carbon, environmentally friendly production, and we have provided our calculations as well as our recommendations with full responsibility to jointly carry out the next steps on the way to a reduction of CO<sub>2</sub> emissions," commented Dariusz Antończyk, the Improvement Projects Manager at LRQA Poland.

The detailed report prepared by LRQA's experts allows Wipasz to carefully analyze the current situation and precisely plan the way forward to reduce its emissions and achieve the long-term objective of zero emissions.

### Conclusion

Thanks to the measures implemented at the Kwasówka plant and the construction of the Green Farms, the emission result per kilogram of finished product has been significantly reduced compared to traditional farms. This is an excellent example of an effective approach to the minimization of the negative impact of human activity on the environment. This result proves that it is possible to keep up with European and global trends. Modern production companies must meet the demands of consumers, whose awareness and expectations regarding the eco-friendliness of the products they choose are growing rapidly.

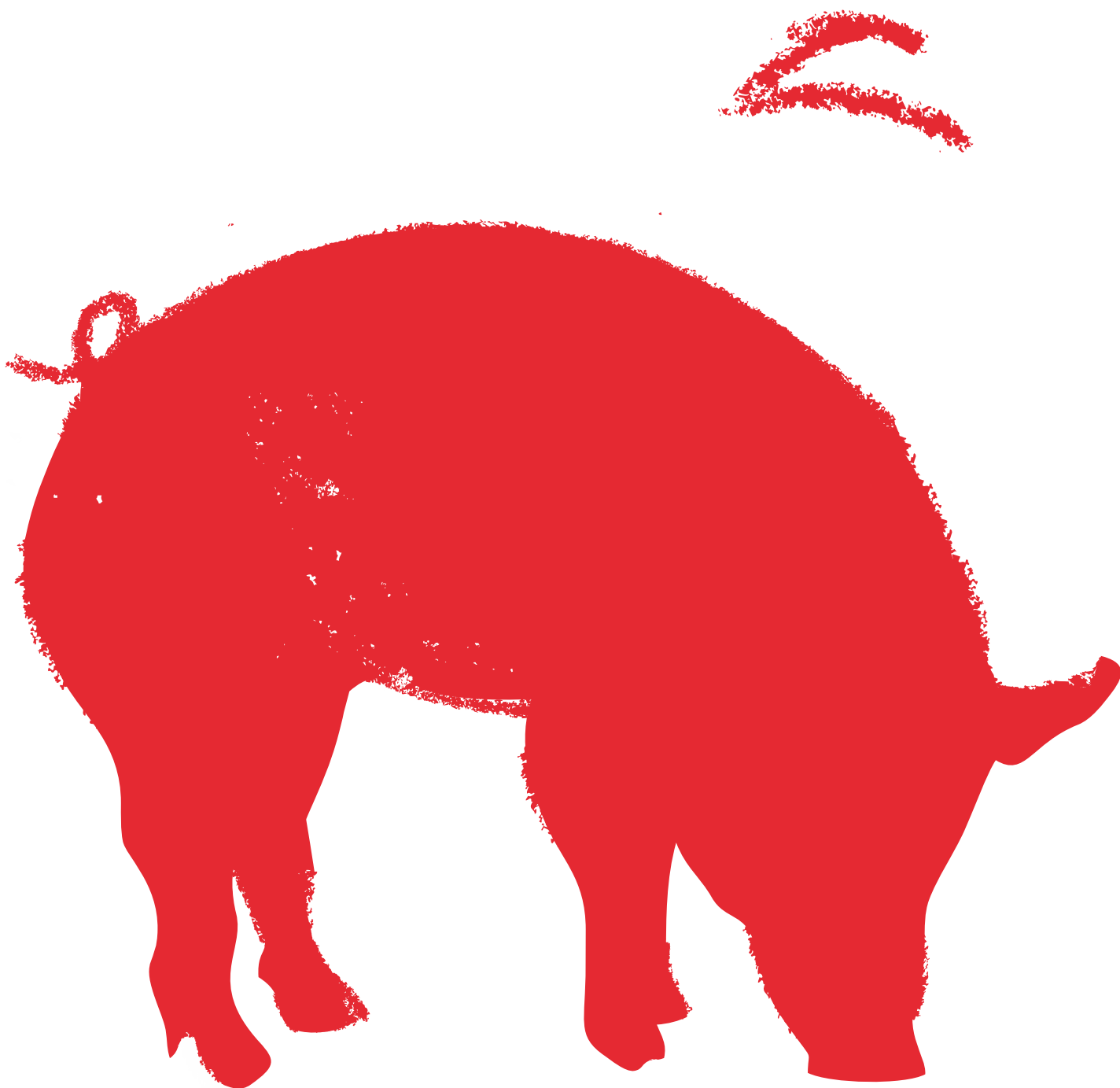






**In this section you will read:**

- Sows – the economic heart of the farm
- Health-promoting methods in pig nutrition



# Sows – the economic heart of the farm

**Paweł Gutowski – Pig Nutritionist Advisor Wipasz S.A.**

Pig production is a branch of agriculture where it is impossible to estimate the value of the product at the time of sow mating because the sale will not take place until several months later and the prices are not known beforehand. Therefore, it is important to pay a lot of attention to the factors that make it possible to produce a good quality product at the lowest cost. However, savings may not be achieved by buying cheap and ineffective products, because the final workload and the costs will turn out to be very high. Any profit achieved by doing so would be unreal and the cost reduction would only be apparent.

Every pig producer has a very large impact on the costs occurring during production, which is very much reflected in the value of one kilogram of livestock; the difference can amount to over 10 PLN per 1 piglet/fattening pig.

Sows are precisely the utility group of animals that allows farmers to maximize income the most. The most important goals to achieve are:

- ☒ having the largest possible number of piglets weaned per year;
- ☒ increasing and equalizing birth weight and having as many live piglets per litter as possible;
- ☒ having as many piglets as possible from each sow during her life.

The number of weaned piglets per year determines the breeding performance, which depends on:

- ☒ the number of piglets born in a litter;
- ☒ herd replacement, also referred to as the rate of replacement of sows;
- ☒ the number of piglet deaths during the period of rearing with the sow;

☒ the birth rate, which additionally includes:

- ✓ the mating efficiency;
- ✓ the non-pregnant period;
- ✓ the age of weaned piglets;
- ✓ the gestation time.

Efforts to achieve the largest possible number of piglets born make the problem of piglet survival worse. This is due to the limited size of the sow's uterus, whose capacity does not increase with the growing number of fetuses. This results in altered birth weight and lower chances of survival, which is an important economic factor. The large number of developing embryos in both corners of the uterus promotes 'uterine crowding' as well as 'Intrauterine Growth Restriction' (IUGR). The IUGR syndrome affects multifetal species and defines the impaired growth and development of mammals' embryos and fetuses during pregnancy. It can cause increased susceptibility to cardiovascular, metabolic, and endocrine diseases.

Due to the large number of fetuses and the limited size of the uterine corners, access to nutrients is reduced during the period of muscle fiber formation. Adequate nutrition during that period, i.e. the early and middle stages of pregnancy, can affect the myogenesis of secondary fibers. Therefore, it is important to properly feed pregnant sows because this affects not only the size and alignment of the newborn piglets, but also the subsequent growth rate, meat content, and feed conversion.

Feeding of sows in the second half of pregnancy should be intensified and the composition of the feed should include an adequate amount of nutrients. When using feeds with fibrous com-

ponents, the farmer must bear in mind the health of both the sows and the fetuses. The **Extrasorb Premium** product ideally assists the sow's body in excreting mycotoxins and contains yeast cell walls, MOS mannan-oligosaccharides, and fermented protein produced by the *Corynebacterium glutamicum* bacteria. This allows the farmer to maintain the health of the mothers and to avoid diarrhea in the piglets, and thus to eliminate the need for antibiotics to inhibit diarrhea.

The perinatal period covers the time when sows are being prepared for farrowing and about 14 days after farrowing. During that period, it is important to properly bring sows into the farrowing sector, which should be cleaned, dried, and disinfected beforehand. It is best to wash the animals in order to maintain the highest possible sterility of the place where the piglets will be born. It is important to make sure that the bacterial flora is compatible with the animals that inhabit the sector, so that new infections and the development of unforeseen diseases can be avoided. This guarantees a better health status and is another factor that reduces the need for antibiotics. Once the All-In-All-Out (AIAO) rule is met, the timing of the introduction of sows into the farrowing sector is important, so it should be done no later than 7 days before the scheduled farrowing because acclimatization of animals takes a minimum of 3 days and there are earlier farrowings (from sows that were successfully inseminated as the first of the group).

Sow feeding during this period should not be restricted because the sow needs a lot of energy during farrowing. The farrowing campaign is then carried out in the shortest possible time and without complications. Prolonged labour can cause the piglets born at the end to be asphyxiated, so it is very important to provide fiber of adequate quality in the feed, which will result in a lower but prolonged release of energy in the large intestine. In grain-based feeds, starch is the main source of energy. Energy from glucose is released within 30 minutes and decreases 3 hours after the last feeding. In a feed based on fermentable fiber, the main source of energy is short-chain saturated fatty acids (SCFAs). They cause a slow increase in energy, which is available over an extended time interval of 4 to 24 hours after the last feeding. Therefore, an

excellent and stable source of fiber in feed is the Fibromix additive, used at the rate of up to 10% in the finished compound feed. Feeding should not take place less than twice a day and sows should have access to an adequate amount of water – the flow at the nipple waterer for each sow should be at least 2 l/min.

During parturition, supervision is very important – after the first piglet is born, the next one should be born after 30 minutes. If this is not the case, the cause should be determined. For example, the piglet may be stuck in the birth canal. If so, it should be pulled out as soon as possible so that it does not block the path for the next piglet, which could lead to losses due to asphyxiation of the piglets inside the sow.

Immediately after birth, proper care must be taken of the piglets. They need to be dried, warmed, and allowed to drink colostrum, which is rich in energy, protein, immunoglobins, and growth factors. It is important to perform these actions in a specific order:

- ① Drying
- ② Warming up
- ③ Drinking

This order is important because a wet newborn piglet loses a huge amount of energy to become dry and then to warm its own body. Only later is it able to consume food. The largest losses are recorded for the last piglets because they are the weakest and have limited access to the sow's nipples or, for large litters, do not have the opportunity to drink colostrum until the other piglets are satiated. This results in cachexia and death as a result.

After birth, colostrum is produced for a period of about 24 hours, but its value decreases after just 6. During that period, each piglet should drink 250 g per 24 hrs. It is estimated that the average amount produced by one sow is about 3.5 liters. Optimally, it is sufficient for 14 piglets, but if more are born, the quality of colostrum should be improved by proper feeding of sows. Drinking a smaller amount of colostrum enriched with nutrients will guarantee higher piglet survival rates.

Sow feed additives that are recommended include good quality mycoabsorbents, which should be effective enough to bind a broad spectrum of mycotoxins. This is necessary because mycotoxins, if present in plant material, occur collectively. Our product that we recommend is the **Extrasorb Premium**, which has a high content of yeast and enzymes necessary to bind various types of mycotoxins. We also recommend the use of our acidifier **Viacid Locha pH**. The acid composition in this product effectively lowers the pH of urine and reduces the development of pathogens such as *E.Coli*, *Salmonella*, and *Staphylococcus*, which improves the composition of colostrum.

The condition of sows and the amount of colostrum produced (Decaluwé R. 2014)			
Characteristics	Emaciated	Correct	Excessively fat
fat thickness on the 108 <sup>th</sup> day of gestation (mm)	<17 mm	17–23 mm	>23 mm
colostrum volume	3 874	3 991	3 163
growth of piglets born-weaned (kg)	3,2	3,8	3,6

Until the piglets are weaned, the farmer should remember to adjust the sow's feeding process accordingly. The living needs of the sow, as well as the need for milk production for piglets must be met. It is recommended that at the peak of lactation, the feed portion should be 2 kg for the sow and 0.5 kg for each piglet. It is important that the weight of mothers entering and thus exiting the farrowing pen does not change by more than about 50 kg, and that the thickness of the fat does not decrease by more than 3 mm.

The farrowing pen is a place where the sows' and piglets' welfare must be ensured, taking into account such factors as space, temperature, air humidity and movement, floor quality, and access to feed and water.

According to the current law, the area of the farrowing pen should not be less than 3.5m<sup>2</sup>. Sows in the farrowing sector should have adequate welfare conditions. The area allowed for groups smaller than 39 sows is 2.25m<sup>2</sup>. For larger groups, the area can be reduced to 2.025m<sup>2</sup>. In addition, if the breeder increases the welfare by a minimum of 20%, he is able to receive additional financial support.

Sows are most willing to consume food at temperatures that do not exceed 25°C. As a result, the rearing of piglets also proceeds properly. However, 7 days after farrowing, it is optimal to maintain the temperature at 18.3°C. It is also a good idea to create two climate zones in one room, due to the fact that piglets prefer a much higher temperature than sows – more than 30°C. It is recommended to install canopies and heating mats in the piglet zone to provide the higher temperature.

After the piglets are reared, a new reproductive cycle begins. It is very important to properly prepare the sows in the days before insemination (proper flushing) and to ensure that insemination is later carried out in the best possible way (with the necessary factors, such as appropriate specialists and semen quality) because the economy of the use of the building depends on the effectiveness of mating. The consequence of optimal mating effectiveness is the achievement of the assumed number of piglets in a litter for the entire production group. However, if mating efficiency is low, the farmer will incur additional costs associated with keeping of non-pregnant sows.

The proper introduction of a sow before insemination requires an estimation of the exact amount of daily feed needed and its supplementation with an appropriate portion of the flushing additive. We recommend using **Energomix**, which is an easily digestible energy supplement enriched with medium-chain acids and a probiotic. It allows the sow to be provided with all the nutrients and energy it needs, which results in an adequate insulin spike. It also enables the formation of a large number of follicles (larger than 8 mm), which facilitate successful fertilization.

The factors important for stimulation are:

- ☒ checking the standing reflexes;
- ☒ light intensity above 250 lux and extending the day to 16 hours;
- ☒ insemination time not exceeding 20 minutes from the start of stimulation;
- ☒ the presence of a boar and stimulation with such stimuli such as smell, sight, sound, and touch.

In the insemination sector, the farmer needs to bear in mind the important factor of herd replacement. It is necessary to decide which sows to eliminate from the herd and how many young gilts to introduce into the group. The farmer has to know the appropriate structure of the herd but also of each group, and should make the selection especially on the basis of the efficiency and the objectives of the farm, as well as the problems associated with the animals to be eliminated.

When introducing young gilts, the farmer must bear in mind:

- ☒ the age: 220–240 days (2nd or 3rd heat);
- ☒ the appropriate weight: 135–150 kg;
- ☒ the correct thickness of the fat: not less than 12 mm;
- ☒ the cycle – if the first heat is identified, then the reproductive cycle process occurs. This helps avoid the surprise associated with lack of ovulation or ineffective mating.

After proper stimulation and insemination, sows should be fed an adequate amount of feed; in order to stabilize the condition, the size of the feed ration can be adjusted after the pregnancy is confirmed. Feeding must be done in such a way that there is no absorption or loss of implanted embryos. This type of problem occurs between the 12th and 19th day after insemination – this is often indicated by irregular heat.

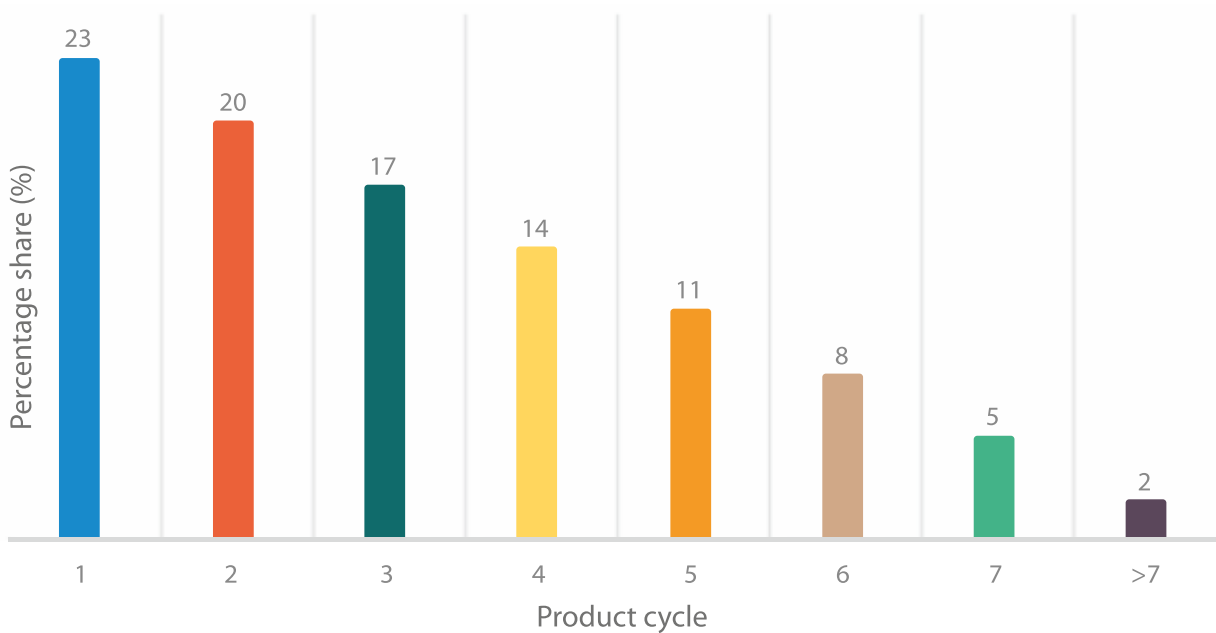


Figure 1. Proper herd structure

Once pregnancy is confirmed (from the 30th day of the pregnancy), the feeding should be done in such a way as to ensure the most optimal condition of the animals. This can be confirmed most reliably by examining the thickness of the fat at point P2. Feeding stimulates the condition until the 85th day: this begins to affect not only the sow but the size and development of the fetuses.

Proper routing of sows through each sector on the farm ensures that the number of sows that are fed and not productive is minimized. Each non-pregnant sow means 12–15 fewer piglets per group.

The space that a sow occupies in the farrowing room, as well as the additional cost associated with

her feeding, causes an increased financial outlay and more labour input. Below are tables with data showing a simulation comparing the mating efficiency in a group of 100 sows.

In conclusion, the economic heart of the farm also translates into environmentally friendly farming solutions. By making optimal use of the building's potential, we minimize energy consumption.

Properly balanced feed with health-promoting ingredients reduces the need for antibiotics and environmental emissions. The result is a balance between economics and environmental protection. By maintaining high sow welfare, we contribute to changes that lead to sustainable breeding.

Number of sows in the group	100	100	100	100	100	100	100
Farrowing effectiveness	70%	75%	80%	85%	90%	95%	100%
Number of farrowing sows	70	75	80	85	90	95	100
Number of average weaned piglets per litter	15	14	13,15	12,35	11,66	11,05	10,5
Number of weaned piglets in the group	1050	1050	1050	1050	1050	1050	1050

Number of sows in the group	100	100	100	100	100	100	100
Farrowing effectiveness	70%	75%	80%	85%	90%	95%	100%
Number of farrowing sows	70	75	80	85	90	95	100
Number of average weaned piglets per litter	13	13	13	13	13	13	13
Number of weaned piglets in the group	910	975	1040	1105	1170	1235	1300



# Health-promoting methods in pig nutrition

**Jakub Goździk – Pig Nutritionist Advisor Wipasz S.A.**

The health of our animals depends to a very large extent on properly balanced feed mixtures produced on the basis of carefully selected formulas. Currently, the cost of feed amounts to about 60–70% of the total cost of pig production. Therefore, it is necessary to constantly optimize mixtures in terms of their costs and ingredients, as this increases the productivity and health of animals.

How can farmers achieve the highest quality of feed produced at their own farms so that it has health-promoting effects for their livestock?

## Acidifiers

Acidifiers are the most common and well-known feed additives. The most important advantage of their use is that they lower the pH in the gastrointestinal tract, thereby reducing the proliferation of pathogens there. The use of acidifiers in pig nutrition reduces feed consumption and offers the possibility of a better economic result and a lower feed cost at each stage of production. It also reduces the risk of possible deaths due to poor feed digestibility. When a disease occurs in the herd, feed acidification helps reduce changes in the intestinal villi and promote their recovery. If feed is stored for a long time, the use of an acidifier improves the hygienic condition of the feed by reducing bacteria and mould fungi. In addition, such treatment improves the efficiency of proteolytic enzymes that break down protein in the digestive tract and reduces the frequency of diarrhea in the herd. Acidified feed stimulates appetite in animals and is responsible for the secretion of saliva and hydrochloric acid, which increases feed intake and animal growth. It is important to select the right acidifier from the **Viacid** line offered by Wipasz for the right production group on the farm, taking into account any problems the animals may have.

## Mycoabsorbents

Mycoabsorbents are products designed to bind and neutralize mycotoxins present in the feed. Mycotoxins are metabolites of pathogenic fungi produced during the growth or storage of cereals through infection with mould fungi. They can have many negative health effects in the animal body. The most common symptoms are food poisoning, litters of varied size and weight, the splay leg syndrome in piglets, poor growth rates, redness of the vulvae in gilts, and a decline in the immunity of the herd. The addition of a mycoabsorbent to feed has a health-promoting effect and significantly reduces the risk of many ailments in the herd by eliminating the toxic effects of mycotoxins. It also improves the production rates. It is recommended to add a mycoabsorbent, for example **Extrasorb** or **Extrasorb Premium**, at the rate 1–2 kg/t of feed.

## Feed yeast

Feed yeast of the species *Saccharomyces cerevisiae* is particularly recommended for use in feeding of piglets and sows. Yeast is a rich source of protein and amino acids, but it also provides vitamins from the B group, vitamin E, and folic acid, which have a positive effect on reproduction. In addition, it neutralizes toxins and is responsible for reducing the number of pathogens in the intestine. Thanks to its properties, yeast strengthens the stability of the desirable intestinal microflora, stimulates the immune system, and reduces constipation in sows. The use of yeast during pregnancy in sows results in easier delivery, fewer stillborn piglets, higher piglet birth weights, and higher milk yields of sows. The use of the **Farmpak SB Forte** additive in the feeding of piglets and sows significantly reduces the occurrence of the problems discussed herein in animal reproduction.



## Fermented protein products

This group of products includes feed ingredients that undergo special fermentation processes aimed at increasing the biological value and palatability of the feed. Wipasz offers two products that are designed to reduce the use of zinc oxide, increase the weaning weight of piglets, and contribute to the reduction of feed costs by replacing fishmeal. In sows, these products help reduce the weight loss between farrowings, maintain high milk yields, and shorten the inter-farrowing period. **Fersoy** is a complementary feed mixture (CFM) for piglets based on fermented soybeans, which contains live cultures of lactic acid bacteria, organic acids, and enzymes. **Fercan**, on the other hand, is a complementary feed mixture for sows based on fermented rapeseed, also with live lactic acid bacteria cultures, organic acids, and enzymes.

## Additives with probiotic effects

Natural additives are designed to enrich the digestive tract with bacteria that aid digestion and displace pathogens such as *Escherichia coli* and *Clostridium*. **Herbal Pro** is a fermented herb extract. The product contains a set of probiotic microorganisms and a composition of herb extracts that stimulates digestive processes and improves animal immunity. It inhibits the growth of pathogenic bacteria and contributes to a better feed intake and utilization. By providing balance in the gastrointestinal tract, it reduces digestive system diseases. It prevents diarrhoea, increases daily weight gain, and is also recommended for problems with anaerobic bacteria.

During the summer, when animals are exposed to stress caused by high temperatures in the pigery, the right product to use is **VitaSOL**. It is a liquid additive that reduces heat stress in animals. It contains natural plant ingredients, electrolytes, vitamin C, and organic acids that support animals during periods of stress caused by the environmental conditions. It ensures the maintenance of the body's water-electrolyte and acid-base balance.

It is also beneficial to use a product that features a broad spectrum of action, such as **Viacid Herbal**, which is a combination of an acidifier and a phyto-biotic. As such, it makes it possible to achieve results similar to those provided by a traditional acidifier, but with enhanced antimicrobial and anti-inflammatory effects. The phytoncidal compounds contained in the acidifier inhibit the growth of bacteria and fungi, and impair the vital functions of pathogenic microorganisms. They activate the processes of renewal of the epithelial tissue in the digestive and respiratory systems, relieve cough, and stimulate lung ventilation.

The use of feed additives that exhibit health-promoting activities in pig nutrition reduces feed costs through better utilization and lower consumption of feed. This is a natural method to minimize the occurrence of gastrointestinal disorders that can develop into diseases, thus enabling the farmer to reduce the financial costs associated with treatment of animals.



**In this section you will read:**

- Agolin Ruminant in Wipasz S.A. products for cattle reduces methane emission
- Reducing the carbon footprint in feed rations for dairy cows – more fat in milk, lower feeding costs
- Increasing amount of ALA in dairy cow diets to reduce enteric methane emissions while improving health and reproduction



# Agolin Ruminant in Wipasz S.A. products for cattle reduces methane emission

## Agolin S.A.

### What is Agolin Ruminant?

Agolin Ruminant is a blend of high quality plant extracts from herbs and spices, designed to optimize feed intake and feed utilization. Many years of research have resulted in this blend with a pleasant smell and form, which brings many benefits to ruminants.

Agolin Ruminant is widely used in dairy cows across Europe, Asia and the USA. Trials in these regions have shown the following benefits:

- ☒ higher milk yield;
- ☒ increased feed intake;
- ☒ positive effect on reproduction;
- ☒ methane mitigation (validated by Carbon Trust);

- ☒ improved feed efficiency (validated by Carbon Trust).

Furthermore, the product is supplemented to minerals heifers, beef cattle, sheep and goats.

### Agolin Ruminant and rumen efficiency

Research trials demonstrate that Agolin Ruminant alleviates nutritional stress in ruminants through a positive effect on the rumen microbiota. INRA, the French agricultural institute discovered a significantly larger rumen bacteria population and a reduced number of protozoa when Agolin Ruminant was fed to cows. The feed additive has shown reduced methane and ammonia production in the rumen when supplemented to diets. This leads to better energy and protein retention and consequently improved feed utilization.

Increased rumen bacteria population  
(INRA, France, FP7, SMethane)

Improved feed efficiency  
(meta-analysis CSIC)

	Grupa kontrolna	Agolin	Różnica %
FPCM, kg/head/day	30,7	33,6*	+9,4
Milk fat, kg/head/day	1,32	1,44*	+9,1
Milk protein, kg/head/day	0,96	1,05*	+9,4
Feed efficiency, kg milk/ kg DMI	1,32	1,39	+5,3
Pregnant %	60,5	69,9	+15,6
Methane, g/head/day	438	411*	-6,2
Methane, g/kg milk	17,2	13,8	-19,8

**+9,4%**  
FPCM

**-19,8 %**  
methane

**+5,3%**  
feed efficiency

*Table 1. The results of reasearch at the university at University of Aberystwyth, UK, duration 22 weeks, n =149*

\*p ≤ 0.05

## Performance

Many University and field trials with Agolin Ruminant show positive responses in dairy cows. An example is the long term trial carried out in the University of Aberystwyth, sponsored by the European Institute of Technology, where animal performance, health and environmental parameters were measured.

A Holstein dairy herd (n = 149) fed with grass and maize-based silage was divided into two groups. The duration of the experiment was more than 5 months. Most of the production parameters were increased, such as fat and protein corrected milk production, milk yield and total milk fat and protein production. Also dry matter intake was increased.

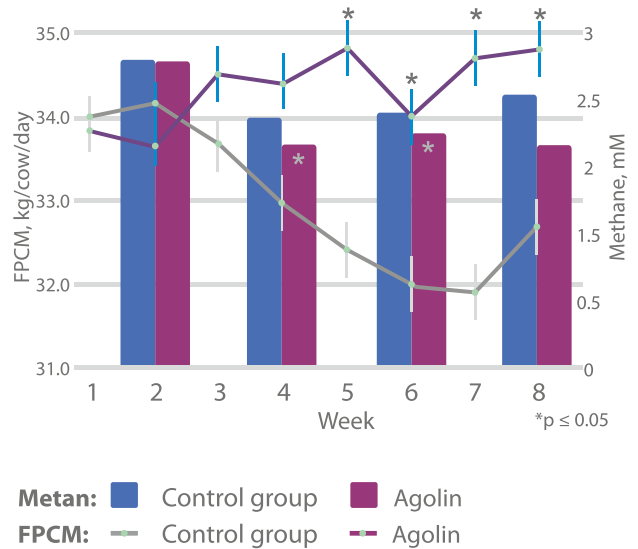
Along with a substantial improvement in milk yield, the protein and fat content in the milk was maintained in the experimental group. Furthermore, the feed efficiency was improved by 5.3% as shown in the table above.

Another institutional trial with dairy cows, fed with a typical local TMR (maize and rye grass based), was carried out by IRTA (Blanca) in Spain. Two groups of 24 paired Holstein cows were selected and one of each pair was fed daily with 1 g Agolin Ruminant. Following an adaptation period of 4 weeks, a significant improvement of 5.2% in fat and protein corrected milk production (FPCM) was measured. Along with an improvement in milk yield, other production parameters such as milk components showed significant improvements.

	Control group	Agolin	Difference %
FPCM, kg/cow/day	33,0	34,4*	+4,2
Methane: control, agolin	1,23	1,28	+4,1
Protein/kg/day	0,985	1,029*	+4,5
DMI kg/day	22,9	23,4	+2,2
Feed efficiency	1,41	1,43	+1,4
Methane, mmol/l	2,48	2,29*	-7,7

\*p ≤ 0.05

**Table 2. Production parameters, IRTA Spain (total trial period)**



**Figure 1. Fat and protein corrected milk yield and methane concentration, IRTA Spain**

**+6%**  
feed efficiency  
(after adaptation)

**+5,2%**  
FPCM  
(after adaptation)

**-15%**  
methane production  
(after adaptation)

## Fertility

In a number of long term trials with Agolin Ruminant, the reproductive performance, another key success factor of a herd, was also monitored. In one trial, carried out at Thüringer Landesanstalt für Landwirtschaft (TLL) 159 Holstein cows in early lactation were split in two groups. The animals were fed twice a day with TMR containing mainly maize silage, grass silage and a high amount of concentrates. The average intake of the feed ration supplemented with Agolin Ruminant was significantly increased to 26.5 kg of dry mass. Also, the average fat and protein corrected milk production as well as the pregnancy rate during the 6 months trial tended to be higher.

Non-esterified fatty acids (NEFAs) increase in the blood quickly during and after calving when the cow is using its body's fat reserves. In particular, during early lactation, Agolin Ruminant fed cows released 25% less NEFA's and were better adapted to a negative energy balance.

A similar increase in fertility was observed during a long-term study carried out by the University of Aberystwyth in Wales where the proportion of pregnant animals increased by 15%.

	control group	Agolin
Pregnancy index %, 1 <sup>st</sup> insemination	48,1	83,3
Dry matter intake, kg/head/day	25,9	26,5
FPCM, kg/head/day	39,6	40,8

\*p ≤ 0.05

Table 3. TLL, Germany, duration of the trial: 180 days, n = 159

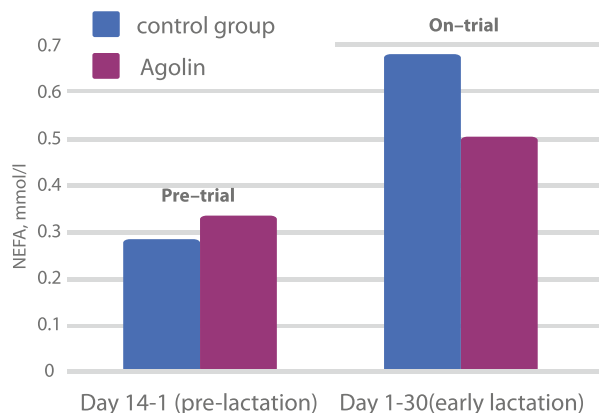


Figure 2. NEFA, TLL, Germany

**+15%**  
ciąża

**- 25%**  
NEFA

### Meta-analysis on dairy cows trials

A total of 23 studies were selected for the meta-analysis, all carried out in the past ten years, across ten different countries. In total around 4 000 cows were included in the trials chosen for the study.

Number of trials: **23**  
Years of experience: **10**  
Number of cows, ca.: **4 000**

Number of Universities: **7**  
Number of countries: **10**  
Various production systems

Source: Animals 2020; 10, 620  
Poster GGAA, 2019

**Fertility AI. attempts**  
- 9.1%

**Methane reduction:**  
8.8% head  
10%/kg FPCM  
12.9%/ DMI

**Feed efficiency**  
+4.4%

**FPCM +4.1%**

## VALIDATED BY CARBON TRUST

The Carbon Trust has provided a validation opinion concluding that correct use of Agolin Ruminant can reduce methane emissions in dairy and beef cattle and sheep. The Carbon Trust opinion of Agolin Ruminant is based on academic references, published scientific papers and field reports and joins the conclusions of the independent meta-analyses from A. Belanche et al.

### Environment

It is well known that ruminants have an important environmental impact due to the emission of up to 500 l of methane per day, which is produced in fermentation processes in the rumen. A cow produces up to 500 l of methane gas per day. According to the Food and Agriculture Organisation (FAO) beef cattle and dairy cows are responsible for about 10% of global greenhouse gas emissions, which corresponds to 4 600 million tonnes of CO<sub>2</sub>-eq per year. As part of the long term study (22 weeks) at Aberystwyth University in Wales

(grass based ration), cow methane production was measured individually with a novel system called 'Greenfeed'.

The average methane output was 18% less per kg of milk (FPC) for cows fed with Agolin Ruminant for the duration of the trial. This includes the initial 3-week adaptation time.

In a study, carried out in Spain, methane from rumen fluid samples was measured. The experiment demonstrated a 15% lower methane production after adaptation time.

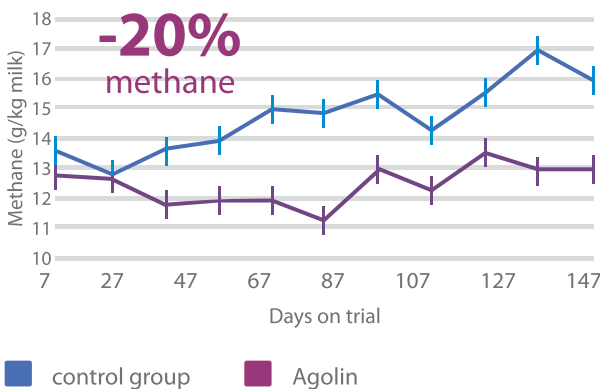


Figure 4. Methane emissions over the whole trial period (22 weeks), University of Aberystwyth, n = 149

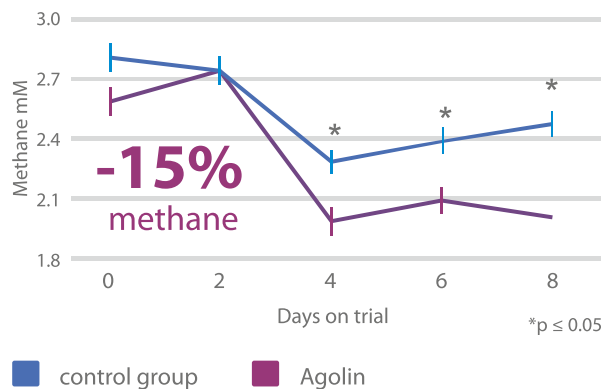


Figure 5. Methane in rumen, IRTA Spain, n = 48

# Reducing the carbon footprint in feed rations for dairy cows – more fat in milk, lower feeding costs

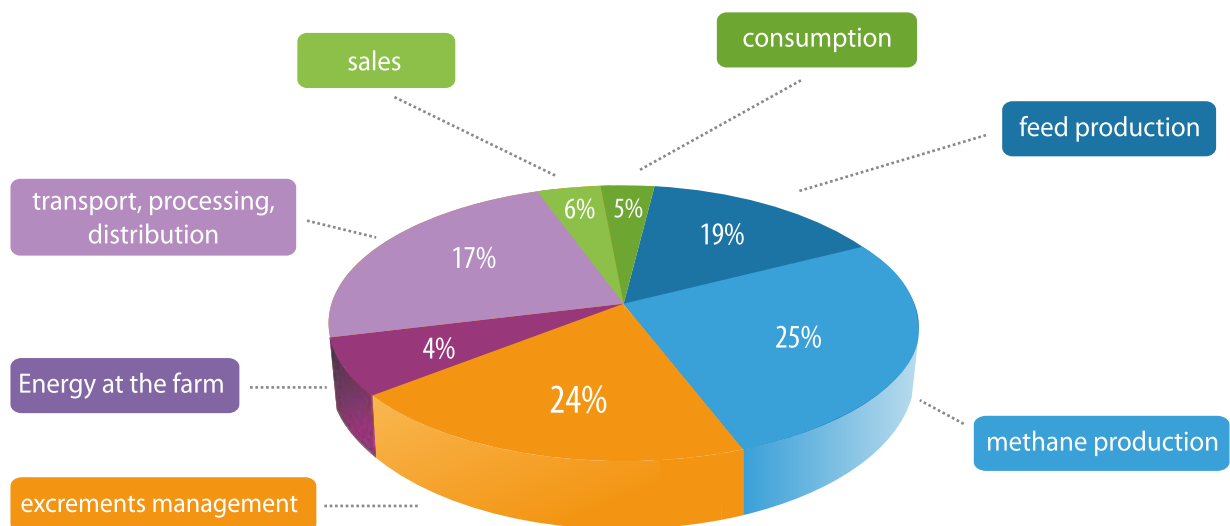
**Marcin Forkajm – Adisseo Polska Sp. z o.o.**

## Carbon footprint in milk production

Carbon footprint is the total sum of greenhouse gas emissions caused directly or indirectly by a person, organization, product, or raw material. It is a type of environmental footprint that includes emissions of carbon dioxide, methane, nitrous oxide, and other greenhouse gases. It is expressed as carbon dioxide equivalent (CO<sub>2</sub>e). Since different greenhouse gases contribute unequally to global warming, the carbon dioxide equivalent allows emissions of different gases to be compared on a common scale.

In the following article, we would like to introduce the issue of the carbon footprint of milk production. The University of Wisconsin (Thoma et al./ international dairy Journal 31 (2013) s3-s14) calculated that every litre of milk we consume produces an emission of 2.05 kg CO<sub>2</sub>e. The researchers took into account milk production at farms, transportation, processing packaging, distribution, sales, and consumption. The chart below also shows the percentage impact of each process on the total production of greenhouse gases emitted by a specific dairy producer in the United States.

## Greenhouse gas emissions in the USA



*Figure 1. Share of the chain of supply in the carbon footprint of milk (Thoma et al.)*



## GFLI value of raw materials

The carbon footprint of dairy cow rations comes from the raw materials used in the feed. Each raw material is characterized by its own emissions parameter from the supply chain and from all the processes needed to source and produce it (product life cycle assessment). These data are officially published in GFLI tables, are country-specific, and can be tracked at <https://globalfeedlca.org>. The table below includes some of the basic raw materials used to feed dairy cows and the parameters of their carbon footprint, which are used to create a ration later in the article.

Raw material	kg CO <sub>2</sub> e in dry matter
corn silage	0,2
alfalfa silage	0,22
brewer's spent grain	0,45
beet pulp	0
soybean meal 46%	4,49
rapeseed meal (%)	0,63
Barley	0,32
protected fat C16	14,16
vit.-min. premix	1,24
protected methionine	1,18
fat stimulator	1,23
protected lysine	1,18

**Table 1. Value of kg CO<sub>2</sub> in dry weight of raw material according to the GFLI table**

As we can see, the raw materials with the greatest impact on greenhouse gas emissions are, in this case, soybean meal and C16 protected palm fat.

## Basic ration

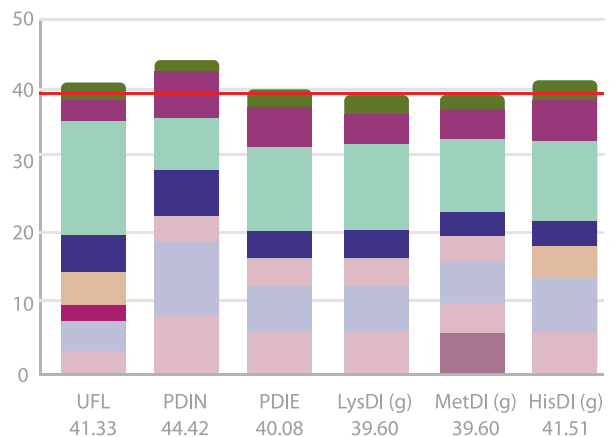
The ration for dairy cows was calculated based on the above raw materials. The assumed daily production is 39.5 liters of milk, and the fat level is at

the level of 4.2%. The protein level is 3.4% and the dry matter intake is 25.3 kg.

Raw material	kg in the ration	kg of dry weight
corn silage	30	10,5
alfalfa silage	10	3,8
brewer's spent grain	8	2,16
beet pulp	6	1,44
soybean meal 46%	1,7	1,49
rapeseed meal (%)	3	2,67
Barley	3	2,62
protected fat C16	0,5	0,5
vit.-min. premix	0,2	0,19
protected methionine	0,014	0,01
fat stimulator	0	0
<b>total</b>	<b>62,414</b>	<b>25,38</b>

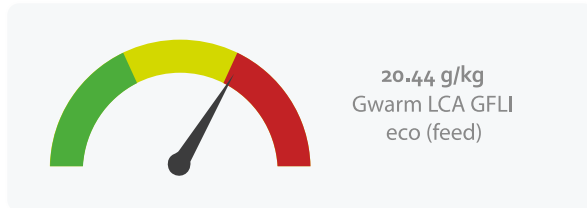
**Table 2. Sample food dose**

The above ration was balanced in terms of energy and intestinal protein, and contains adequate levels of limiting exogenous amino acids, as shown in the chart below.



**Figure 1. The values are expressed according to the INRA system standards. The UFL indicator is responsible for the energy level of the ration for a specific production; the PDIN and PDIE indicate the intestinal protein content. The LysDi, MetDi, and HisDi are, respectively, lysine, methionine, and histidine available in the small intestine.**

The carbon footprint index was 20.44 g/kg, which was above the value specified in the applicable standard. The maximum permitted level is 15 g/kg. This indicator specifies the amount of ration-derived CO<sub>2</sub> equivalent produced by the cow during the day.



**Visualization of carbon footprint values according to the Ruminix 3.0 software.**

Raw materials imported from distant countries or continents directly contribute to such a high level of the indicator related to greenhouse gas emissions. In the ration described, the GFLI is adversely affected by the C16 protected palm fat and the soybean meal from Brazil. The best way to reduce the carbon footprint is to reduce the use of raw materials whose supply chain is too long and whose mode of production places an excessive burden on the environment. Nowadays, there are products on the market that allow partial or complete replacement of these feed materials, thus reducing greenhouse gas emissions.

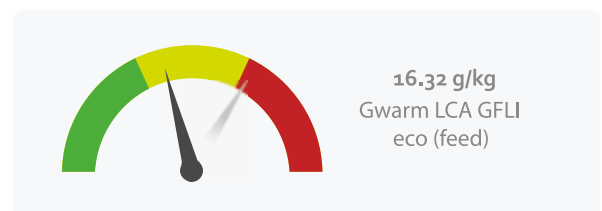
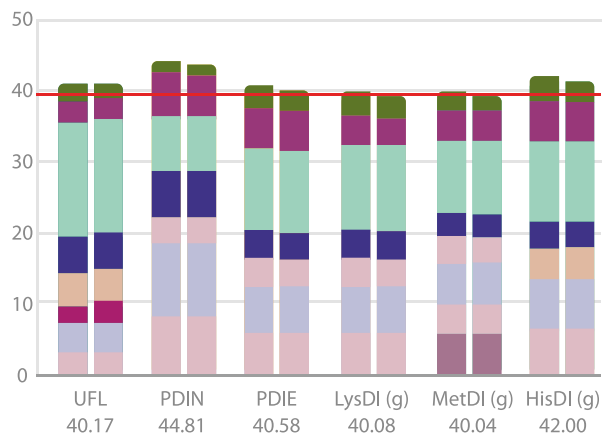
### Reduction of the amount of protected fat with a 'fat stimulator'

Based on the above ration, changes were made in the amount of the C16 fat used and some of it was replaced by supplementing the feed with a calcium salt analogue of methionine, which is called 'fat stimulator' in the article. The protected palm fat was reduced by 300 grams and barley was reduced by 300 grams in the ration, and 30 grams of the 'fat stimulator' were added to the ration instead.

As a result, the carbon footprint index decreased to 16.32 g/kg, which was 4.12 g/kg lower compared to the base ration and much closer to the emission standard.

Raw material	Kg w dawce	Kg suchej masy
corn silage	30	10,5
alfalfa silage	10	3,8
brewer's spent grain	8	2,16
beet pulp	6	1,44
soybean meal 46%	1,7	1,49
rapeseed meal (%)	3	2,67
Barley	<b>3,3</b>	<b>2,88</b>
protected fat C16	<b>0,2</b>	<b>0,2</b>
vit.-min. premix	0,2	0,19
protected methionine	0,014	0,01
fat stimulator	<b>0,03</b>	<b>0,03</b>
<b>total</b>	<b>62,444</b>	<b>25,37</b>

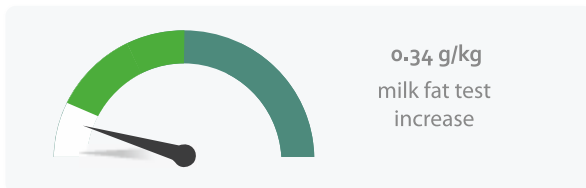
**Table 2. Sample food dose**



**Visualization of carbon footprint values according to the Ruminix 3.0 software.**

An additional benefit associated with the introduction of the 'fat stimulator' into the ration was that milk fat levels were 0.34 g/kg higher than for the

base ration. The savings associated with the reduction of protected fat amounted to PLN 2.28 per cow per day, which amounts to PLN 41 610 per year for a herd of 50 cows fed protected fat. This value does not comprise the additional farm income associated with the higher levels of fat in milk, which in the case of many milk buyers brings additional profits to the farm.



Visualization of carbon footprint values according to the Ruminix 3.0 software.

### Reduction of soybean meal by using methionine and lysine protected from decomposition in the rumen

The ration described in the paragraph above can still be optimized in terms of its environmental impact. After reducing the content of palm fat, the next possible step is to reduce the content of soybean meal using exogenous amino acids protected against decomposition in the rumen: methionine and lysine. In the following ration, the content of soybean meal was reduced by 0.5 kg to the level of 1.2 kg per cow per day and 0.5 kg of barley, an additional 2 g of methionine protected from decomposition in the rumen (80% bioavailability), and 24 g of intestinally digested lysine with 67% bioavailability were introduced instead.

Raw material	kg in the ration	kg of dry weight
corn silage	30	10,5
alfalfa silage	10	3,8
brewer's spent grain	8	2,16
beet pulp	6	1,44
soybean meal 46%	<b>1,2</b>	<b>1,05</b>
rapeseed meal (%)	3	2,67
Barley	<b>3,8</b>	<b>3,31</b>
protected fat C16	0,2	0,2
vit.-min. premix	0,2	0,19
protected methionine	<b>0,016</b>	<b>0,01</b>
fat stimulator	0,03	0,03
protected lysine	<b>0,024</b>	<b>0,024</b>
<b>total</b>	<b>62,468</b>	<b>25,384</b>

Table 3. Sample food dose

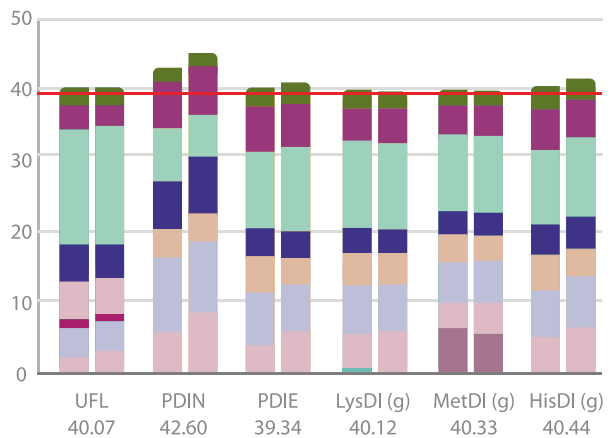
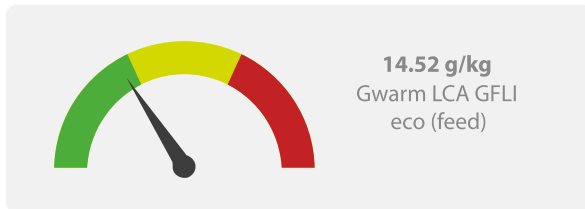


Figure 2. The given values are expressed according to the standards of the INRA system



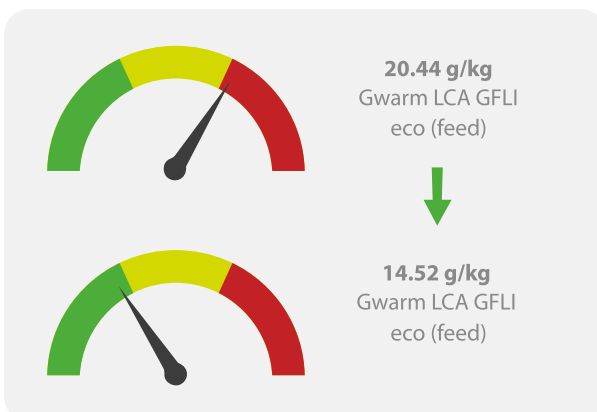
In such a balanced ration, another decrease in the GFLI carbon footprint, to 14.52 g/kg, was noted. The amino acids introduced into the feed significantly reduced the carbon footprint of the ration, which resulted in compliance to the emission standard of 15 g/kg.



*Visualization of carbon footprint values according to the Ruminix 3.0 software.*

### Conclusion

The ongoing legal changes and new European Commission directives will soon require Polish dairy producers to calculate the carbon footprint of rations. The raw materials used have a significant impact on this parameter. Programmes and products are now available on the market that help reduce the carbon footprint of milk production. By reducing the amount of protected fat and soybean meal in rations for dairy cows, one can not only produce milk more sustainably, but also more profitably. A reduction in the amount of protected palm fat and an introduction of a 'fat promoter' and amino acids protected from decomposition in the rumen make it possible to achieve additional revenue, equal to more than PLN 41 000 per year for a herd of 50 cows and to reduce the carbon footprint from the initial 20.44 g/kg to 14.52 g/kg, and have a positive impact on milk parameters without reducing the production output. Your production can be efficient and environmentally friendly at the same time.



*Visualization of carbon footprint values according to the Ruminix 3.0 software.*





# Increasing the amount of ALA in dairy cow diets to reduce enteric methane emissions while improving health and reproduction

Solveig Mendowski – Valorex / NOACK Polen Sp. z O.O.

Adding lipids to dairy cow diets is a known solution to reduce methane emissions. In particular, omega-3 fatty acids, and especially alpha-linolenic acid (ALA), have been shown to be more efficient in decreasing methane emissions compared to palmitic or oleic acids for example. Increasing the amount of ALA in dairy cow diets decreases enteric methane emissions, thanks to a 'rumen effect', by reducing the amount of dihydrogen ( $H_2$ ) produced by ruminal fermentations. Indeed, supplying energy through the diet in the form of lipids, in particular ALA, reduces the part of the energy provided by carbohydrates, and consequently reduces the part of fermentable organic matter which will reduce the amount of  $H_2$  produced. As  $H_2$  is a substrate for methane ( $CH_4$ ) production, the less  $H_2$  produced in the rumen, the less  $CH_4$  will be eructed by the cow. Moreover, the presence of ALA in the rumen favours the production of propionate in-

stead of acetate and butyrate. Propionate production is an  $H_2$ -incorporating pathway, with propionate competing with  $CH_4$  as a metabolic hydrogen sink – this too will reduce the amount of  $H_2$  available for methane synthesis (figure 1). Finally, ALA has an inhibitory effect on the microbial populations responsible for the production of  $H_2$ .

## ALA and methane reduction

To quantify the extent to which enteric methane emissions could be reduced due to the 'rumen effect' observed when feeding ALA, a meta-analysis was conducted to examine the effect of increasing amounts of ALA in the diet of dairy cows, through the incorporation of linseed processed under specific temperature and pressure conditions, as a strategy for  $CH_4$  mitigation.

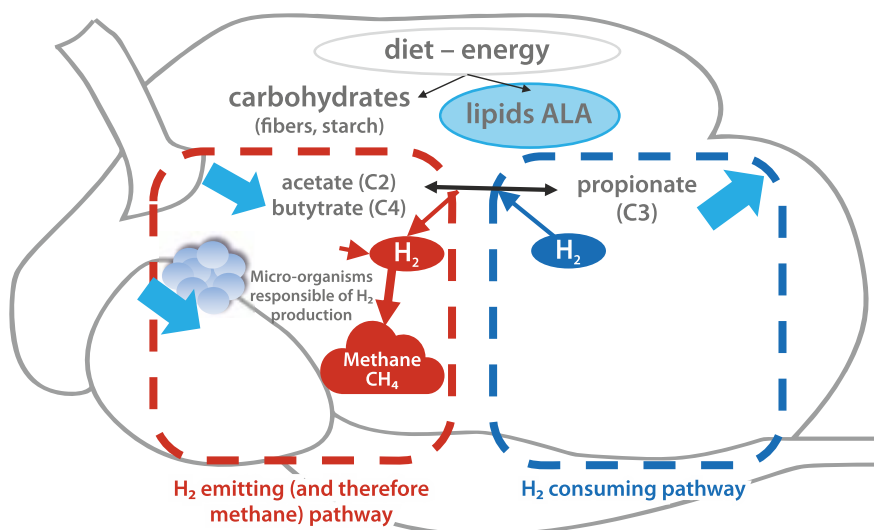
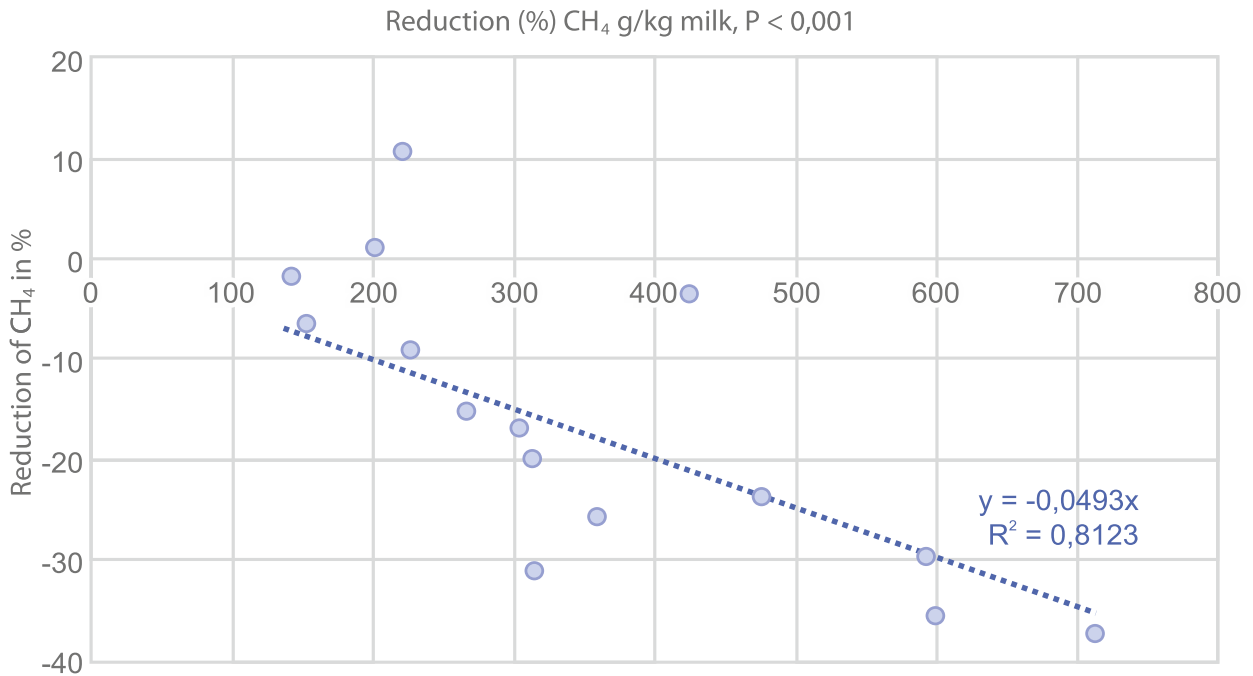


Figure 1. Effects of linolenic acid on the dihydrogen ( $H_2$ ) concentration in the rumen.





**Figure 2.** Linear regression of methane emission reduction with increasing amounts of ALA in diets

The meta-analysis was comprised of seven research articles published between 2008 and 2020, in four different European countries (France, the Netherlands, the United Kingdom and Switzerland). The amount of ALA supplied in the 15 treatments was calculated, along with the associated CH<sub>4</sub> reduction compared to the control group (i.e., without ALA added via processed linseed in the diet). The amounts of ALA supplied in these experiments were between 141 g/cow/day and 714 g/cow/day, which is not representative of the levels of ALA conventionally supplied on farms – typically only around 72 g/cow/day of ALA is supplied (Meignan, 2018). In order to extrapolate the experimental results to represent real on-farm situations, the regressions between the amount of ALA and the decrease of enteric CH<sub>4</sub> emissions were forced to go through the intercept to integrate amounts less than 141 g/cow/day of ALA (figure 2). According to this data, increasing the amount of ALA to 200 g in dairy cow diets reduces methane emissions by 9,84%, 9,86% and 8,16%, when methane is expressed in g CH<sub>4</sub>/day, g CH<sub>4</sub>/l of milk and in g CH<sub>4</sub>/kg dry matter intake (DMI), respectively (updated and adapted from Mendowski et al., 2021). For example, 1 kg of linseed, processed under specific temperature and pressure conditions, supplies 220 g of ALA.

### Improved reproduction and health

However, reducing the environmental impact of dairy cows by reducing enteric methane emissions is not the only advantage of increasing the level of ALA in dairy cow diets. According to a large-scale retrospective observational study conducted by Meignan et al. (2019), increasing the amount of ALA in dairy cow diets by including processed linseed leads to a reduction in the number of days between calving and the first artificial insemination, and between calving and conception. Consequently, if conception occurs closer to calving, this leads to a reduced 'calving-to-calving' interval. This result was obtained with data collected between 2008 and 2015 in 1 096 French Holstein dairy herds (representing more than 200 000 artificial insemination data points collected from more than 125 000 cows). Moallem et al. (2020) found the same conclusion in a trial comprised of 516 dairy cows supplemented with ALA from extruded linseed over an eighteen-month period. In a similar large-scale retrospective observational study, Meignan (2018) further showed that dairy cow diets containing higher ALA levels from processed linseed are associated with an increased recovery from subclinical mastitis, compared to a control population of cows that did not receive



supplemental linseed in their diet. This result was obtained with 1 997 763 cow test-day records on somatic cell counts in 1 204 French Holstein dairy herds between 2008 and 2015. This is consistent with the fact that ALA is speculated to have anti-inflammatory effects.

### In conclusion

Increasing the amount of ALA in dairy cow diets has multiple advantages, both on the environmental footprint by reducing enteric methane emissions and on reproductive performance.

# TRADILIN® REDUCES ENTERIC METHANE

TRADILIN® is the profitable, productivity and health solution in dairy farming. Its use also reduces methane emissions.



**-9 %**  
methane emissions  
with TRADILIN®  
at the zootechnical dose

**-9 %**

**-6 %**  
with the  
rumen effect

**-3 %**  
with the  
productivity  
effect

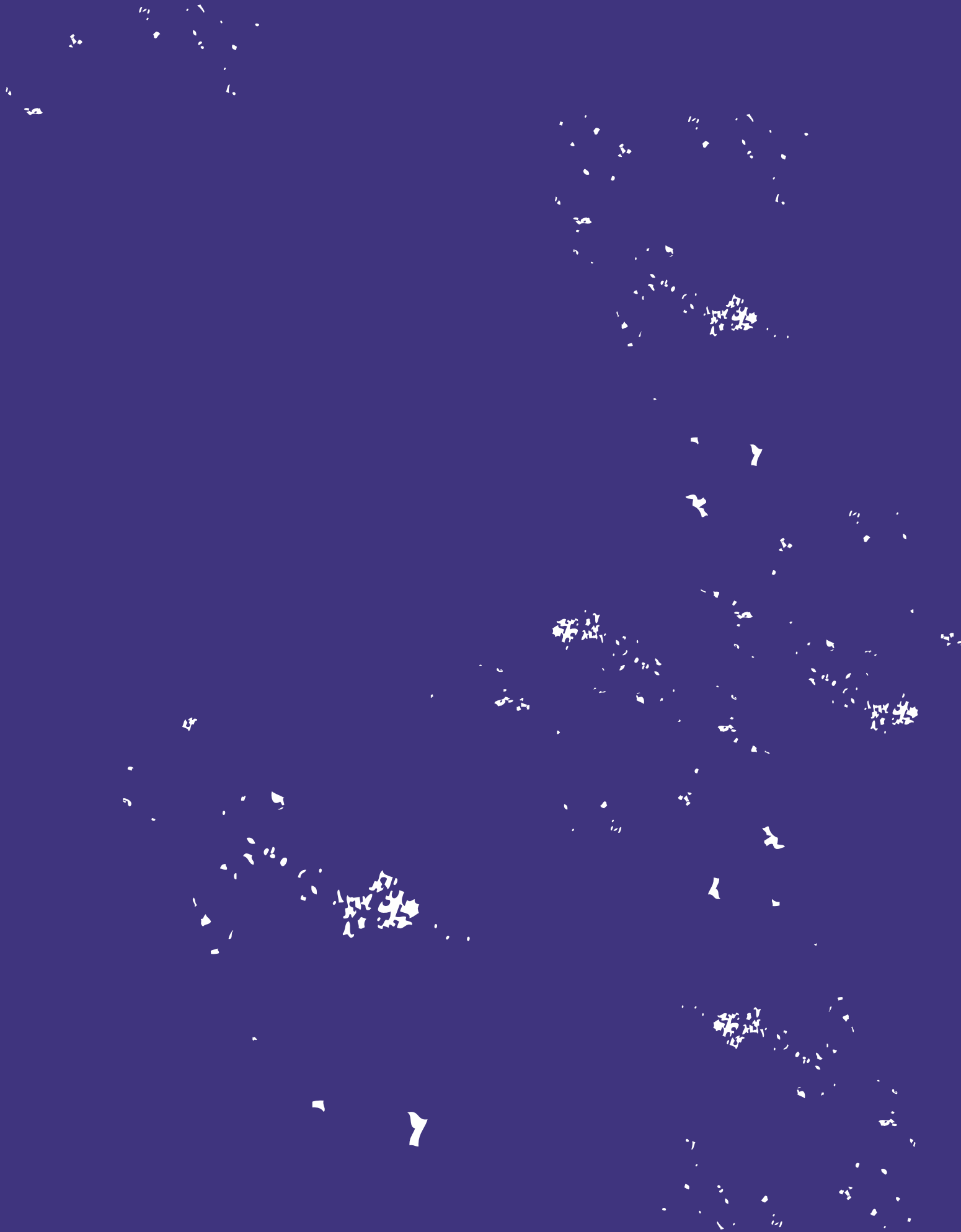
## BENEFITS OF TRADILIN®

- ✓ Natural solution, **WITHOUT CHEMICALS.**
- ✓ Promotion of **LOCAL LIN CROPS.**
- ✓ Improvement of the **NUTRITIONAL QUALITY OF MILK.**

**8 SCIENTIFIC PUBLICATIONS  
& OVER 4 000 FARMERS**

TRADILIN® is a solution officially validated by 8 publications of in vivo trials. In addition, nearly 4 000 dairy farmers in Europe are users of this solution.

emisji metanu



In this section you will read:

- Corporate sustainability reporting directive



# Corporate sustainability reporting directive

**Filip Krajewski – Attorney at law**  
**Piotr Włodawiec – Attorney at law**

On December 16, 2022, the Corporate Sustainability Reporting Directive was published in the Official Journal of the EU.

The directive amends previous EU legislation: Regulation (EU) No. 537/2014, Directive 2004/109/EC, Directive 2006/43/EC, and Directive 2013/34/EU, which govern the reporting obligations of corporations.

The directive is binding on each EU member state in terms of the result to be achieved, but leaves the national governments free as to the choice of the form and means. The directive, therefore, has no direct effect, unlike regulations, which are binding in their entirety and directly applicable to all member states.

The adoption of the directive stems from the European Green Deal, which aims to transform the EU into a modern, resource-efficient, and competitive economy with zero net greenhouse gas emissions by 2050, as well as to protect, preserve, and enhance the EU's natural capital, and protect the health and well-being of the EU's citizens from environmental risks and negative impacts.

Pursuant to the directive, all large corporations, as well as medium and small listed companies are required to include in their reports information on their activities related to the environmental and social aspects, as well as to human rights and corporate governance.

This information is necessary to understand the entities' impact on sustainability activities and how sustainability issues affect their development, performance, and situation.

In their reports, entities have to clearly distinguish the above information by placing it in separate sections of the reports.

An expanded corporate governance disclosure is also to include, among other things, a description of the diversity policy applied in the entity's administrative, management, and supervisory bodies with respect to gender and other aspects, such as age, disability, education, and work experience, the objectives of the diversity policy, how it is implemented, and the results achieved during the reporting period. The absence of such a policy will require the submission of a statement explaining such a decision.

According to the directive, the Commission will adopt delegated acts to establish sustainability reporting standards. The adoption of such standards is aimed at ensuring a high level of reported information, so that it is coherent, verifiable, comparable, and accurate.

The obligation to publish sustainability reports has also been imposed on subsidiaries based in EU member states, whose parent companies are governed by the laws of third countries.

Compliance of sustainability reports with the standards to be adopted by the Commission will be subject to validation by auditors.

The EU member states are required to implement the directive by July 6, 2024.

Large public companies listed on a stock exchange (with a balance sheet total of EUR 20 MLN or sales revenue of EUR 40 MLN) with more than 500



employees are required to start submitting sustainability information as early as for the fiscal year of 2024.

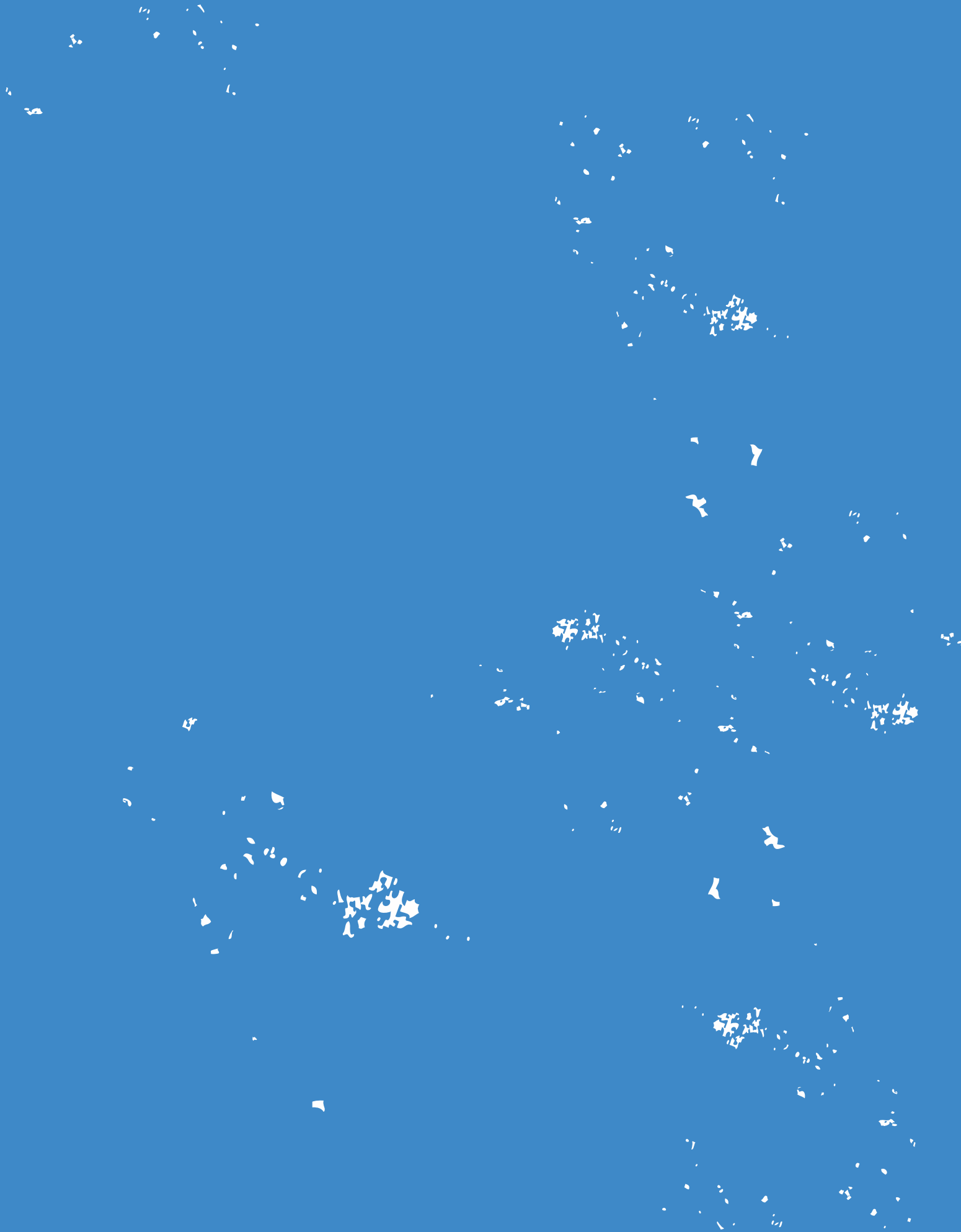
For the fiscal year of 2025, sustainability information must be submitted by other large entities that exceed at least two of the following three criteria as of the balance sheet date: 1) balance sheet total of EUR 20 MLN; 2) net sales revenue of EUR 40 MLN; 3) average number of employees in the fiscal year: 250.

Other entities, i.e. small public companies (which, as of the balance sheet date, do not exceed the limits for at least two of the following three criteria: 1) balance sheet total of EUR 4 MLN; 2) net sales revenues of EUR 8 MLN; 3) average number of employees in the fiscal year: 50) and medium-sized public companies (which, as of the balance sheet

date, do not exceed at least two of the following three criteria: 1) balance sheet total of EUR 20 MLN; 2) net sales revenues of EUR 40 MLN; 3) average number of employees in the fiscal year: 250) are required to start submitting sustainability information for the fiscal year of 2026.

According to the directive, the improved corporate sustainability reporting is intended to ultimately benefit citizens, investors, and the civil society. With the new obligations imposed on companies, every market player will have better access to selected and comparable sustainability data. Good reporting is also expected to provide opportunities for the reporting entities themselves by facilitating their access to financial capital, identifying their own risks and their ability to manage these risks, and improving their reputation and the communication between the entities and their stakeholders.

Specification	Final implementation date	Reporting date
Large public interest companies, already covered by the NFRD and employing more than 500 employees.	from January 1, 2024	2025
Large companies that are not subject to the NFRD and have more than 250 employees and/or €40 million in turnover and/or €20 million in total assets.	from January 1, 2025	2026
Small and medium enterprises as well as other listed companies.	from January 1, 2026	2027



# Our experts

answer your questions



### Can the carbon footprint be determined for pig feed?

The term carbon footprint refers to the calculation of total greenhouse gas emissions during the full life cycle of a product (business/farm). It is expressed as carbon dioxide equivalent per functional unit of a product. Carbon footprint is the most reliable, measurable and internationally recognized tool for comparing companies in the same industries in terms of their innovation and environmental protection.

Every activity, especially human activity, creates environmental impacts. During the entire pig production process, there are many steps, each resulting in a specific carbon footprint, an element of the environmental footprint. The latter, on the other hand, is nothing more than an analysis of human demand for natural resources. One of the stages of pig production is feed production. Calculation of the carbon footprint in this case is facilitated by providers of optimization software. The feed formulation software used at our company provides a 'feed production – environmental impact' panel. The basis for this functionality is a dataset developed by the Global Feed LCA Institute (GFLI). The GFLI is an independent institute that studies animal nutrition and the food industry, whose goal is to develop a publicly available database for animal nutrition life cycle assessment (LCA). The goal is to support an authoritative environmental assessment of animal nutrition products and stimulate continuous environmental improvement in animal nutrition and the food industry.

The following page shows an excerpt from a table that includes 962 final products from four different sources. Processed products additionally include the impact of transportation and processing. Each of the listed products has more than a dozen parameters specified (19 are currently published). These include 'impact on global warming' with or without the inclusion of land use change (LUC). LUC is associated with deforestation of large areas of land. The best example is the deforestation of Amazonia. As can be seen in the table, the carbon footprint of barley grain from Argentina is as much as 4 370.04 kg of carbon dioxide equivalent per ton of product, compared to 464.04 kg for barley from Poland.

For pig feed (and feed for other livestock), the carbon footprint can be calculated using indicators from publicly available tables, such as the GFLI. Sometimes formulations include ingredients that are not listed and it is difficult to estimate their environmental impact. In such cases, the proportion of dry matter that can be declared for a given formulation is specified. The GFLI values include the production of raw materials delivered to production plants. In addition, the 'environmental' modules in the nutritionist's optimization software can include the carbon footprint associated with the production process and the transport of feed to the farmer. As one can easily guess, feeds that are less processed at the feed plant (e.g. loose feed versus pelleted feed) have a lower carbon footprint. Likewise, regarding transportation, feed delivered to local customers has a lower carbon footprint than feed transported over hundreds of kilometers to its final destination. To adapt feed production to climate change, modifications in animal nutrition will be necessary. The expectation is that new feeds will result in lower carbon dioxide and methane emissions from animals, even though these emissions have already been significantly reduced. More precise evaluation of ingredients, processing of ingredients in thermobaric processes, balancing of digestible amino acids, work on animal genetics, i.e. intensification of production in the broadest sense, has resulted in lower feed consumption and better growth rates, and consequently in lower greenhouse gas emissions. For example, an increase in the milk production of cows from 4 000 to 12 000 liters per year results in an increase in methane emissions by 'only' 56% instead of the 300% that would result from a simple calculation.

With the view to protect the climate and the environment, our company no longer focuses solely on production results, health, and the broadly defined welfare of livestock, but also on the use of raw materials from the immediate vicinity of our plants, which only strengthens our business ties with local producers and leads to independence from supplies from outside the country or continent.

*Sylwester Filipek*  
–Animal Nutrition Specialist Wipasz S.A.



GFLI Deliverables		Life Cycle Impact Assessment		
Product name	Source	Global warming -Including LUC (kg CO2 eq / ton product)	Global warming -Excluding LUC (kg CO2 eq / product)	Stratospheric ozone depletion (kg CFC11 eq / ton product)
Barley grain, dried, at farm/AR Economic S	GFLI EU	4370,04	475,46	0,01
Barley grain, dried, at farm/AT Economic S	GFLI EU	368,92	368,92	0,01
Barley grain, dried, at farm/AU Economic S	GFLI EU	808,94	542,31	0,01
Barley grain, dried, at farm/BE Economic S	GFLI EU	432,11	432,11	0,01
Barley grain, dried, at farm/BG Economic S	GFLI EU	441,00	441,00	0,01
Barley grain, dried, at farm/CA-AT Economic S	GFLI Cane	309,87	309,87	0,01
Barley grain, dried, at farm/CA-ON Economic S	GFLI Cane	265,54	265,54	0,01
Barley grain, dried, at farm/CA-QC Economic S	GFLI Cane	243,42	243,42	0,00
Barley grain, dried, at farm/CA-WE Economic S	GFLI Cane	285,95	285,95	0,01
Barley grain, dried, at farm/CH Economic S	GFLI EU	391,27	391,27	0,01
Barley grain, dried, at farm/CZ Economic S	GFLI EU	445,54	445,54	0,01
Barley grain, dried, at farm/DE Economic S	GFLI EU	403,47	403,47	0,01
Barley grain, dried, at farm/DK Economic S	GFLI EU	364,55	364,55	0,01
Barley grain, dried, at farm/EE Economic S	GFLI EU	547,78	547,78	0,01
Barley grain, dried, at farm/ES Economic S	GFLI EU	721,32	721,32	0,01
Barley grain, dried, at farm/FI Economic S	GFLI EU	4.85,74	4.85,74	0,01
Barley grain, dried, at farm/FR Economic S	GFLI EU	361,34	361,34	0,01
Barley grain, dried, at farm/GR Economic S	GFLI EU	623,70	623,70	0,01
Barley grain, dried, at farm/HU Economic S	GFLI EU	440,21	440,21	0,01
Barley grain, dried, at farm/IE Economic S	GFLI EU	371,59	370,41	0,01
Barley grain, dried, at farm/IT Economic S	GFLI EU	525,40	525,40	0,01
Barley grain, dried, at farm/LT Economic S	GFLI EU	517,76	517,76	0,01
Barley grain, dried, at farm/LV Economic S	GFLI EU	551,44	551,44	0,01
Barley grain, dried, at farm/NL Economic S	GFLI EU	469,87	469,87	0,01
Barley grain, dried, at farm/PL Economic S	GFLI EU	464,04	464,04	0,01
Barley grain, dried, at farm/PT Economic S	GFLI EU	1255,73	1255,73	0,02
Barley grain, dried, at farm/RO Economic S	GFLI EU	470,73	470,73	0,01
Barley grain, dried, at farm/SE Economic S	GFLI EU	361,32	361,32	0,01
Barley grain, dried, at farm/SK Economic S	GFLI EU	491,71	491,71	0,01
Barley grain, dried, at farm/UK Economic S	GFLI EU	402,52	402,52	0,01
Barley grain, production mix, at farm/CA Economic S	GFLI Cane	285,01	285,01	0,01
Soybean meal, from crushing (solvent), at plant/AR Economic S	GFLI EU	5326,56	567,63	0,00
Soybean meal, from crushing (solvent), at plant/BR Economic S	GFLI EU	4285,02	635,69	0,00
Soybean meal, from crushing (solvent), at plant/DE Economic S	GFLI EU	2479,34	589,39	0,00
Soybean meal, from crushing (solvent), at plant/ES Economic S	GFLI EU	3552,56	781,17	0,00
Soybean meal, from crushing (solvent), at plant/FR Economic S	GFLI EU	2188,61	574,32	0,00
Soybean meal, from crushing (solvent), at plant/GLO Economic S	GFLI EU	2644,20	570,62	0,00
Soybean meal, from crushing (solvent), at plant/IT Economic S	GFLI EU	2186,31	721,00	0,01
Soybean meal, from crushing (solvent), at plant/NL Economic S	GFLI EU	2691,08	598,51	0,00
Soybean meal, from crushing (solvent), at plant/PT Economic S	GFLI EU	3124,76	641,84	0,00
Soybean meal, from crushing (solvent), at plant/RER Economic S	GFLI EU	2681,63	581,41	0,00
Soybean meal, from crushing (solvent), at plant/UK Economic S	GFLI EU	3628,10	647,29	0,00

### How can the use of antibiotics be reduced in pig production?

One should be aware of the fact that the use of antibiotics in animal production to improve health and stimulate animal growth results in the possibility that the residues of these substances remain in animal products such as meat. Zoonotic products consumed by humans that contain antibiotic residues can adversely affect their health. This includes the development of allergies, as well as changes in the composition of the intestinal microbiota, which disrupts not only digestive functions, but also the body's homeostasis. Nowadays, we know that the intestinal microflora is largely responsible for our immunity and other aspects of health, including its impact on mental health.

The need to reduce the use of antibiotics is primarily due to the growing problem of drug-resistant bacteria that cause disease in both pigs and humans and the increasingly narrow list of antibiotics that guarantee effective treatment.

Since January 1, 2006, the use of antibiotics as growth promoters (AGPs) in animal production has been completely banned in the member states of the European Union, but AGPs are still widely used outside the EU, especially in Asia and the Americas.

It is encouraging to see that, according to a recent report by the European Medicines Agency, sales of antimicrobial veterinary products fell by 47% between 2011 and 2021 in 25 European countries. This path leads in only one direction: our common good. One should also bear in mind that one of the principles of the Green Deal is to reduce the use of antibiotics in livestock production in EU countries by 50% by 2030.

How is it possible to adhere to the principle of antibiotic-free pig production?

It is extremely important to ensure optimal environmental conditions in pig houses, which involve a number of aspects: nutrition, microclimate, stocking, zootechnical and veterinary prophylaxis, but also production hygiene and taking care to ensure the lowest possible level of stress.

The microclimate in the pig house – temperature, humidity, lighting, concentrations of noxious gases, and noise – must comply with the applicable legal standards for each technological group.

A pig's body exposed to unsuitable microclimate conditions is subjected to strong stressors, which weaken the body's immune system and adaptive abilities. Excessive heat, draughts, hypothermia, and excessive concentrations of noxious gases are all factors that weaken immune mechanisms.

Ensuring adequate stocking standards should be driven not only by legal obligations, but also by concern for animal health. Nowadays, the very production environment is a very strong stressor. High production concentration, overcrowding in the pen, limited living space, poor production environment, and lack of enriching elements (bedding, toys) lead to behavioral disorders. These are very strong stressors that cause not only somatic stress, but also psychogenic stress. Pigs tired of lack of space and boredom, frustrated and stressed out suffer from emotional problems, which can manifest as cannibalism, for example. The associated elevated levels of cortisol impair immune mechanisms, resulting in increased susceptibility to infections, and consequently to the administration of antibiotics.

When the ban on antibiotic growth promoters was implemented in 2006, a gap was created for various feed additives to take over their role and non-antibiotic growth promoters started to be mentioned. Non-antibiotic growth promoters are antibacterial, bacteriostatic, antiviral, and anti-inflammatory sub-

stances of natural origin. Their role is to stimulate immunity and improve health, but also to stabilize metabolic processes. Non-antibiotic growth promoters comprise such groups of additives as:

- ☒ probiotics;
- ☒ prebiotics;
- ☒ synbiotics;
- ☒ enzymes, emulsifiers;
- ☒ mineral compounds, chelates of certain bioelements;
- ☒ dried herbs and plant extracts in loose or liquid form;
- ☒ acidifiers (organic and inorganic acids, salts of these acids);
- ☒ substances extracted from plants: fractions of extracts (alkaloids and phosphorylated glycosides, triterpene derivatives), individual compounds (e.g. thymol, carvacrol, cinnamaldehyde, capsaicin, eugenol).

Probiotics, prebiotics, and synbiotics show beneficial effects on the health, growth, and development of an animal's body by selectively stimulating the proliferation and activity of beneficial bacterial strains that make up the natural microflora of the digestive system. This positive effect becomes particularly important in the case of very young animals whose intestinal microflora is not yet stabilized.

The action of acids (acidifiers) has shown great effectiveness in reducing the abundance of pathogenic intestinal flora, and thus a positive effect on the decrease in morbidity. The acidic reaction in some sections of the digestive tract inhibits the growth of pathogenic microorganisms, but also stimulates digestive processes, improving the utilization of feed nutrients.

The herbs with the strongest antibacterial activity include thyme, oregano, and sage. Results of many studies carried out on this subject are available.

The antimicrobial effect of essential oils is that they disintegrate bacterial cell membrane structures, cause ions to migrate out of the cell, etc. Some saponins, such as those from *Yucca Schidigera*, reduce ammonia production in an animal's digestive tracts, thus reducing ammonia emissions into the environment and improving animal welfare in livestock buildings. Herbs that also have a stimulating effect on the immune system include echinacea, garlic, aloe vera, oregano, and nettle.

The next point that should not be overlooked is the modification of the organization and technology of production, as well as the introduction of the principles of bioassurance in the broad sense:

- ☒ prevention;
- ☒ site fencing;
- ☒ improving occupational hygiene;
- ☒ implementing vaccination programmes;
- ☒ controlling the entry of visitors to the farm;
- ☒ monitoring the health status of the herd;
- ☒ eliminating the risk of the spread of diseases;
- ☒ DDD (disinfection, disinfestation, deratization) programmes;
- ☒ using acclimatization methods for animals introduced into the herd;
- ☒ setting up a quarantine room for sick animals;
- ☒ dividing the farm area (administrative, supply, and production parts).

There is much more to be said on the subject of antibiotic-free pig farming and only the most important issues are mentioned here. In order to achieve the goal, a number of measures must be implemented, including the principles of proper care, nutrition, attention to microclimate, production hygiene, prophylaxis, monitoring of the health status of the herd, reduction of stress, and obligatory application of the principles of bio-assurance.

**Bartosz Myśliński**  
– *Feed Formulation Specialist Wipasz S.A.*

### Organic cereal production – what should be the basis for selecting varieties for cultivation?

According to Statistics Poland (SP), the number of organic farms in 2021 was nearly 20 000, and the area of land devoted to organic production was equal to 549 443 hectares. The share of cereals in these farms exceeds 40%, which indicates the great importance of this type of crop in organic production.

In general, the yields achieved are lower compared to the conventional farming system. Depending on the type, they range from 1.5 to 4 tonnes/hectare. This is due to the fully extensive method of cultivation of this crop category and the underutilization of its production capacity. However, if farmers take care of weed control, proper fertilization, and crop rotation, and implement biosecurity methods, the yields obtained can approach the results achieved by conventional farms.

An important element of cereal agrotechnology, which in practice is insufficiently utilized on organic farms, is the selection of the right variety. This is a key element that determines the success of the crop. Not all varieties can be successfully used on organic farms. When selecting the variety, one needs to be aware that there is no variety that is completely disease resistant, but choosing the right one will allow the farmer to better utilize the potential of the habitat and contribute to the quality of the harvest.

The main criteria for selecting cereal varieties for cultivation on organic farms are:

- ☒ longer straw, as this type of cereal can better compete with weeds;
- ☒ greater ability to recover after intensive treatment with a weeder harrow;
- ☒ adaptation to local habitat conditions, which enables stable yields of the variety;
- ☒ lower soil requirements and high ability to absorb fertilizer nutrients from the soil;
- ☒ high winter hardiness, since fields thinned during the winter undergo heavy weed infestation and produce very low yields;
- ☒ early ripening, as damage caused by leaf and ear diseases (mildew, blight, and septoria) is generally more limited than in late varieties.

Breeders are constantly improving new varieties in terms of yield quality, as well as in terms of many economic traits, mainly those related to resistance. This is especially true of the resistance of cereal varieties to biotic stresses – diseases, pests, and tolerance to abiotic stresses – low and high temperatures, lack and excess of rainfall, soil acidification, etc. With yield being the main focus of cultivation, the currently available varieties have significantly higher yields (up to a ton more) than varieties from a decade ago. It is safer to bet on proven varieties, i.e. those that produce high and consistent yields over the years. However, one should not be particularly attached to growing the same varieties, as new varieties can bring major advances.

*Sebastian Węgiński  
– Purchasing and Market Analysis Specialist  
Wipasz S.A.*



## Is carbon-free agriculture possible?

Over the next few years, Polish and European agriculture will undergo major changes. The reform of the Common Agricultural Policy, the EU's biodiversity and 'farm-to-table' strategies are expected to ensure, among other things, greater resilience to crises resulting from climate change.

Poland is in a good position compared to other European Union countries due to the fact that it already uses less plant protection products and fertilizers. Food production is, after all, one of the sectors of the economy that are most important to us. We use its products practically every day when buying and consuming. However, Polish agriculture emits about 32 million tons of CO<sub>2</sub> equivalent into the atmosphere annually, which is about as much as the Bełchatów power plant.

Polish agriculture will have to meet the growing global demand for food in the near future, not only because of the higher consumption and the larger global population. The increasingly severe effects of climate change could lead to a collapse or at least a significant reduction, in agricultural production in tropical regions. The production lost there will have to be replaced with more food produced in Europe, among other places. But here, too, agricultural production will be subject to climatic pressures. In Poland, these will mainly be more frequent and longer heat waves and

water scarcity. That is why it is so important for agriculture to become more involved than before in reducing greenhouse gas emissions while implementing adaptation programmes.

The introduction of solutions that support climate neutrality in Polish agriculture will not be possible without the involvement of politicians and the creation of an institutional and legal framework for their implementation. Therefore, the transformation process – at both the organizational and practical levels – must primarily involve public institutions. A possible solution that can help consumers make responsible purchasing decisions is to implement a system for labeling food products with information about their carbon footprint. Such a system, introduced by legislators, would contribute to an effective reduction of CO<sub>2</sub> emissions in the agricultural sector. This would allow consumers to choose products made with greater concern for the climate, as well as those from the local market that are not imported from distant places (e.g. meat from cows raised in Brazil or flowers grown and brought to the European market from Africa). Such a mechanism would also stimulate producers, including farmers, to do more for climate responsibility.

*Sebastian Węgiński*  
– Purchasing and Market Analysis Specialist  
Wipasz S.A.



### **How should pre-slaughter fast be conducted correctly to be in compliance with the applicable regulations and, at the same time, avoid the problem of fed birds at the slaughter-house?**

To make sure that birds are not fed (which is checked by monitoring the filling of the crop), the birds should be deprived of access to feed for at least 8 hours before the scheduled slaughter time. Complete feed deprivation involving lifting the feed lines, not just shutting down the feed conveyor. Water must remain available until loading begins: if the birds do not adequately moisten the contents of the crop after they consume the feed, it will not move further and will stay in the crop regardless of the time until slaughter and the duration of transport. A full digestive tract is very easily damaged during evisceration, causing contamination of the carcass - this is not only a reason for confiscation of the carcasses by the State Veterinary Inspectorate (in the case of visible contamination), but most importantly, it causes contamination of the slaughter line with the content of the digestive tract, which leads to a dramatic deterioration of the microbiological purity of the meat and spoilage before the expiry of the declared shelf life. Any remaining feed particles are treated as foreign bodies and disqualify the product from sale. In practice, this means that one shipment of fed livestock at the beginning of a slaughter can disqualify meat from the entire slaughter day.

At the same time, Council Directive 2007/43/EC of June 28, 2007 laying down minimum rules for the protection of chickens kept for meat production specifies the maximum time chickens can be deprived of access to feed – in its Annex 1, section 2 'Feeding' which provides that:

*Feed shall be either continuously available or be meal fed and must not be withdrawn from chickens more than 12 hours before the expected slaughter time.*

In practice, this leaves 4 hours between the slaughter time of the first and last transport from

a given poultry house. Therefore, counting the loading time i.e. one hour per vehicle, all poultry houses from which more than 4 transports leave on one slaughter day must be received by 2 loading teams simultaneously (alternating, to speed up the loading) or the facilities must be equipped with the possibility to fence off a part of the area in order to reduce the time when birds are deprived of access to feed.

On the next page is an example photo of a poultry house divided with a fence; the birds to be loaded first are already undergoing a period of pre-slaughter fast and are being prepared for transport, while the remaining birds are still feeding normally.

*Marek Mrozowski*  
– *Director of Raw Materials Supply,*  
*Chief Veterinary Wipasz S.A.*

### **Can poultry droppings be used in an environmentally friendly manner?**

Poland is the largest producer of poultry in Europe, which involves the production of large quantities of manure (a mixture of droppings and litter), mainly chicken manure. It is assumed that the daily amount of droppings is about 150 kg per thousand of laying hens and 65 kg for chicken broilers. Therefore, it is important to properly manage such large quantities and to do it in an environmentally friendly manner.

The largest amount of chicken manure is managed in an environmentally friendly manner as an organic fertilizer added to the soil in crop fields, orchards, and gardens. This is a very important method that reduces the use of mineral fertilizers, and in recent times, with the high prices of artificial fertilizers, also has a positive economic aspect. Chicken manure de-acidifies the soil, improves its structure, and provides plants with nutrients.

In recent years, research and practice related to the use of the energy content of chicken manure and droppings as the main substrate in biogas plants has become increasingly important. The disadvantage of this material is the large amount of protein it contains, which inhibits the production of biomethane in the fermentation process. However, technologies are being introduced to reduce nitrogen and therefore protein levels. The most common method is to add another organic substance with high fermentation potential (dilution). Such substances include coconut waste, coffee grounds, corn straw waste, and dehydrated beet pulp. The ratio of these components of droppings to the other substrate should not exceed 1:1. Another method, developed by Dr. Andrzej Lewicki of the Poznań University of Life Sciences, is nitro-

gen reduction by precipitation of lactic acid. It is then not necessary to add a second substrate. This method dramatically improves the economic viability of biogas production. The Austrian company NAHTEC GmbH is conducting research on the use of chicken manure and droppings in an environmentally friendly way, while improving the cost effectiveness of production. The company has developed a two-stage evaporation system that leads to thickening of the fermentate and to nitrogen extraction. The resulting substances are ammonium sulfate, which is a fertilizer that is suitable for sale, as well as manure or droppings prepared as a substrate for the production of biomethane.

*Tomasz Kisiel  
– Regional Sales Director, Poultry Sales Department  
Wipasz S.A.*



*Image 1. Livestock facility divided by a fence*

### Use of common garlic in pig nutrition

The ever more sophisticated methods of raising pigs are increasing the risk of health problems. For prevention and treatment, it is wise to use natural products that improve immunity and speed up recovery.

An example of a natural health-promoting product used in animal nutrition is garlic, which inhibits the growth of bacteria and fights infections. The plant itself and the oil extracted from it are characterized by a rather intense odor, which increases appetite in pigs. This results in a better feed intake and increased secretion of saliva and bile juices. The essential oils inhaled by animals during feeding promote the removal of the dust that clings to the walls of the respiratory tract and eliminate the dry cough reflex. In addition to its excellent antibacterial activity, garlic is also rich in vitamins and mineral salts. Adding a small amount of garlic to the feed significantly improves the recovery of piglets, as well as animals in other production groups. In swine nutrition, it is most often used to stimulate the immune system, metabolism, and digestion. Garlic affects mainly the digestive system, and its health-promoting properties are particularly evident in the elimination of pathogenic intestinal flora. In view of its qualities, Wipasz offers a concentrate with a natural garlic extract – **Witamix Multi Sojowy Czosnek**.

Adam Rzewuski  
– Pig Nutritionist Advisor Wipasz S.A.

### Application of biological methods to improve the quality of liquid manure

The agricultural use of manure produced in animal

husbandry is a legitimate economic method in many respects. The abundance of easily digestible nutrients and their high bioavailability in manure make it an excellent natural fertilizer. However, the introduction of manure is accompanied by ecological, hygienic, and sanitary problems. The possible presence of microorganisms in sediments that are pathogenic to humans and animals requires measures that realistically reduce the potential contamination of soil, water, and plants. The proliferation of antibiotics and their active metabolites in liquid manure can promote the development of antibiotic-resistant strains. On the other hand, the appearance of microorganisms with developed drug resistance mechanisms in this environment can lead to their transmission to other microorganisms.

Wipasz offers **Activ N**, a product that contains bacteria that decompose organic matter through aerobic processes. In addition, these bacteria prevent the growth of anaerobic organisms responsible for unpleasant odors, as well as the formation of ammonia, hydrogen sulfide, and many other harmful gases and odors. Sludge processing by landfilling, composting, or aerobic digestion can effectively eliminate antibiotic residues, thereby reducing the absorption of these compounds into the soil. Any treatment by which sewage sludge is carried out must, in addition to improving its physicochemical properties, primarily reduce its microbiological activity before use. Knowledge of the presence and survival of pathogenic microorganisms in sludge is the basis for their proper handling. Compliance with relevant standards ensures effective elimination of pathogenic microorganisms from sludge and allows its safe use in agriculture.

Adam Rzewuski  
– Pig Nutritionist Advisor Wipasz S.A.





### Fattening without antibiotics – important factors to be considered before and during fattening

Antibiotic-free fattening involves growing piglets that usually weigh between 30 kg and the weight required by the slaughterhouse (120–125 kg) without using chemotherapeutic products in the entire herd. Injectable drugs are allowed only in individual cases when the treatment requires it. Animals treated in this way are labeled and sold as conventionally raised porkers.

Herd health is a critical factor for fattening without antibiotics. To keep it at a high level, one needs to ensure a relative homeostasis for the animals, improve their immunity, and limit the pressure of pathogenic microorganisms. These measures must be implemented as early as during the selection of the animals for fattening and must continue until the production results that summarize the fattening process are collected.

#### Pre-fattening

The first step is to gather information on the piglets to be fattened. The health status and the prophylactic measures used in the herd, the genetics, the nutritional requirements, and the number of animals per batch are important factors. The collected data must be reviewed by the veterinarian who will take care of the herd. It is wise to analyze the immunoprophylactic measures applied for the animals – if they are lacking, vaccinations must be carried out, which work well in antibiotic-free fattening. It is wise to agree with the veterinarian in charge of the herd on the principles of future cooperation.

The piglets must be placed in a properly prepared building. This means that the livestock premises, the equipment used during the production, the elements around the livestock premises (ramps, containers for dead animals, basins, and gates for disinfection) must be cleaned, washed, and disinfected. The watering line and the feed dispensing systems also need to be cleaned and disinfected.

#### During fattening

Fattening starts by proper settling and care for the achievement of a balance. The animals must be placed in clean, disinfected, and heated premises, and the temperature must be adjusted according to the weight of the piglets. The number of the animals must correspond to the size of the fattening house, i.e. 1 m<sup>2</sup>/head. 75% of the fattening house should be occupied by the piglets, while empty pens should be allocated to animal undergoing treatment, animals of inappropriate weight, and a hospital, among other things. The availability of water and feed, and the adjustment of the feeders must be inspected. The feed should be selected according to the nutritional requirements of the piglets: the choice depends mainly on the genetics and the weight of the animals. In addition to the feed parameters, the right amount of each type of feed should also be adjusted. If feed is prepared from the farm's own cereals, it is necessary to examine the parameters of the cereals beforehand to properly balance the formulas.

In antibiotic-free fattening, one must constantly observe the animals and react quickly to physiological changes. One must not allow pathological symptoms to worsen, as the herbal, mineral, and vitamin products used often have a longer response time. The course of action and the groups of changes and symptoms that require immediate attention must be agreed with the veterinarian. Products for ongoing disinfection in the presence of animals should be constantly available and such treatments should be carried out systematically.

*Agata Sienkiewicz-Sagan  
– Pig Nutrition Advisor, Sow Nutrition Specialist,  
Veterinarian at Wipasz S.A.*

## How does Wipasz reduce the carbon footprint of its feed production?

Wipasz S.A. has been running a responsible business and caring for the welfare of the environment since its inception. We are promoting the right direction – the Green Farms standard – which is based on renewable energy sources, improved animal welfare, and total antibiotic-free broiler breeding.

It is well known that the factor with the biggest impact on the amount of the greenhouse gases emitted is the length of supply chains, both of feed ingredients and the finished product. With six feed plants located throughout Poland and our own fleet of delivery trucks, we optimize the transportation of feed and materials. We buy most of our raw materials, such as cereals, post-extraction meal, and oil cake, domestically, from domestic producers – only those raw materials that are not available naturally in Poland are imported from other countries. We also use renewable energy sources and advanced energy-saving technologies. By increasing the productivity of the herds we care for them and reduce their negative impact on the environment. The lower the feed consumption per unit of production, the lower the greenhouse gas emissions.

Methane is considered to be the most dangerous gas generated in the course of livestock production, which, along with carbon dioxide, has the greatest impact on climate change. Cow herds are a huge source of this gas. The amount of emissions

is strongly related to the productivity of animals: it is assumed that for a yield of 10 000 liters, the emissions are 12 g per liter of milk, and for lower yields they increase: for example, they are equal to 23 g for animals producing 5 000 liters.

In cattle feed, Wipasz S.A. uses specialized additives included in the BIOLTAN formula, which reduce the amount of methane emitted while contributing to better feed utilization, thereby increasing productivity.

For years, we have been using proteins protected from degradation in the rumen to produce compound feed for cattle. This allows us to greatly reduce our purchases of soybean meal, the shipping of which has a large carbon footprint.

Modern forms of vitamins, trace elements, and protected amino acids make it possible to reduce their amounts in feed while providing better nutrition to animals. This contributes to a reduction of the carbon footprint of their production and transportation.

Our specialist are constantly working to optimize rations at the thousands of farms supported by Wipasz S.A., and their work to improve farming efficiency contributes to a reduction of carbon dioxide and methane emissions.

*Filip Kula*  
– Product Manager, Cattle Sales Department,  
Wipasz S.A.



# Green Farms chicken soup with roasted vegetables

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## Ingredients:

- ▶ 1 package of Green Farms Chicken Legs
- ▶ 1 package of Green Farms Chicken Wings
- ▶ 1/2 celery
- ▶ 2 large carrots
- ▶ 1 leek
- ▶ 1 onion
- ▶ 1 table spoon of vegetable oil
- ▶ 3 liter of cold water

## Spices:

- ▶ 2 tablespoons of fresh lovage
- ▶ 1 pinch of pepper
- ▶ 1 table spoon of salt
- ▶ 4 grains of allspice
- ▶ 4 bay leaves

## Preparation:

### STAGE I

Pour cold water into a large pot and put the meat inside. Bring to a boil over high heat. In the meantime, peel and wash the vegetables. Cut the leek and the onions in half, and the carrots, the parsley, and the celery into thicker sticks. Put all vegetables (except the leek) in a bowl, drizzle with oil, and sprinkle with pepper. Mix and move the products onto a baking pan lined with baking paper. Bake it at 200°C for 30 minutes.

### STAGE II

Reduce the heat under the stock, pour off the scum or remove it with a straining spoon. Move the roasted vegetables into the pot with the meat. Add the leek, the allspice, and the bay leaves.

### STAGE III

Cook the soup on low heat for about 3 hours. Halfway through the cooking, add a tablespoon of salt. Remove the roasted vegetables from the pot, cut them into pieces and place them on the bottom of a plate. Take out the meat, separate it from the bones, and cut it into smaller pieces. Then combine it on a plate with the vegetables. Pour the broth and sprinkle with chopped lovage. You can serve it with your favorite noodles.

**Enjoy it!**



# Spring tart with Chicken from the Green Farms and asparagus

## Ingredients for the crisp bottom:

- 200 g of wheat flour
- 150 g of cold butter
- 2 egg yolks
- a pinch of salt

## Ingredients for the filling:

- 250 g of Green Farms Chicken Fillet
- 1 bunch of green asparagus
- 250 g of feta type salad cheese
- 10 cherry tomatoes

## Spices:

- 2 boiled beets
- 2 eggs
- ½ cup of 30% cream
- 1 small Greek-type yogurt
- 3 table spoons of milk
- 1 table spoon of flour
- a bunch of dill
- a pinch of salt
- a pinch of pepper

## Preparation:

### STAGE I

Knead a shortbread dough from flour and cold butter cut into small pieces, with salt added. Make the crumble by hand or with a mixer. Then add egg yolks and combine the ingredients into a homogenous dough. Wrap the kneaded dough in plastic wrap and place it in the refrigerator for half an hour.

Use the dough to line the bottom and sides of a buttered tart pan. Prick the bottom with a fork and then place it in an oven preheated to 180°C. Bake it for 15 minutes until the bottom becomes brownish.

### STAGE II

Dice the chicken, fry it in a skillet and season it as desired. Rinse the asparagus, break off the woody ends, and cut the remaining stalks into smaller pieces. Also cut the beet, cherry tomatoes, and salad cheese into smaller pieces and put them in a bowl.

Mix the eggs in a separate bowl with a spatula with the following ingredients: cream, yogurt, milk, flour, salt, and pepper. Add finely chopped dill.

**Enjoy it!**



# Layered salad with Green Farm Chicken and horseradish dressing

## Ingredients for the salad:

- ☒ 1 package of Green Farms Chicken Breast Fillets
- ☒ a handful of lettuce
- ☒ 1 can of peas
- ☒ 1 can of corn
- ☒ a piece of leek
- ☒ 5 hardboiled eggs
- ☒ 2 pickled cucumbers
- ☒ 3 radishes
- ☒ a handful of bitter-cress or parsley leaves

## Ingredients for the horseradish dressing

- ☒ 2–3 tablespoons of horseradish
- ☒ 5 tablespoons of mayonnaise
- ☒ 8 tablespoons of natural yogurt
- ☒ 2 tablespoons of lemon juice
- ☒ a pinch of salt and pepper

## Preparation:

### STAGE I

Sprinkle the chicken breast with salt and pepper, drizzle with olive oil or vegetable oil, and place in an ovenproof dish. Bake in an oven preheated to 180°C for about 12 minutes. After cooling, cut into small cubes.

### STAGE II

Put the lettuce shredded by hand on the bottom of a bowl. Make the next layer with drained corn, and another with peas. You can cut the hard-boiled eggs into eighths or thick slices. Then place the sliced leek and diced pickled cucumbers in a thin layer. Make the last layer with diced Green Farms Chicken fillet.

### STAGE II

Place all the ingredients for the horseradish dressing in a small bowl and mix thoroughly. Pour the dressing on top of the salad.

**Enjoy it!**







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