The latest news and features from the farm food industry – WIPASZ COMPANY MAGAZINE

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NR 2/2023

EDITORIAL OFFICE ADDRESS:

Wipasz S.A.
Wadąg 9
10-373 Olsztyn

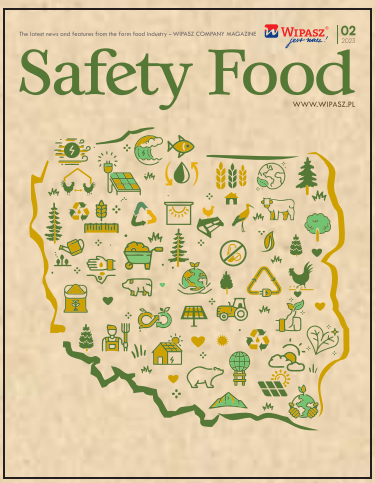
EDITOR-IN-CHIEF:

Paulina Buczek
paulina.buczek@wipasz.pl

GRAPHIC DESIGN:

Marcin Szuszkiewicz
marcin.szuszkiewicz@wipasz.pl

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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The history of Polish large-scale poultry farming began 50 years ago. We started with no experience and no facilities. Over the years, Polish farmers and breeders have improved and enlarged their farms, so that today we are the world leader in poultry farming. Our country and Polish farmers account for 22% of chicken farming in the European Union. The consumption of poultry meat in our country is about 30 kilograms per person, and we export almost 80% of our domestic production to the European Union.

For some time, we have been witnessing and participating in discussions regarding whether we need large-scale farms. Based on many analyses and all the experience so far, I can conclude that without such farms, we will not be able to meet the demand for poultry meat. In Poland, we consume an average of 30 kilograms of that meat per person, and if we assume that there are 1.3 million farms in Poland and each is involved in poultry farming, then each would have to produce 1 185 kilograms of poultry meat per year. With such farming and current prices, this would yield a profit for the farmer of about 1 PLN a day. Such production is not cost-effective, and the risks associated with it, such as bird flu, would be many times greater. It is an obligation of the Polish state and of Polish farmers and businesses to ensure food security. We can achieve this goal through large-scale farms. However, we must keep in mind that the world is changing, and we are also gaining the knowledge, experience, and possibility to adapt our farms to the changes and needs, and even develop them to be a leader in the transformation of chicken farming.

Sensitivity to the environment, animal welfare, as well as consumers' expectations regarding product quality require new infrastructure and technology. That is why we established the Polish Chicken Research Center – based on the experience and research conducted at the Center, we are building the Green Farms. Our research and experience have allowed us to prepare a farm concept that will meet the highest standards of animal welfare and minimize negative environmental impact. We can already boast some success. We are certified for breeding without the use of antibiotics, the Green Farms have been tested by the Polish Academy of Sciences in Zabrze, the Veterinary Institute – National Research Institute in Puławy, and the Technological and Natural Science Institute – National Research Institute in Falenty. The studies and tests conducted so far have shown that the Green Farms have no negative impact on air, soil, or water.

Ladies and Gentlemen, fellow Poles, politicians, local government officials, environmentalists! Without modern animal farming, Polish agriculture has no chance of survival. Producing healthy food, including animal and plant protein, is our responsibility. The tradition of a strong and hard working Polish countryside that provides food is our legacy. Let us honor this tradition, respect this gift of previous generations, and fight to pass on a strong countryside to new generations. However, for the countryside to be strong, it must also be modern. Plant and livestock production must be carried out in a sustainable manner that respects countryside residents, the environment, and animal welfare. Only by meeting all these conditions will we be able to say that we have brought Polish agriculture into a new era.

Józef Wiśniewski
President of the Management Board

Safety Food

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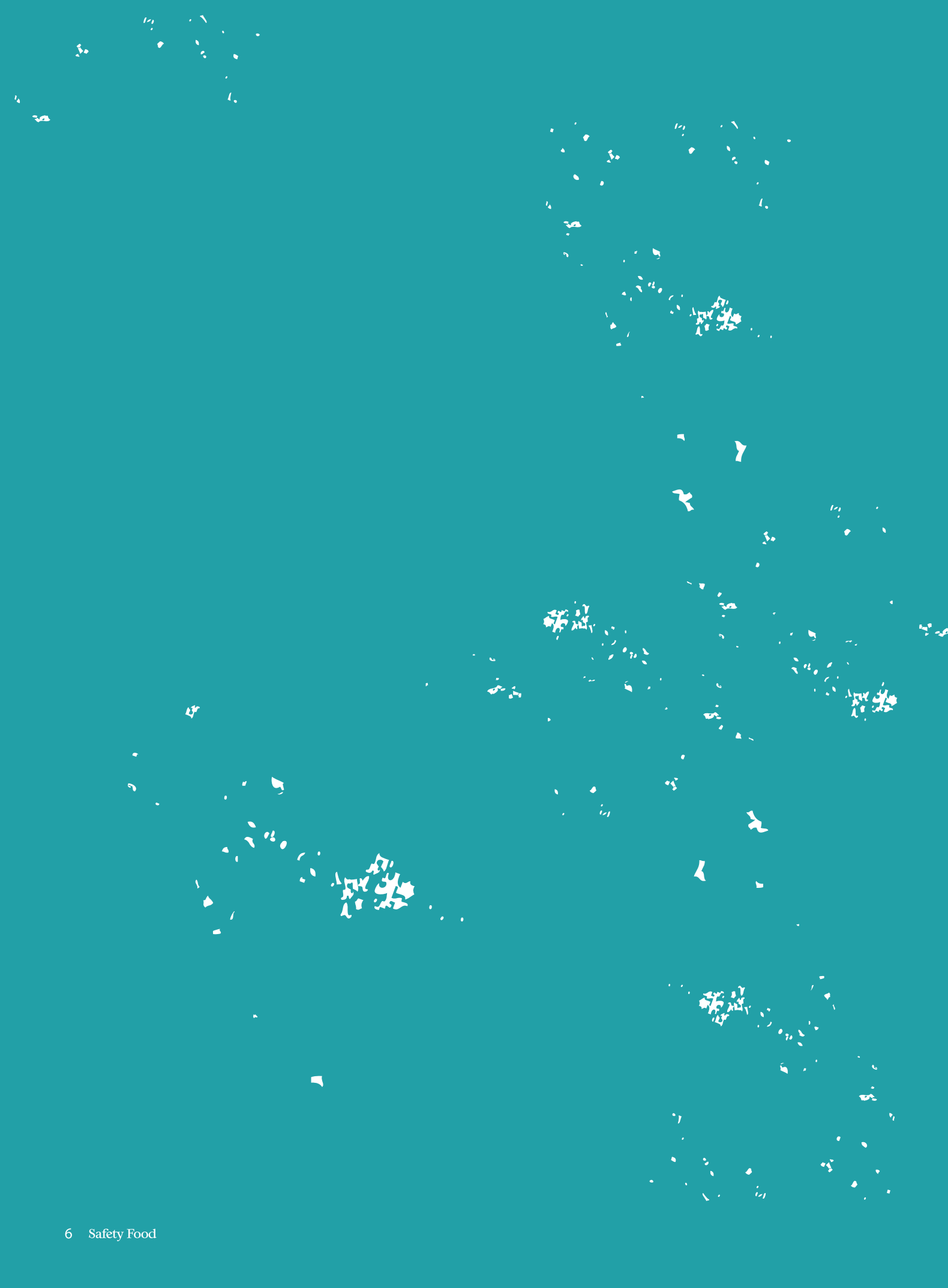

In this section you will read:

- Summary of the 2023 Anuga trade fair – thank you!

Summary of the 2023 Anuga trade fair – thank you!

Dawid Dudek – Deputy CEO, Sales Director, Meat Division Wipasz S.A.

Recent years have been very challenging for our country and for Polish industry. The negative effects of the COVID-19 pandemic, which is taking its toll to this day, the skyrocketing inflation that has caused many companies to go bankrupt, and the recurring bird flu epidemic – these are just a few of the obstacles that prevented Polish companies from operating to the fullest and developing. These factors also made it necessary for our company to make maximum efforts to meet the expectations of our customers and business partners at the highest level. It is also for this reason that we returned, after a 4-year break, to the largest trade fair for the food industry, Anuga 2023, as an exhibitor. It can be said that Wipasz made a revolution during this year's event. First and foremost, this happened because of the promotion of our philosophy related to the Green Farms, but also because of the unique booth that attracted the attention of many visitors from around the world.

From the first day of the fair, our booth attracted crowds of current and potential customers. The Wipasz team consisted of 37 members of the sales, marketing, R&D, technology, purchasing, and production departments. We held more than 700 meetings with customers over five days, which shows how much work we put into promoting our ideas and products. We did all this to share with the world our ideas, development direction, plans, and strategy that we have been pursuing for several years in building our own brand Green Farms and its sales in the form of meat and Wipasz Convenience products.

Anuga Trade Fair

Anuga, the world's largest and most important food and beverage trade fair, is the undisputed leader among such events, and it proved over the course of five days that it is definitely the place to be. The following numbers reflect the importance of this event: some 140 000 visitors from 200 countries and some 7 900 exhibitors from 118 countries made this leading global trade show exceed all expectations. The share of foreign exhibitors was as high as 94%, and the 80% share of foreign visitors was record high. This makes Anuga more international than ever and confirms its continued success as the number one food trade fair in the world.

With the theme 'Sustainable Growth', this year's-Anuga focused primarily on the topics of sustainability and responsible use of resources, which are linked to the philosophy of Wipasz. From the optimization of supply chains to fair food production, experts from around the world presented an impressive variety of approaches. This underscored the food industry's clear commitment to sustainable development and its readiness to tackle global challenges.

Thanks to the diverse program of events and conventions, as well as the Anuga Horizon conference, this year's fair set more new impulses for the food industry of tomorrow than ever before. Expert panels were held to address key industry issues, as well as side events by organizations such as EIT Food and UNIDO that offered additional perspectives and solutions. In addition, as a source of knowledge and know-how, Anuga presented new and current trends.

Shaping the Future with Anuga HORIZON

Anuga HORIZON was organized in the form of a conference for the first time this year. International industry experts, pioneers, and decision makers met to exchange their knowledge and experience. During inspiring lectures and panel discussions, the latest industry trends, challenges, and solutions were discussed.

The #weareAnuga campaign strengthens the fair community

At a time when the world of food is becoming increasingly global and sustainability and healthy food are becoming more important, Anuga promotes exchanges between people from different cultures, industries, and areas of interest not only in Cologne, but also during satellite events held around the world. This solidarity was also reflected in the #weareAnuga campaign, which was launched during the 2023 edition. This leading global trade fair has become a top event on social media with 2.5 million views during the fair.

Wipasz puts the welfare of animals and the health of consumers first, which is why we support the philosophy followed by the largest trade fair in the industry. We are a part of that community and together we want to promote the best quality products and to spread knowledge and share our years of experience with the world, while taking care of the environment. We can confidently say that we will see you at the next edition of Anuga, where we are sure to surprise you with great ideas and an outstanding booth, as well as excellent new products.

See you there!


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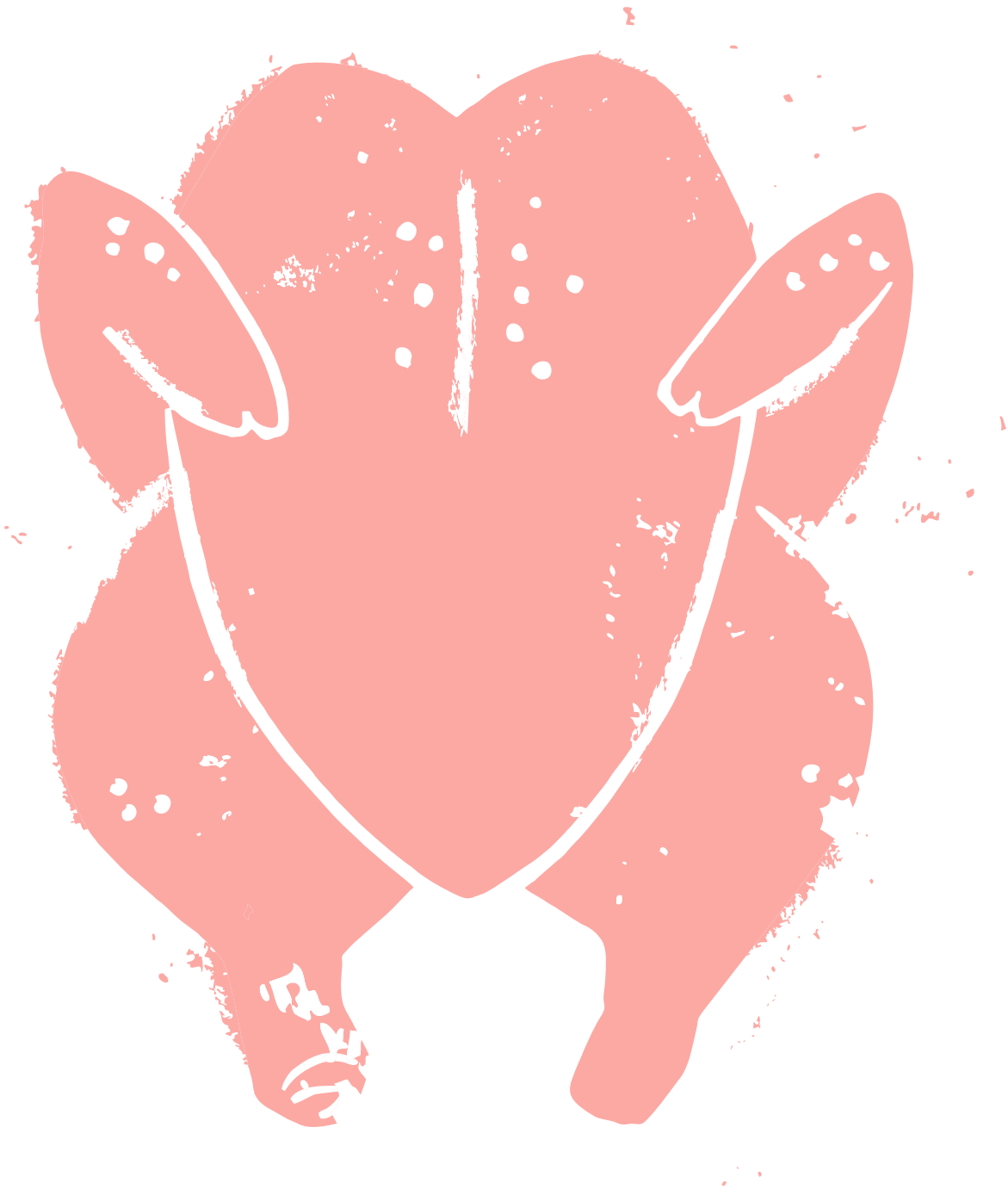
In this section you will read:

- Wipasz became a member of the British Frozen Food Federation
- The variety of elements that diversify chickens' living environmental and their importance in the expression of natural behavior
- Initiative Tierwohl (ITW) and VLOG (Verband Lebensmittel ohne Gentechnik e.V.) – Wipasz S.A. unique certifications
- Development of export sales to third countries
- New poultry houses – what should they be built from?



Wipasz became a member of the British Frozen Food Federation

Maciej Stawicki – Deputy Sales Director, Meat Division Wipasz S.A.

Wipasz S.A. has become a member of the British Frozen Food Federation (BFFF), an elite group of representatives of the frozen food sector. The Federation, with a history of more than 75 years, has more than 300 members representing major manufacturers, the UK's largest retail chains, importers, exporters, restaurateurs, distributors, brokers, and other businesses (e.g., logistics service providers and technology providers).

One of the main goals of the Federation is to bring together representatives of the full chain to create an effective network.

The BFFF cooperates with representatives of industry associations and non-governmental organizations, as well as with public and government organizations, actively consulting on government projects and preparing the interpretation of regulations. It supports its members in the promotion of their activities and their communication, providing expert support on quality, technology, and occupational safety and health issues. The common denominator in the activities of BFFF members is the operation of a frozen food business, and it is frozen products that make up 100% of Wipasz Convenience range. Also, the UK market accounts for 30% of the volume of value added products sold by Wipasz.

The priorities that Wipasz has set in its philosophy, i.e. better animal welfare and sustainability, are in line with the Federation's policy. We are confident that this cooperation will bring a lot of satisfaction and benefits to both parties.

As the data published by the Federation indicate, based on the market research conducted by Kantar, it is clear that demand for frozen products among UK consumers continued to increase in the first two quarters of this year. Compared to the same period of last year, the increase is equal to 1.6%. Two out of five consumers are buying more frozen products than a year earlier. In the same market, the sales volume of chilled products fell by 3.3%. The value of sales of frozen meats, vegetables, and processed products increased by 20%. The higher prices are, of course, influenced by the highest inflation in decades, which reached a peak of 19% in the UK this year. The inflation and the associated increase in the cost of living are some of the factors that cause consumers to buy frozen products, which are cheaper compared to chilled ones. However, this is not the only factor contributing to the marked increase in demand.

Looking at the results of the survey prepared by the BFFF, it is apparent that as many as 42% of consumers would be willing to buy more frozen products if only they could see the clear advantages of frozen food in terms of sustainable production and reduction of food waste, as well as advantages related to healthy eating.

At Wipasz Convenience, we know that frozen chicken products maintain all their flavor and nutritional value. The excellent quality of the ingredients, including the most important one – meat, combined with state-of-the-art production technology, ensures that the dish tastes as good at the customer's home as it does in a recognized restaurant. This is what customers are looking for today, since their habits have been significantly altered as a result of the pandemic. At the same time, conscious consumers appreciate convenient forms of packaging and a long shelf life, which allows them to consciously manage the right amount of product needed to prepare a dish, thus reducing waste.

As a member of the BFFF, we fully support the awareness campaign that the Federation conducted from October 16 to October 25 called Frozen Food Revolution. The campaign was intended for British consumers and emphasized the advantages of frozen products related to their quality as full-value meals, their ease of preparation straight from the freezer, the reduction of food waste and use of packaging – briefly speaking, to the fact that they are environmentally friendly products. At the same time, the fact was stressed that the lower prices of frozen products compared to chilled ones are only due to cheaper logistical solutions, transportation, and storage of goods with a longer shelf life, and not to the lower quality of the product.

We are confident that the promotional campaign will be successful in increasing the demand for frozen products, including Wipasz Convenience products, which we will strive for as an active member of the Federation.

Links:

https://bfff.co.uk/
https://www.thegrocer.co.uk/frozen/why-were-looking-to-lead-a-revolution-in-frozen-food/684332.article?adredir=1&utm_campaign=FFR&utm_content=268606762&utm_medium=social&utm_source=linkedin&hss_channel=lcp-2087871
https://www.foodmanufacture.co.uk/Article/2023/08/31/frozen-food-sales-continue-to-grow-in-q2-2023
https://www.foodmanufacture.co.uk/Article/2023/09/12/The-rise-in-popularity-of-frozen-food-explained

The variety of elements that diversify chickens' living environment and their importance in the expression of natural behavior

Marta Bilko – Veterinarian, Quality Systems Coordinator Wipasz S.A.

Animal behavior is a complex system of animal responses to signals coming from the external environment or from within their bodies. It includes all the ways in which an animal interacts with other organisms and the physical environment. Behavior can also be defined as a change in an organism's activity in response to a stimulus, that is, an external or internal signal or combination of signals. Some behaviors are innate (genetically determined), while others are learned (developed through experience). In many cases, behaviors have both an innate and a learned component. They are shaped by natural selection. Many behaviors directly improve the adaptation of the organism, which helps it survive and reproduce.

To expand on this topic, I would also like to refer to the specific characteristics of breeds. Biology has provided diversity by giving organisms traits and predispositions that are observable and measurable. A simple example is the different breeds of dogs: a greyhound is a dog that can run over long distances, while a French bulldog does not have the physical conditions to do so.

The domestic hen is a species with different functions: egg laying, meat, general purpose, fighting, etc. In this article, I would like to focus on meat function.

A chicken broiler is a young slaughter chicken produced according to a specific technology, which is based on appropriate genetic material (interbreeding hybrids), nutrition (complete feed), and maintenance (intensive farming on bedding). This makes it possible to achieve:

- ☑ rapid feathering;
- ☑ a light-colored skin;
- ☑ a rapid growth rate;
- ☑ good feed utilization;
- ☑ a normal body structure; and
- ☑ high slaughter performance.

This farming must guarantee a high level of welfare for the animals. Without such welfare, the potential of genetics and nutrition cannot be realized. Freedom to express normal behavior – by providing sufficient space, adequate equipment, and the company of animals of the same species – is one of the items on the List of Five Freedoms, a recommendation that has become a basic criterion for assessing the level of animal welfare, including the welfare of slaughter animals.

Elements enriching the living environment and stimulating the natural behavior of our hens are divided into 4 types:

1) Elements providing the ability to perch (stay on elevated structures)

The resulting physiological benefits of this element are (through increased range of motion) improved musculoskeletal endurance and stronger bones.

Staying on an elevated structure also allows birds to observe other birds from a different perspective, to compete with them, and to satisfy curiosity. It also increases their living space.

2) Elements providing roofing and shelter

A cover provides birds with a sense of security while resting. It also naturally allows regulating the intensity of light – lower intensity zones are created. Thanks to such solutions, chickens can rest in the shade whenever they need to.

3) Elements providing the possibility to bathe in the bedding and to scratch

Bathing in the bedding or sand gives the hens pleasure. It is also an important part of their hygiene. By moving her wings and wallowing, a hen regulates her body temperature. Scratching, on the other hand, strengthens the legs.

4) Elements providing the ability to peck and manipulate

It is a very simple element that stimulates curiosity and provokes reactions. Birds naturally use their sense of smell to search for food; they sense sweet, salty, sour, and bitter tastes. Especially the enticing smell of treats makes chickens eagerly peck at them, thus setting the hanging parts in motion. This, in turn, focuses the attention of other companions and also arouses interest. We must keep in mind that chickens distinguish several contrasts with their beaks, the end of which is very sensitive:

- ☑ pain;
- ☑ hot/cold;
- ☑ hard/soft; and
- ☑ surface smoothness – rough/smooth.

One of the demands of Green Farms is to use a holistic scientific approach that is based on our findings and observations. We believe that innovation is a key driver of animal welfare, but monitoring and observation of animals to determine their preferences is essential. We are aware that our knowledge and understanding of animal welfare is constantly evolving.

When choosing a particular element that enriches the animal habitat, it is important to observe the scale of interest. The welfare levels need to be raised for the benefit of the animals – not for higher profits. It is the animals who are the recipients, consumers, and customers. The curiosity-stimulating elements used at Wipasz S.A.'s Green Farms have a positive effect on the psychophysical condition of our hens. As conscious caretakers of our chickens, we have tested various solutions and the animals have chosen what is best for them.

Links:

https://kosmos.ptpk.org/index.php/Kosmos/article/view/1274
https://pl.khanacademy.org/science/ap-biology/ecology-ap/responses-to-the-environment/a/intro-to-animal-behavior

Initiative Tierwohl (ITW) and VLOG (Verband Lebensmittel ohne Gentechnik e.V.) – Wipasz S.A. unique certifications

Michał Jeżewski – Export and New Business Manager, Wipasz S.A.

Since 2021, Wipasz S.A. has been a member of the unique Initiative Tierwohl (ITW) program, which certifies the highest level of the welfare of the animals (chickens) from which meat is produced at Wipasz S.A. poultry plants.

The ITW was established in 2015 in Germany by representatives of the agricultural market, the meat industry, retail chains, and the catering and restaurant sector as an initiative aimed to improve animal welfare and to ensure environmentally friendly production of meat and meat products.

Currently, 13 100 farms participate in the program, of which 2 800 are poultry farms. Wipasz S.A. is the first and only Polish producer to join this group. Currently, 23 farms (52 poultry houses), as well as both of our poultry plants in Mława and Międzyrzec Podlaski, among 115 poultry plants in total, are certified by ITW. It is worth mentioning that 90% of the poultry produced in Germany is ITW certified; in Poland, Wipasz S.A. is a pioneer.

It should be noted that in order to be a member of this elite group, one must meet a number of requirements, such as:

- ☑ having the QS (Qualität und Sicherheit) certification;
- ☑ buildings with windows so that animals have access to natural light;
- ☑ maximum density in the facility not exceeding 35 kg/m^2;
- ☑ provision of additional attractions in the animals' habitat, such as perches, toys, and pecking places;
- ☑ Non-GMO feeds;
- ☑ full system and animal welfare documentation;
- ☑ annual recertification of poultry plants;
- ☑ separation of ITW and non-ITW products;
- ☑ full identification of ITW products;
- ☑ accurate reporting of slaughtered ITW-certified chickens;
- ☑ antimicrobial policy; and
- ☑ donation of funds to support improvements in breeding welfare.

Possession of this certification also entitles us to use the **Halungsform 2** quality mark.

Wipasz S.A. is proud to be a pioneer in the implementation of such solutions in the Polish market, and thanks to **the Green Farms** project we can develop them rapidly and constantly expand the scope of our activities.

Since 2022, Wipasz S.A. has been certified by the German institution **VLOG (Verband Lebensmittel ohne Gentechnik e.V.)** when it comes to nutrition, chicken breeding, and poultry meat production. This is a natural consequence of our company's long-standing policy that genetically modified organisms should not be used in the entire animal nutrition and meat production chain **(Non-GMO policy)**, especially when it comes to feed. At the moment, our poultry feed plant in Koło is certified with the **VLOG geprüft** label, and the Poultry Plant in Mława is authorized to use the **Ohne GenTechnik** label on meat products. Both of these labels prove that we meet the requirements of both our own Non-GMO policy and the VLOG certification body.

The requirements for certification are as follows:

- ☑ a description of the operation of the plant with the most important operating data;
- ☑ comprehensive risk management;
- ☑ a crisis management policy for breaches and GMOs;
- ☑ a system for separating VLOG products from others;
- ☑ full traceability of feed, animals, and products;
- ☑ regular training;
- ☑ regular sampling and submission of results of analyses in terms of GMOs; and
- ☑ keeping detailed records.

We are proud, and at the same time feel a great responsibility, to be a forerunner in the implementation of ever better quality and welfare standards in the Polish market. This allows us to be the leader among Polish producers and to be widely recognized in Europe and the world.

This is evidenced by the following labels that we use:

Haltungsform 2 StallhaltungPlus haltungsform.de

INITIATIVE TIERWOHL Gemeinsam verantwortlich handeln.

VLOG Lebensmittel ohne Gentechnik

Ohne Gentechnik

VLOG geprüft

Development of export sales to third countries

Dawid Dudek – Deputy CEO, Sales Director, Meat Division Wipasz S.A.

Wipasz has been developing exports to new sales markets continuously for many years. Europe is currently the most important continent where we are present with raw products and, for almost two years, also with convenience products. However, in many countries outside Europe, in so-called third countries, there is growing interest in products from Poland, including specifically Wipasz products. At Anuga, the largest trade fair for the food industry, held in October 2023, we shared our company's philosophy and showed the world Green Farms Chicken products. Our presentation attracted the attention of many representatives of the industry, because we gave a unique direction to the development of poultry farming, based on the production of quality meat on a large scale with concern for animal welfare and a focus on environmental protection and care for the consumer. All with the goal of making our products tasty, safe, and healthy.

We want Wipasz products to reach every continent and spread the Green Farms philosophy. We currently offer our products in all countries to which we have export rights. The permits and certificates we have obtained thanks to our experience, knowledge, and developed technology enable us to sell our products in 80 countries around the world. The markets where we want to be more recognized are Japan, the USA, Canada, Singapore, the Philippines, and Vietnam. We will achieve this by focusing on marketing activities and face-to-face meetings with customers, and by participating in industry trade fairs on various continents.

In 2022, agri-food products worth EUR 12.3 billion were exported from Poland to countries outside the EU, which is 20% more than in 2021, of which poultry meat reached the value of EUR 990 million. Despite the growing interest in buying poultry meat from Europe and Poland in particular, we have not seen a significant increase in exports to third countries. Unfortunately, in many cases, we still face restrictions related to, for example, bird flu or lack of regionalization. Temporary and, in extreme cases, even complete blockage of exports prevents us from moving forward. However, patience and determination give us hope that export barriers will be lifted and it will be possible to ship our products to most countries – as in the case of Brazil, which has distinguished itself in many markets, especially the largest import market, China.

Fortunately, there was a breakthrough in 2023, because after many years of effort as a country, we were authorized to export to the Philippines. There have also been advanced discussions and activities regarding exports to the USA, and we hope that the export of poultry meat from Poland to the United States will begin in 2024. The Philippines, like many third countries, imports mainly from Brazil and the USA, but also from Belgium and the Netherlands. Poland needs to become competitive in order to emerge as an export country in the coming years. Japan is the sixth largest importer of poultry meat in the world. Although most products imported there are from Brazil, Thailand, and the United States, most imports to Japan from Europe come from Hungary and France, which means that there is room for us here as well. The next destinations on the world map are Singapore and Mexico, where we have permits and want to start exporting. Our hallmark will be high quality products and unique production coming from the Green Farms. It is worth noting that we will focus not only on the promotion of the meat itself, but also, and primarily, on the development of Wipasz Convenience products.

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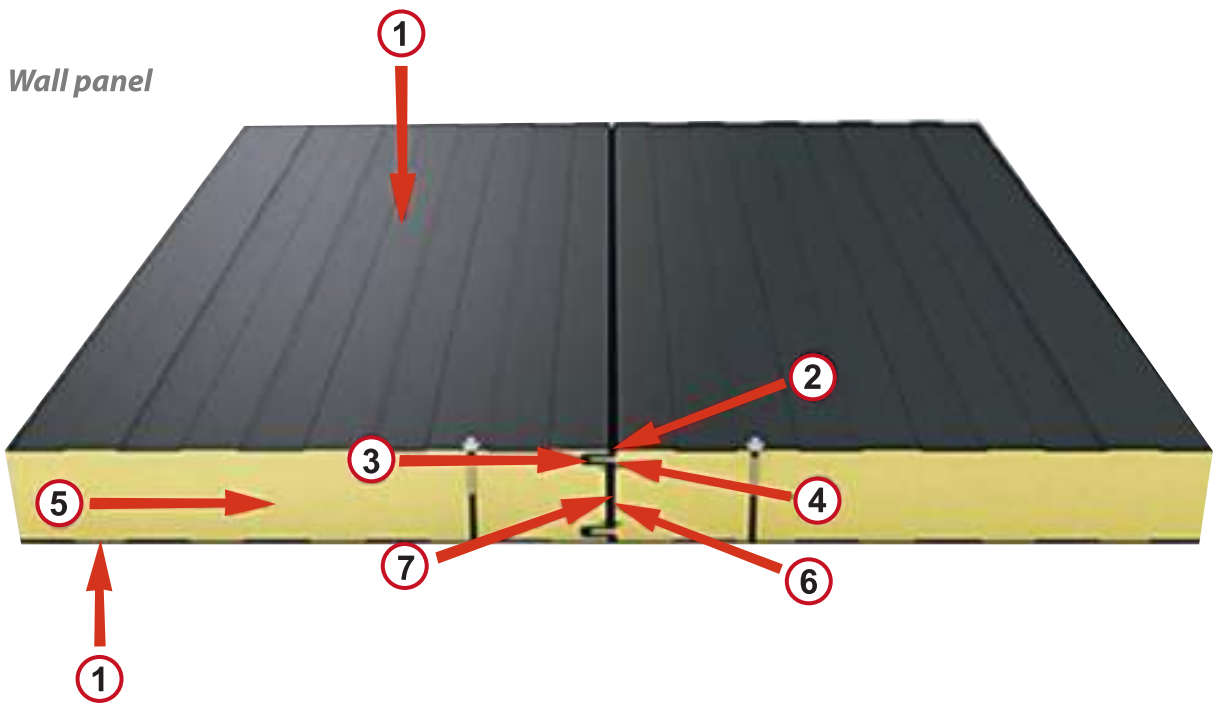
New poultry houses – what should they be built from?

Patryk Mroczek – Contract Farming Coordinator, Technology and Poultry Nutrition Advisor Wipasz S.A.

The poultry farming sector has grown rapidly in recent years. There are more and more broiler farms built in a modern style. The main idea is to build and commission the farm as soon as possible, so that the 'poultry house earns money'.

Farmers used to build poultry houses out of blocks, a process that often took several months to a year. Today, more and more poultry houses, especially in the eastern parts of Poland, where most farms are being built, are built with sandwich panels. Sandwich panels are a modern technology that makes it possible to erect a building within 2-months, which allows putting it into operation very quickly from the start of construction. Sandwich panels are used as cladding of walls and roofs of buildings, and consist of a polyurethane foam core with excellent thermal insulation parameters and steel cladding with a galvanized protective layer.

Wall panel



LEGEND

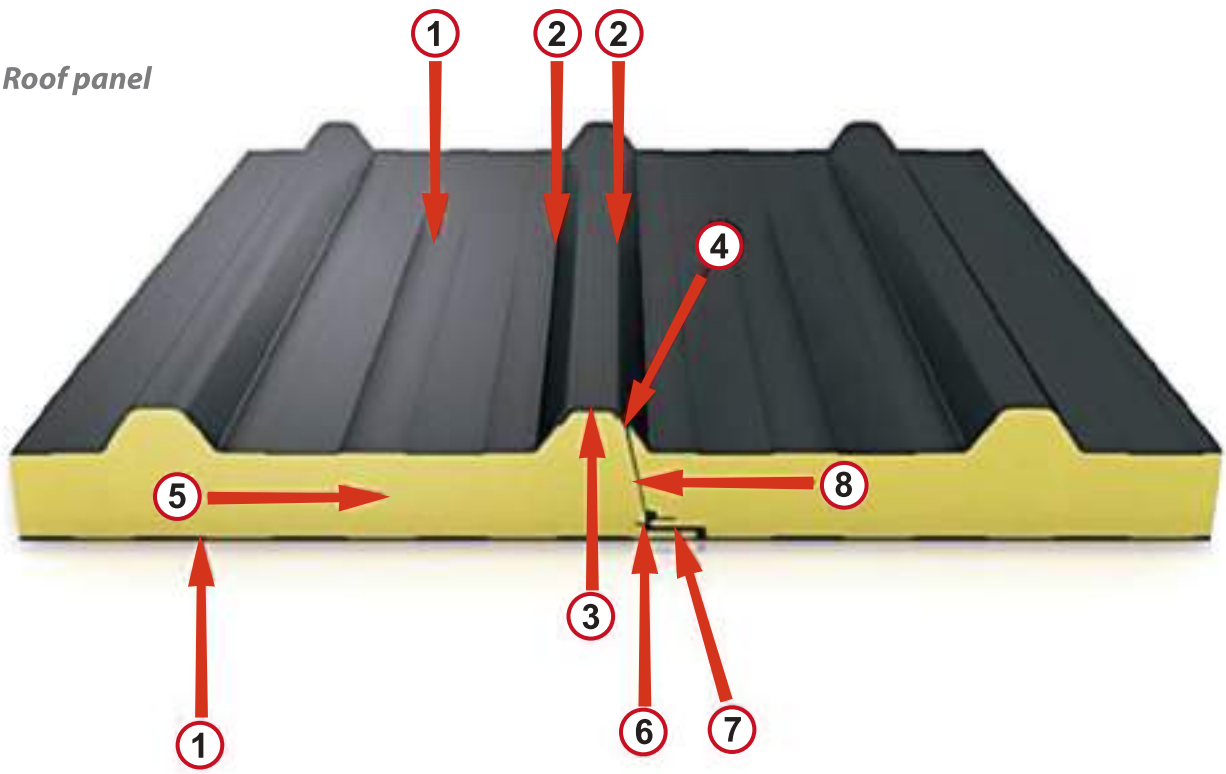
1. Profiled sheet metal cladding that give walls an aesthetically pleasing look.
2. Large lock profiling radius to ensure the integrity of the protective coatings on the sheet metal.
3. Double lock connecting the panels to guarantee excellent fireproof properties.
4. Profiled edges for easier installation and increased thermal insulation.
5. Rigid polyurethane foam core with excellent thermal insulation properties.
6. Continuous polyurethane seal to maintain high thermal insulation – applied during the manufacturing process.
7. Aluminum foil to prevent water vapor penetration into the polyurethane foam core.

When building a poultry house, a structure made of hot-rolled steel frames or plate girders spaced every 6 meters is used. They are protected against corrosion by hot-dip galvanization and painting with epoxy paints. The side walls made of sandwich panels are mounted in steel frames on a concrete ground sill in a horizontal or vertical arrangement depending on the design. The ground sill is used to avoid mechanical damage when removing manure from the poultry house and so that the wall does not come into direct contact with the manure and the animals. The roof panels are easily placed in the building's frame structure and are protected by plastic or aluminum foil cladding that is resistant to aggressive environments (ammonia, hydrogen sulfide, carbon dioxide) and high water pressure during cleaning. In such a structure, it is very easy to install inlets, fans, and windows without the risk of damaging it, since there is no piercing and weakening of walls, as well as no need to install lintels.

When comparing poultry houses made from blocks with additional exterior insulation to poultry houses made from sandwich panels, it can be seen that the latter have better heat transfer coefficients, which, with ever-increasing energy prices, results in very fast return on investment. Sheet metal structures are also better because of biosafety – they are easier to clean because there are no pores where bacteria can remain during cleaning.

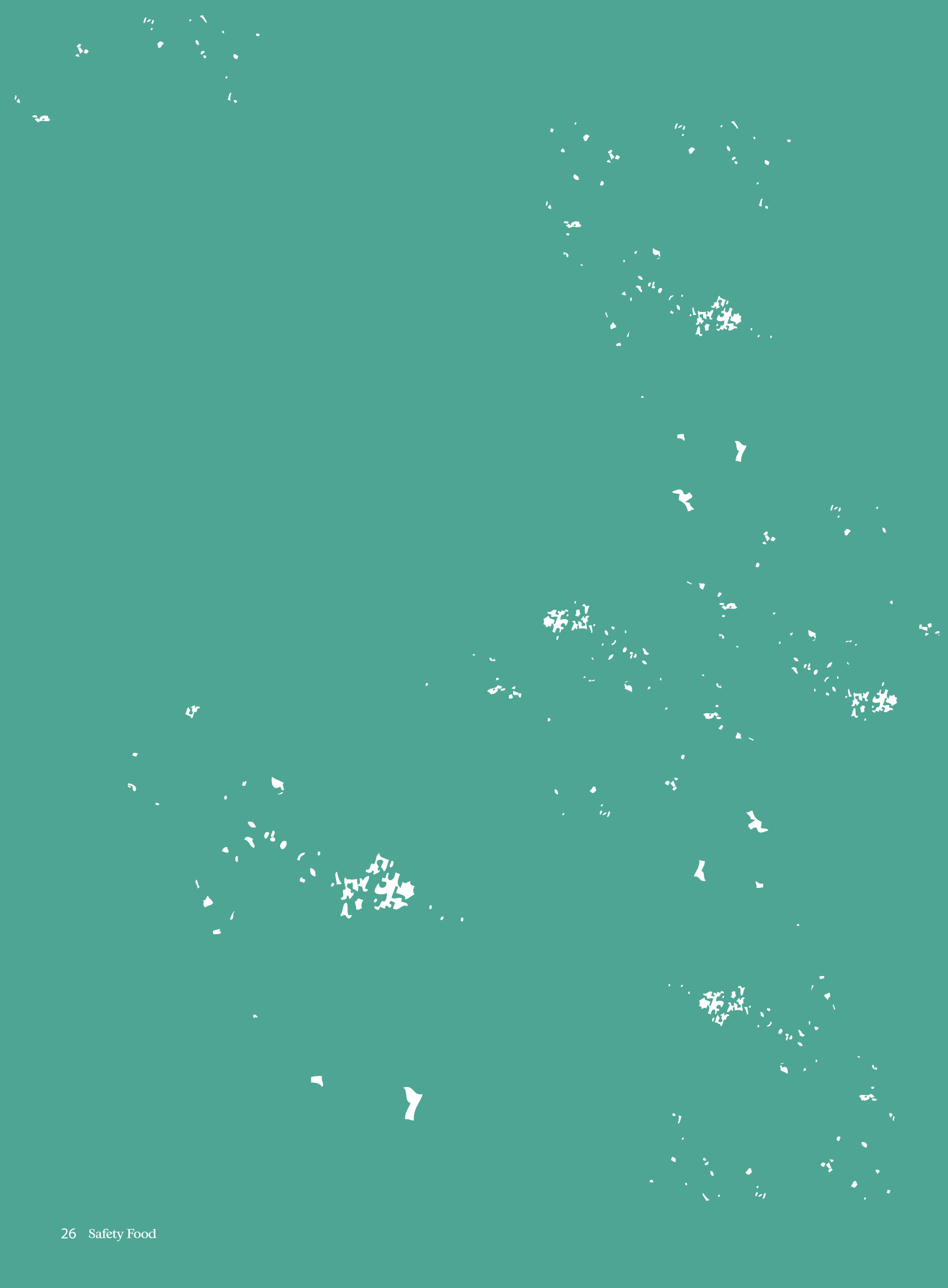
Following the spirit of the times and new trends, I encourage future investors to build poultry houses from sandwich panels and to install windows only at the construction stage. The poultry farming market is growing at an amazing pace and is focusing on certified meat. To obtain QS certification, the most important design element is to provide access to natural light for at least 3% of the floor area.

Roof panel



LEGEND

1. Profiled sheet metal cladding that ensure an aesthetically pleasing look.
2. Large cladding profiling radius to ensure the integrity of the protective coatings on the sheet metal.
3. Continuous polyurethane seal applied during the manufacturing process.
4. Chamber to protect against capillary rise of water.
5. Rigid polyurethane foam core with excellent thermal insulation properties.
6. Profiled edges for easier installation and increased thermal insulation.
7. Continuous polyurethane seal to maintain high thermal insulation – applied during the manufacturing process.
8. Aluminum foil to prevent water vapor penetration into the polyurethane foam core.



In this section you will read:

- The development and future of the Polish poultry industry with Wipasz S.A. – where are we heading?
- Strategies to control coccidiosis in poultry production without the use of antibiotics – Green Farm Wipasz S.A.

The development and future of the Polish poultry industry with Wipasz S.A.– – where are we heading?

Karol Grzęda – Representative of the Management Board of Wipasz S.A. for Welfare and Biosafety
Ryszard Bochenek – Director of the Polish Chicken Research Center Wipasz S.A

Wipasz S.A., which is one of the largest feed and poultry producers on the Polish market, bases its business activities on respect for the legal and moral principles that apply to its business activities and the life of the society. Such actions and direction are part of the global trend of change, which Polish agriculture must also follow. The food sector operates in an environment where policy standards, regulations, and advice related to food safety and quality in terms of sustainable and environmentally neutral production are constantly being developed or updated. Such changes require the harmonization of efforts both globally and locally. Modern consumers are increasingly aware of their needs, and their choices and purchasing decisions are dictated by the belief that the quality and safety of the food they purchase have a decisive impact on their health and the environment in which they live.

In 1960, the total consumption of chicken meat was less than 10 million tons, and by 2021 it increased to more than 120 million tons. It is expected to reach 180 million tons by 2050. This will be a 1 200% increase compared to 1960. Poultry meat will account for 41% of all meat consumed by 2030. The world population will consume significantly more chicken meat than any other type of protein for the first time in history.

Therefore, the poultry sector must take full responsibility for sustainable and harmonious production that ensures a high level of food safety culture. 'The future of chicken protein' is likely to become the key type of protein for food security.

The poultry sector is the most important part of the livestock industry. It consists of many production processes, including at feed mills, hatcheries, breeding farms, and processing plants. The business activities of Wipasz include the production of animal feed, raising, breeding, and processing of poultry meat. With a view to the highest animal welfare, a constant desire to improve the living conditions of birds, and taking care of the highest safety of the food it produces, Wipasz has built the Polish Chicken Research Center in Kwasówka to conduct research related to the nutrition and growing of meat poultry (broiler chickens).

The Center's goal is to develop broiler chicken farming methods that, through nutritional, veterinary, and zootechnical solutions, maximize the genetic characteristics of the birds, keeping in mind their welfare, the breeding effect, the economic results, and environmental protection. The Center's task is to carry out research and testing work that makes it possible to adapt the results to the practical needs in broiler chicken farming, as well to implement and make the results of the work available for commercial farming. The practical solutions for rearing and environmental protection implemented at the Green Farms and obtained through research and testing work have made it possible to eliminate the use of antibiotics and chemotherapeutic agents in the treatment of birds, as well as to minimize odors, immissions, and emissions of harmful substances into the atmosphere.

The results of the research and analyses carried out have shown that the levels of immissions and emis-

sions of livestock gases into the air are on the lower side of the range of the reference values specified in the current 'Reference Document on the Best Available Techniques for Intensive Poultry Farming'. Research in olfactometry has been carried out and documented in relevant reports by the Technological and Natural Science Institute – State Research Institute in Falenty. Research of immissions and emissions of gaseous pollutants discharged into the air have been performed and documented in relevant reports by the Institute of the Fundamentals of Environmental Engineering of the Polish Academy of Sciences in Zabrze. Our industry bears an important responsibility for feeding a growing population in a sustainable and consistent manner. Despite the constant challenges, through the Green Farms project, Wipasz pursues a pioneering, holistic approach that ensures respect for people, the natural environment, and animals in accordance with the slogan 'Green Farms are truly Green Farms' – this is our commitment.

Strategies to control coccidiosis in poultry production without the use of antibiotics – Green Farms Wipasz S.A.

Mateusz Barszcz – Deputy Director for Veterinary Matters, Green Farms Wipasz S.A.

Consumer demand for chickens raised without antibiotics, legal restrictions, and commercial opportunities have encouraged many poultry sector integrators to raise poultry without antibiotics.

Unlike in the European Union, where coccidiostats of the polyether-ionophore class are allowed as a feed additive to handle the ionophore system, in the United States they are not allowed in NAE (No Antibiotics Ever) programs. More than 50% of broiler meat produced in the USA is NAE. Another example is Australia, where leading retail chains also exclude chemical coccidiostats from broiler production. In some European countries, such as Norway, there is increasing emphasis on banning the use of ionophores.

Wipasz S.A., as a leading producer of poultry, as well as a leader in antibiotic-free production in Poland, uses solutions in its Green Farms to dispense with the use of ionophore coccidiostats.

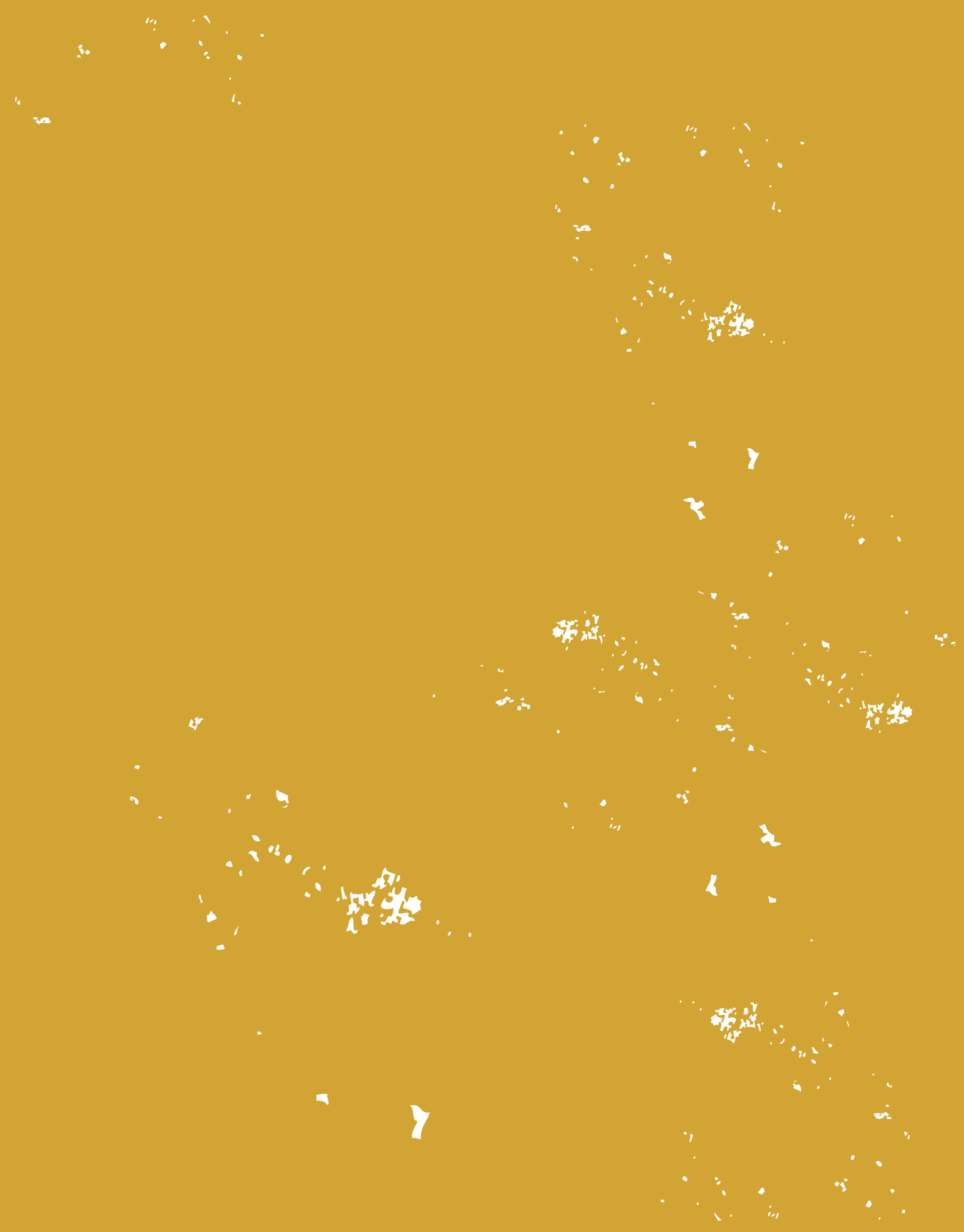
Example of a production model based on the Leszczanka farm

Leszczanka is a farm designed and built by Wipasz as part of the Green Farms system. It consists of 6 facilities, each with an area of 3 000 m². Production at the farm is carried out without the use of antibiotics and coccidiostats. Instead of using ionophores, coccidiosis is controlled with a combination of live vaccines, essential oils, herbs, and farm management. The basis

Breeder	Facility	Birds placed	Average weight	Average weighted day	FCR	EPEF	Confiscation %
GF Leszczanka Farm K1–K3	Leszczanka K1	59 800	2,63	37,30	1,52	445	0,26%
GF Leszczanka Farm K1–K3	Leszczanka K2	59 500	2,51	37,32	1,50	432	0,13%
GF Leszczanka Farm K1–K3	Leszczanka K3	59 580	2,57	36,69	1,54	429	0,20%
GF Leszczanka Farm K4–K6	Leszczanka K4	59 620	2,57	36,65	1,52	422	0,19%
GF Leszczanka Farm K4–K6	Leszczanka K5	59 580	2,33	34,70	1,47	444	0,12%
GF Leszczanka Farm K4–K6	Leszczanka K6	60 600	2,21	34,75	1,49	414	0,11%
TOTAL		**358 680**			**1,51**	**431**	**0,17%**

is to vaccinate the birds on the first day of their lives and then from the very beginning to build intestinal integrity and develop the correct microflora. The absence of antibiotics during the first 7 days does not disrupt the structure of the intestinal microbiota and allows probiotic bacteria to colonize key sections of the intestines. Using vaccines for a minimum of 3 production cycles allows to populate the farm with vaccine oocysts. The next two cycles can be conducted without the use of vaccines and coccidiostats, which saves money without harming the production result. The holistic approach results in good bird health and high meat quality, as well as very good economic results. The table below shows the results of cycle 4 without the use of a vaccine (only natural solutions were used, including herbs and probiotics).

Although coccidiosis and necrotizing enterocolitis remain a challenge for the poultry industry, the above example proves that they are not to be feared. Poultry production according to the Green Farms standard proves that it is possible to conduct production that is simultaneously sustainable, antibiotic–free, and profitable.



In this section you will read:

- One Health Concept the Green Farms project

One Health Concept the Green Farms project

Elżbieta Pietkiewicz – Animal Nutrition Specialist Wipasz S.A.

Antibiotic resistance is another way of saying that bacteria are resistant to an antibiotic. This is a situation where microorganisms acquire resistance to medicines that were previously able to kill them. It is a growing global health threat as treatments become less effective or even completely ineffective. Resistance develops naturally, usually through genetic mutations. This process is much faster when antimicrobials are abused or used incorrectly.

Drug resistance among microorganisms isolated from both humans and animals is inextricably linked to the presence of the same microorganisms in the environment. Even with the correct use of drugs, it is important to keep in mind that about 70% of antibacterial products pass unchanged through the digestive system or are excreted in the urine. All these drugs then combine in municipal wastewater, which, while providing a nutrient-rich environment, also promotes microbial accumulation. A second potential source of drug resistance in the environment is the improper disposal of fertilizers produced during animal farming. This provides a starting point for the further spread of drug-resistant pathogens, resistance genes, and residues of the drugs themselves. The latter, being found in sub-threshold doses in the environment, intensify the selection pressure on environmental microorganisms, and thus further drive the phenomenon of resistance. In addition, international transportation and food trade mean that bacteria found in animals and food can be spread globally in a very short time. Resisistance genes from both pathogens and commensal parasites are also transferred along with the bacteria. In the light of reports published in recent years, free-living animals seem to be the most interesting group. Because they do not receive targeted therapy, the results of tests of the level of drug resistance in their microbiota can be an excellent reflection of the real level of drug resistance in the environment.

A good example of a growing problem that can be traced back to raw materials of animal origin is bacteria of the ***Campylobacter*** genus. In domestic settings, the cause of about 30% of infections with ***Campylobacter spp*** is the so-called 'cross-infections' where (due to the absence of basic hygiene) the transmission of these pathogens, found in the blood from raw meat (especially poultry), can take place from the hands of the person preparing the food and kitchen equipment to other people. In industrialized countries, the level of resistance to antibiotics used to treat ***Campylobacter*** infections is increasing by about 1–2% per year. Studies conducted in Poland indicate that among the ***C. jejuni*** strains isolated from humans (mostly from children under 2 years of age), the highest percentage of resistant strains (49.5%) was observed for cirpofloxacin.

Cirpofloxacin is not a drug used in children under the age of 16, so it is reasonable to assume that such a high percentage of resistant strains is due to the overuse of fluoroquinolones in veterinary medicine, especially in poultry farms, which are the main reservoir of bacteria of the ***Campylobacter*** genus.

This can lead to the selection of resistant strains and then to their transmission to humans through contaminated food.

The poultry industry worldwide routinely uses ionophore coccidiostats classified as feed additives. Although ionophores are antibiotics, they are not included in antibiotic sales data due to their classification as feed additives. In addition to their coccidiostatic activity, they help control intestinal infections, including necrotic enteritis in chickens caused by the ***Clostridium perfringens*** bacteria.

That is why today's intensive broiler production is heavily dependent on ionophore coccidiostats administered in the feed. Since they are not used in humans, it is generally assumed that their use has no effect on human health. However, recent studies suggest that ionophores may influence the increase in vancomycin resistance in enterococci, and may also promote the transmission of other medically relevant antimicrobial resistance in Gram-positive bacteria, potentially endangering human health.

In 2016, a team appointed by the then British Prime Minister David Cameron and led by prominent English specialist Jim O'Neill prepared a report that extensively analyzed antibiotic resistance and its consequences.

The findings presented in the report titled 'Tackling drug-resistant infections globally: final report and recommendation' are frightening. It was shown that if we do not immediately take broad action to slow down the phenomenon of antibiotic resistance, 10 million people per year (one person every 3 seconds) will die as a result starting in 2050, which is much more than the number of deaths from cancer, and the resulting costs will be USD 100 trillion per year. Among the areas where action should be taken to combat antibiotic resistance, the document mentions, among others, global education campaigns; improving sanitation standards and preventing the spread of infections; reducing unnecessary use of antibiotics in agriculture and preventing their transmission to the environment; global monitoring of antibiotic resistance and antibiotic consumption in medicine, veterinary medicine, and food production; supporting new diagnostic methods to prevent unnecessary use of antibiotics; promoting vaccination and developing new vaccines; ensuring sufficient facilities to fight infections; and supporting initiatives to develop new drugs and strategies to fight bacterial infections.

The report spurred the implementation of intensive actions in countries that understood the importance of the information presented in it. As early as in 2015, the ECDC (European Center for Disease Prevention and Control), the EFSA (European Food Safety Authority), and the EMA (European Medicines Agency) for the first time jointly presented links between human and livestock antibiotic intake and bacterial resistance.

The rise of drug resistance in the bacteria most commonly found in humans and animals, including ***Escherichia coli***, ***Streptococcus pneumoniae***, ***Klebsiella pneumoniae***, ***Enterobacter spp.***, ***staphylococcus aureus***, ***enterococci***, and ***pneumococci*** was highlighted.

That is why the European Parliament and the European Commission, as well as European governments, have pledged to tackle the crisis of rising antibiotic resistance by adopting the 'One Health' principle, which implies a strong relationship between animal, human, and environmental health. The Commission collects and compiles the monitoring results received annually from Member States, which form the basis for an assessment of the current situation. The European Food Safety Authority prepares annual reports.

Despite the measures taken by most European countries and the USA, global trends and reports on drug sales indicate that global sales of antibiotics used in animal production are increasing. The use of antibiotics for animals continues to be higher than for humans. This is due, among other things, to the higher overall biomass of animals, which is almost twice that of humans – the boundary between the use of drugs as growth promoters, in prophylaxis, in metaphylaxis, and in therapy is very narrow.

Unfortunately, Poland is the second largest market for veterinary antibiotics among 31 European countries, after Spain. The sales of veterinary antibiotics in 2021 (converted per 1 kg of livestock kept in the country) were equal to 175.5 mg/kg, more than double the EU average (84.4 mg/kg) and more than three times the European median (47.6 mg/kg).

Limiting the use of antimicrobial substances in livestock is also one of the tenets of the holistic 'from farm to fork' strategy, which is a key element of the European Green Deal. The strategy aims to introduce the principles of a sustainable food production system, which should have a neutral or positive impact on the environment, thus helping, among other things, to mitigate climate change, adapt to its effects, and reverse biodiversity loss, as well as ensure food security and have a positive impact on public health. These goals are to be achieved, among other things, by reducing the sales of antibacterial substances used in slaughter animal farming and aquaculture by at least 50% by 2030.

Therefore, the actions taken by Wipasz are due to the need to make a difference and take responsibility for protecting the planet and those who inhabit it. Thus, one of the hallmarks of the company's policy is a holistic approach that encompasses all aspects of a farm's impact on the environment, the chickens raised, and the consumers.

We believe we can make a difference in the way the chicken farming industry in Poland operates and is perceived. We want to support the farmers who work with us, as well as build trust among those outside the industry and consumers, using our experience and reliable knowledge. We test each of our new solutions at our Polish Chicken Research Center, where we seek optimal methods for raising healthy animals without the use of antibiotics. We work with leading universities and their scientists to validate our research in terms of feed production, quality control, animal welfare, statistics, etc. In order to properly design a strategic plan for maintaining proper intestinal health comprehensively (holistically), we look at several factors: nutrition, housing conditions, bioassurance, zootechnical and veterinary care.

The microorganisms that form the microbiome are strongly influenced by the composition of the feed consumed. This enables appropriate formulation measures to be taken to increase bird productivity and reduce the risk of intestinal infection by pathogenic flora. Properly selected products enable overall improvement in intestinal health, i.e., intestinal barrier integrity, immune function, and reduction of inflammation in the small intestine of broilers.

Probiotics, prebiotics, symbiotics, emulsifiers, essential oil blends, medium-chain fatty acid blends, etc. are products we use in the composition of feed formulations. At the same time, we are improving the methods for the effective use of known feed enzymes and introducing new products (protease, amylase, hemicellulase, and alpha-galactosidase) that use other substrates found in compound feeds.

One of the substances we use is the feed enzyme serine protease. This enzyme improves the protein digestibility of a wide range of feed materials, allowing the level of total protein in broiler feed to be reduced without adversely affecting productivity. An addition al advantage of feed with reduced levels of total protein is a reduction in the amount of water consumed by the birds, which has a direct impact on the quality of the bedding, thereby improving animal welfare.

Based on the research conducted at our Wipasz Institute, we select the optimal specialized products to support animal health and productivity. Examples of such ingredients are feed additives containing yucca (Yucca schidigera) and soapbark (Quillaja saponaria) extracts. Saponin fractions reduce urease activity, while polyphenols form complexes with nitrogen compounds, thus reducing ammonia secretion at the farm. Natural polyphenols support physiological antioxidant mechanisms in the birds' bodies and support physiological intestinal functions, thus contributing to the maintenance of good intestinal health and improving digestion and nutrient absorption.

For several years, we have conducted research on antibiotic-free farming. This allows us to point the way for conducting efficient breeding with the proper use of nutritional solutions and flock management tools. How animals are fed and treated from the first day of their life affects their development, health, welfare, and productivity. Our field tests confirm the effectiveness of the solutions we use in replacing antibiotic metaphylactics in poultry. Our knowledge, continuous research, and technological development allow us to offer solutions for the effective control of coccidiosis. We are able to effectively control coccidiosis without the routine use of ionophores or other coccidiostats. We use the available vaccines, but we grow some flocks only with herbal products, phytomolecules, and specific synthetic compounds.

By growing chickens in this way at our Green Farms, we prevent the increasing threat posed by antimicrobial resistance. We fully accept the 'One Health' strategy, which values the needs of poultry meat consumers. We believe that a holistic approach to nutrition, animal health, and farm management that relies on science is the only right way to develop the poultry industry and produce safe food.

In this section you will read:

- Summary of the 2023 harvest in Poland

Summary of the 2023 harvest in Poland

Sebastian Węgierski – Procurement and Market Analysis Specialist Wipasz S.A.

This year's staple cereal harvest took longer than usual. The constantly recurring rainfall and thunderstorms in August effectively made harvesting work impossible. Temporary excessive soil moisture was observed in many regions of the country, causing difficulties and delays. The precipitation also contributed to an increase in grain moisture, and thus to the development of fungal diseases, lower protein levels, and falling numbers. This has resulted in a smaller share of consumer grains in the total harvest than a year ago. It is estimated that it does not even exceed 50%. Despite the difficulties, this year's yield and harvest of staple cereals can be considered high.

It is estimated that the total area with cereal crops in 2023 was approximately 7.1 MLN hectares. The sown area of staple cereals including cereal mixtures was 3% lower than last year and equal to 5.7 MLN hectares, of which:

- ☑ rye was 0.7 MLN ha;
- ☑ wheat was 2.4 MLN ha;
- ☑ barley was 0.6 MLN ha;
- ☑ triticale was 1.2 MLN ha;
- ☑ oats was 0.5 MLN ha; and
- ☑ cereal mixtures was 0.3 MLN ha.

Harvest reports indicate slightly lower grain yields achieved by farmers compared to last year's. This year's yield results are mainly due to the distribution of rainfall. They fare slightly better in the south of Poland with a weaker score towards the central and northern regions. It is estimated that this year's yield of staple cereals including cereal mixtures was 4.54 t/ha, only 1% lower than in 2022. The biggest decline in yields is in oats and spring triticale (-7% y/y), as well as spring wheat and spring barley (-5% y/y).

Designation	2010	2015	2018	2019	2020	2021	2022	**2023** [a)]	2022 =100
	in tens of tonnes from 1 ha								
staple crops with crop mixtures	35,1	36,7	32,3	35,2	44,8	42,6	45,9	**45,4**	99
winter wheat	45,7	47,6	43,0	46,4	54,2	51,8	54,4	**54,5**	100
spring wheat	34,3	33,5	31,5	32,6	41,7	39,6	42,4	**40,3**	95
rye	26,9	27,8	24,2	27,2	35,1	33,1	36,0	**35,0**	97
winter barley	40,7	41,3	37,8	43,0	51,1	47,7	49,6	**50,1**	101
spring barley	33,0	33,0	29,5	32,1	40,0	37,8	39,5	**37,7**	95
oat	26,4	26,5	23,5	24,9	33,2	31,4	32,8	**30,5**	93
winter triticale	35,2	36,3	32,8	35,9	45,0	43,1	45,5	**45,2**	99
spring triticale	28,4	28,4	25,1	27,5	36,4	33,7	35,6	**33,0**	93
winter crop mixtures	30,9	30,9	28,2	30,6	38,1	36,6	37,5	**37,4**	100
spring crop mixtures	30,5	27,2	25,0	26,2	34,5	33,7	33,8	**31,3**	93
total rapeseed and agrimony	23,6	28,5	26,1	27,1	31,9	32,1	33,8	**33,8**	100

Table 1. Total yields of cereals, rapeseed, and agrimony in 2010–2023

a) Pre-harvest estimation of yield in 2023

Because of a slightly smaller cultivated area and lower yields, it is estimated that this year's production of staple cereals amount to 26.1 MLN tons – 3% less than in 2022. Despite the large amount of grain harvested, this is the lowest result since 2019, when the harvest amounted to 25.1 MLN tons. This year, the wheat production will reach 13 MLN tons and that of triticale – 5.3 MLN tons, about 4% less than last year. The harvest of barley and oats harvests will remain at the same level (2.8 and 1.5 MLN tons, respectively), while the production of rye and rapeseed will increase by 0.1 MLN tons y/y.

Despite the completed harvest and the large amount of grain in total, the trade in agricultural products is limited. Many farmers have decided to store grain as they expect higher prices, especially for grains with high quality parameters. This in turn supports the prices paid by mills and exporters for high-protein wheat. However, the current grain prices in Poland and around the world are already the lowest since mid-2021. This is due, among other things, to weakening demand caused by the global economies' struggle with high inflation, a good crop forecast, and high stocks, subsidies for farmers, as well as the normalization of sentiment in the global grain market after the wartime surge. Thus, due to the aforementioned price declines in global markets and limited opportunities for grain exports from Poland due to strong competition, price increases in the near term should be hardly expected, especially for feed grains. According to data from the Ministry of Agriculture and Rural Development, during the harvest period, the average purchase price of wheat was equal to 954 PLN/tonne, which was 63% lower than in the same period of 2022. On the other hand, the average price of rye was 674 PLN/tonne, which was 75% lower than last year, as was the case with triticale, whose average price was 759 PLN/tonne. This is the largest price drop compared to other cereals. In July/August this year, the average purchase price of barley was 750 PLN/tonne, which was 68% lower than during the 2022 harvest. The dry corn price decreased by 47% and was equal to 970 PLN/tonne this year, while the largest year-on-year decrease of 44% was recorded for oats, the price of which was 674 PLN/tonne.

Designation	2010	2015	2018	2019	2020	2021	2022	**2023** [a)]	2022 =100
	in tens of tonnes from 1 ha								
staple crops with crop mixtures	25,1	24,7	22,8	25,1	28,6	27,0	26,9	**26,1**	97
winter wheat	8,5	9,9	8,3	9,5	12,0	11,3	12,6	**12,3**	98
spring wheat	0,9	1,1	1,5	1,5	0,6	0,9	0,9	**0,7**	77
rye	2,9	2,0	2,2	2,5	3,0	2,5	2,4	**2,5**	104
winter barley	1,0	1,0	0,8	1,0	1,4	1,4	1,5	**1,7**	113
spring barley	2,4	2,0	2,3	2,4	1,6	1,6	1,3	**1,1**	85
oat	1,5	1,2	1,2	1,2	1,7	1,7	1,5	**1,5**	97
winter triticale	4,2	4,7	3,6	4,1	5,9	5,2	5,3	**5,1**	96
spring triticale	0,4	0,6	0,4	0,5	0,3	0,2	0,2	**0,2**	83
winter crop mixtures	0,3	0,3	0,2	0,2	0,4	0,4	0,2	**0,2**	79
spring crop mixtures	3,0	1,9	2,3	2,3	1,7	1,9	1,0	**0,8**	79
total rapeseed and agrimony	2,2	2,7	2,2	2,4	3,1	3,2	3,6	**3,7**	101

Table 2. Total harvests of cereals, rapeseed, and agrimony in 2010–2023
Source: 'Preliminary estimates of the key agricultural and horticultural crops in 2023', Statistics Poland 2023

a) Pre-harvest estimation of yield in 2023

grain type	July – August 2022	July – August 2023	y/y change
wheat	24,7	28,6	**26,1**
triticale	9,9	12,0	**12,3**
rye	1,1	0,6	**0,7**
barley	2,0	3,0	**2,5**
dry corn	1,0	1,4	**1,7**
oat	2,0	1,6	**1,1**

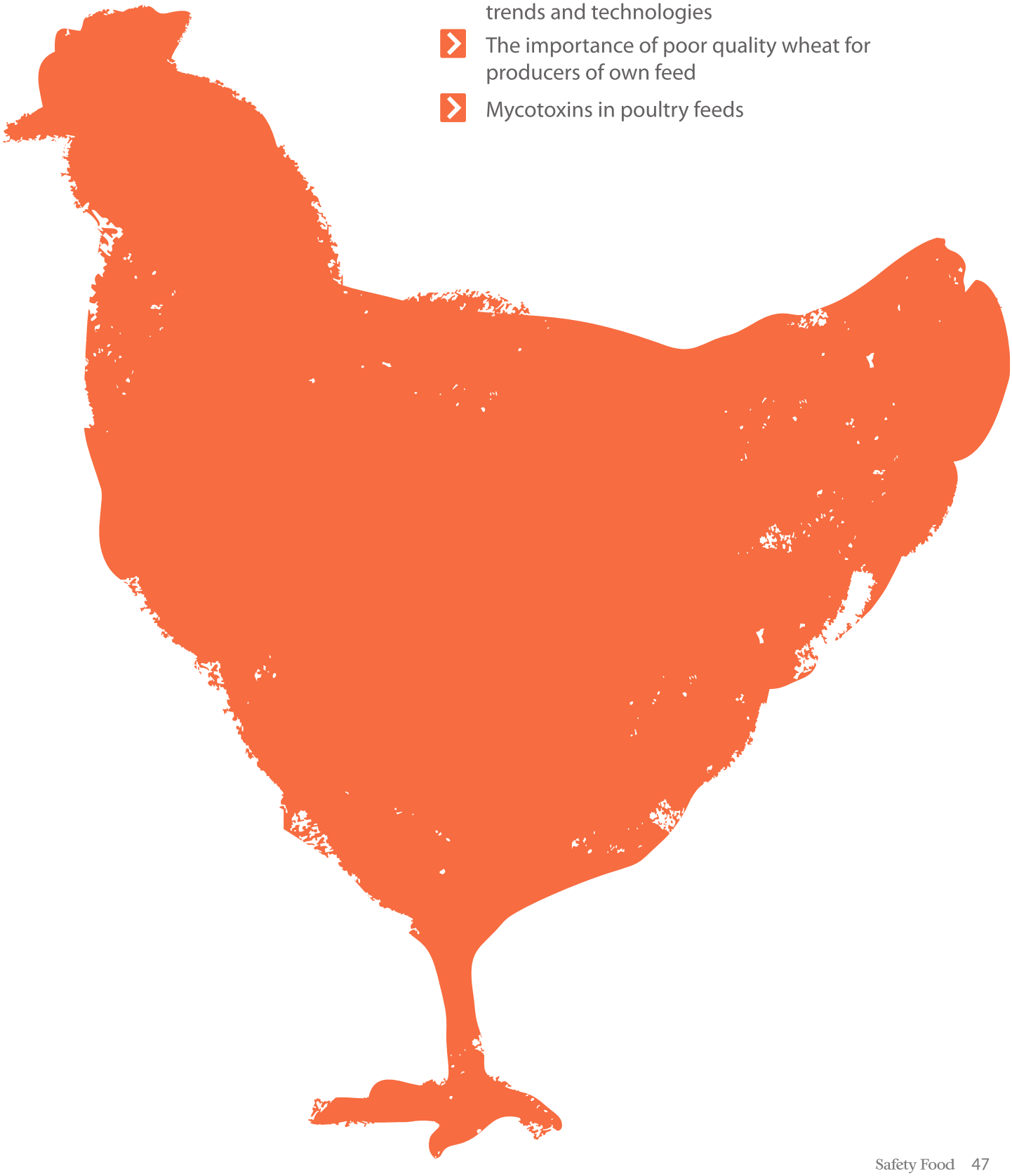
Table 3. Average prices for feed grains during the 2022–2023 harvest

On the other hand, the demand for grain from processors is also limited. Feed manufactures have built up grain stocks for current production, are fulfilling previously concluded grain supply contracts, and are trying to buy grain locally. Greater demand on their part is expected as the corn harvest begins. Similarly, mills are buying grain on local markets. Grain exporters are trying to buy grain all the time, but the prices offered for grain with delivery to ports or inland warehouses are not attractive to sellers. In addition, during the last season we had a sizable surplus of good quality wheat. This year, the quality of harvested grain is definitely worse, which will make it more difficult to export grain out of the country, possibly causing stocks to rise again at the end of the season.


WIPASZ

In this section you will read:

- Broiler chicken health and welfare – latest trends and technologies
- The importance of poor quality wheat for producers of own feed
- Mycotoxins in poultry feeds



Broiler chicken health and welfare – – latest trends and technologies

Tomasz Kisiel – Regional Sales Director Wipasz S.A.

The Bankiwa chicken, which was domesticated around 6 000 BCE, is considered the original form of the domestic chicken. Thousands of years of staying with the homo sapiens have resulted in a different behavioral and usage pattern compared to its ancestors. The bird was less aggressive and resistant to stress, had a higher body weight, and laid more eggs. This made the domestic chicken a source of food, mainly meat, for humans. Professional raising of chickens for slaughter began in the 1930s in the United States, while the first farms in Europe did not appear until the 1950s. It was also at that time that breeding work, aimed at achieving specific bird traits, began. Individuals with selected desirable traits were crossed with each other so that these traits would be inherited by their offspring. The progenitors of the chicken broiler line are two breeds of chickens: Red Cornish and Arbor Acres White Rocks. In general, broiler chickens are supposed to be characterized by rapid weight gain with optimal feed utilization and a high proportion of breast muscle. At this point it is also worth noting the origin of the word 'broiler'. The first way to cook chickens was broiling, hence the name 'broiler'.

Broiler chicken health – the key to success

Breeding work has typically focused on broiler meat traits, which seemed understandable given the objective of obtaining ideal slaughter birds. However, the large muscles, primarily of the breast, have caused the bird's center of gravity to shift forward. This has affected the hip joints: necrosis of the head of the femur, and consequently motion problems. Other significant problems associated with this line of breeding work include an imperfect circulatory system, thin skin, and birds' missing plumage (the result of controlled indoor temperatures). These accumulating traits have had a negative effect on chicken breeding. Changes in the perception of bird maintenance were first seen in the 1990s. Poultry breeders and slaughter houses have realized that the health of the birds is crucial to efficient production. Healthy broilers grow faster, convert feed into meat more efficiently, and generate less waste. Genetic companies have begun breeding work to improve the lives of chickens. The work focused on better quality and proportion of the skeleton and bones. Another important element was the improvement of heart function – given the large weight of the bird's body, the heart is relatively small, which leads to the ischemic disease and increased bird death rates (sudden cardiac death). In the past two decades, numerous studies have been conducted on oxygenation in chickens, which has resulted in evident progress and has significantly lowered the mortality caused by this problem.

Nevertheless, an important issue for improving the quality of life of broiler chickens is proper monitoring of bird health, primarily disease prevention. Professional broiler chicken farming focuses on regularly checking the health of the birds. Appropriate vaccinations are used. Nowadays, new-generation vaccines obtained through genetic engineering or molecular biology are becoming more widely used. In addition to the traditional injectable or water-applied vaccination, in ovo vaccination is gaining popularity. The vaccine is administered into the space in the air chamber of the egg or directly into the embryo. The first experiments began as early as in the 1990s and involved Marek's disease. The purpose of these vaccinations is to improve the immunity of chickens and to reduce the need for medical treatment during raising. Another risk factor is coccidiosis, and an effective method of its control is a regular flock examination program – in each new group. The method is widely used and allows for accurate monitoring and the introduction of an appropriate coccidiostat program and its rotation. Such monitoring makes it possible to improve and maintain at a good level the production outcomes resulting from better flock health status.

An old Polish proverb says: through the stomach to the heart. To paraphrase it, when it comes to broiler chickens it will not be an exaggeration to say: through the stomach and intestines to health.

A healthy diet is a key factor in bird production results. Therefore, the production of a properly balanced basic compound feed suitable for the age and growth stage of the birds is an important part of building their health. A good feed should be based on simple bulk commodities, such as cereals: corn, wheat, and triticale. The demand for protein is satisfied mainly by vegetable components, such as soybean meal and, to a lesser extent, rape. Research is also being conducted on the addition of lupin and pea varieties, as well as potato protein.

Nutritional immunology has become popular recently. The bacterial composition of the gastrointestinal tract – the microbiome – is made up of 640 different types of bacteria. There are more than twenty different hormones in the gut. A healthy gut improves the bird's immunity, as it is the first line of defense against pathogens, in addition to digestive processes. Health-promoting feed additives also play an important role in the management of a healthy gut. This group includes phytochemicals, organic acids, probiotics, prebiotics, and exogenous enzymes.

- ☑ Phytochemicals are natural compounds found in plants that inhibit or kill bacteria, viruses, and fungi. These compounds are found in garlic, for example. This group also includes essential oils contained in herbs and spices. They stimulate improved appetite and secretion of enzymes associated with improved feed digestibility.

- ☑ Organic acids work in the feed and the digestive tract of the animal, as well as influence its metabolism. Their use in feed is aimed at lowering its pH. These compounds exhibit antibacterial activity and reduce the quantity of such microorganisms as *Salmonella* in the broilers' cecum.

- ☑ Probiotics, prebiotics, and synbiotics are bioactive substances. Probiotics are live cultures of bacteria, fungi, or mold, while prebiotics are substances that stimulate their growth and activity. A synbiotic is a combination of a probiotic and a prebiotic and results in a favorable composition of the microbiome.

- ☑ Exogenous enzymes additionally allow the breakdown of substances previously unavailable to birds due to the lack of production of proper enzymes in their digestive tracts. For poultry, an example is NSP enzymes, which improve feed digestibility by breaking down non-starch polysaccharides.

A modern diet and proper management of intestinal health can significantly improve the health of broiler flocks. They increase both production and economic results. The reduction of the use of antibiotics is also an important factor in modern nutrition. The new approach to this problem is aptly reflected in the origin of the word probiotic – ***pro bios***, meaning 'for life'.

Other factors affecting gut health include minimizing stress and microbial infections, proper sanitary conditions, and proper flock management (proper watering, feeding, and good quality bedding).

Stress and animal welfare

The health and welfare of birds depend largely on the conditions in which they are raised: proper ventilation, lighting, and space help minimize stress. Modern technologies and automation are increasingly beginning to play an important role when monitoring the health of broiler chickens. Thanks to advanced systems, breeders are able to track health parameters in real time. Currently, the welfare of broiler flocks is assessed by examining the limbs at the time of slaughter. Experiments are being conducted at the University of Oxford, where a camera in the facility is connected to a computer and the movement pattern of the flock is estimated. The appearance of many slow-moving birds in a flock indicates that there may be welfare problems associated with lameness or disease in some birds, which allows for a quick intervention. Additional cameras in the ceiling of the building can analyze the distribution of birds. Changes in the distribution of animals indicate, for example, a malfunction of the watering system or the feeders. Other interesting research includes that on the use of sound signals. Sound monitoring can complement image analysis to monitor the entire floor area.

Technological advances provide opportunities to remotely monitor the health of a flock of birds also via smartphones and apps, making it easier to manage the farm and ensuring immediate response to any problems. It also reduces stressful effects on chickens because it reduces direct human intervention in the flock environment.

In conclusion, in recent years, more and more attention has been paid to the health and welfare of broiler chickens. This is implemented at several levels, from breeding work in genetic companies, through the nutritional sphere, to advanced analysis of bird welfare. Such a system makes it possible to achieve good production results while ensuring maximum comfort for the chickens.


K5
K6

The importance of poor quality wheat for producers of own feed

Kinga Jaszczyk – Sales Specialist, Premixes for Poultry Wipasz S.A.

This year's harvest produced high yields, but the total protein content in wheat grain was much lower than in previous years. The low protein content in wheat requires including a higher proportion of high-protein raw materials, mainly post-extraction soybean meal, in the ration. Increased levels of this component in the formulation have economic consequences, but can also affect the production results. Despite the fact that post-extraction soybean meal has a relatively good amino acid profile and is a very good raw material for use in poultry feeds, it excessively high content in the ration reduces the digestibility of feed, as well as may promote diarrhea in birds.

One solution is to incorporate alternative protein sources into the formulation. These include post-extraction rapeseed or sunflower meal, oil cake, and seeds of legumes such as beans and peas. These raw materials are rich in protein, but also in fiber, which reduces the digestibility of the feed, so their share in the feed ration of broiler chickens should not be too high. A possible solution is to use them in small proportions, which, given the current prices for post-extraction soybean meal, can still significantly affect the economics of own feed production.

A second, slightly more unconventional solution is to reduce the level of total protein in the feed, while keeping the value of amino acids at the recommended level. Reducing the total protein in feeds for poultry while maintaining adequate levels of amino acids is a trend that has been emerging at European and global nutrition conferences for some time. Amino acids are the basic component of proteins of which the body is built. To break down proteins into amino acids, the body needs enzymes, the production of which involves the consumption of energy. By providing them in a pure form, one can increase their availability and assimilability, which is why supplementing amino acids in feed is so important. It can be assumed that granular feed, which is precisely crushed, mixed, and integrated, with each granule identical, provides the birds with all the necessary ingredients. The idea of lowering the concentration of total protein in loose feed may cause some controversy. The fact that loose feed is taken up more slowly

Ingrediens	P. e. soybean meal	P. e. sunflower meal	P. e. rapeseed meal	White peas	Field beans
Total protein [g/kg]	466,0	336,0	340,0	214,0	256,0
Raw fiber [g/kg]	40,0	180,0	122,0	58,0	81,0
Metabolic energy	9,3	6,3	6,5	10,2	10,3
Total lysine [g/kg]	27,5	12,1	18,2	16,3	15,9
Total methionine [g/kg]	6,5	17,4	6,9	1,9	1,8
Total threonine [g/kg]	17,8	12,1	15,5	8,2	8,9

Table 1. Chemical composition and nutritional value of selected protein feeds per 1 kg of feed material (source: Nutritional recommendations and nutritional value of feed for poultry, 2018)

than granular feed should be taken into account as early as at the formulation stage. The loose form also obliges one to carefully grind the raw materials and mix them thoroughly. The greater the homogeneity of the feed, the greater the guarantee that the birds will take up all the necessary ingredients, even if the feed is transported over large distances and is taken up more slowly granular feed.

Both of the above-described solutions are successfully used in formulating recipes for producers making their own feed.

Mycotoxins in poultry feeds

Dorota Elminowska – Product Manager Wipasz S.A.

Mycotoxins are secondary metabolites of fungi produced by certain species of fungi mainly of the ***Aspergillus***, ***Penicillium***, ***Fusarium***, and ***Claviceps genera***. They are formed after the completion of the essential phase of multiplication and have no explained connection with their vital processes. The production of mycotoxins is genetically determined and often limited to only one species or even strain of fungus. More than 250 mold fungi are known that produce 400 different mycotoxins and their derivatives. They can contaminate food and feed, especially cereals, grain products, nuts, oilseeds, milk, and meat.

The toxic effects of mycotoxins can be divided into:

- ☑ acute poisoning – it happens very rarely, when feed materials with high content of fungi are fed to animals. It is more common in tropical climates. Symptoms typical of acute-type poisoning include liver damage, fragility of capillary vessels, and ecchymosis that, in extreme cases, leads to bird death;
- ☑ subacute and chronic mycotoxicoses – it is much more common than acute poisoning.

In chronic poisoning, symptoms are negligible or absent. In these cases, most often there is a weakening of the body, the birds become lethargic and apathetic, and diarrhea appears, which intensifies the process of dehydration. These symptoms are often accompanied by a reduction in feed and water intake.

For specialists in economics and animal nutrition, the most important mycotoxins are aflatoxin, ochratoxin, deoxynivalenol and its derivatives, zearalenone (ZEN), fumonisins (FB1, FB2), and T-2 + HT-2 toxins.

Aflatoxin – produced by fungi of the genus ***Aspergillus***, mainly ***aspergillus flavus***. Young animals, especially turkeys, ducks, and pheasants, are most susceptible to the disease. The affected birds have a reduced appetite, which makes them more susceptible to coccidiosis (due to, among other things, lower intake of the coccidiostat) and less resistant to salmonellosis and infectious bursal disease, and their results show anemia. The birds are lethargic and sluggish, moving with a wobbly step. Mycotoxicosis in poisoned poultry also causes a tendency to have hemorrhages, and the number of legs laid by hens decreases. The consequence of exposure to high doses can be death.

Ochratoxin – the most important in this group of toxins is ochratoxin A. It is produced by toxigenic species of the genus ***Aspergillus***, mainly ***A. ochraceus***, and is mainly formed during improper storage of cereal grains. Young birds (including turkeys, which are less resistant than chickens) are most susceptible to the disease. Mycotoxicosis caused by ochratoxin leads to inhibition of protein synthesis, necrosis of renal tubular epithelium, and impaired renal function. It also delays the process of sexual maturity and reduces the appetite, and consequently the infected animal's body weight and laying rate decreases. In acute mycotoxicosis, ataxia and diarrhea are added to the above symptoms.

Deoxynivalenol (DON) – belongs to group B of ***trichothecenes*** which are metabolites of fungi of the genus ***Fusarium graminearum***. It is found in the grain of wheat and other small grain cereals and corn in crops on all continents. The toxin has a hemolytic effect, and also affects the animal's uptake of nutrients. Ingestion of feed containing deoxynivalenol induces intestinal disorders associated with reduced uptake of glucose and 5-methyltetrahydrofolic acid. Acute poisoning with trichothecenes is accompanied by diarrhea, decreased weight gain, hemorrhages, leukocytosis, nervous disorders, and even death.

T-2 + HT-2 – mycotoxins belonging to group A of trichothecenes. T-2 is a stronger toxin that occurs less frequently than DON and is typical of countries with cold climates. They are mainly found in corn grain and its processing products. The toxic effects of trichothecenes include changes in the mouth, reduced speed of growth, abnormal plumage, reduced egg production and shell quality, peroxide changes in the liver, and blood clotting disorders.

Zearalenone (ZEN) – a non-steroidal mycoestrogen produced by ***F. graminearum***, ***F. culmorum***, and ***F. sporotrichiodes***. It appears mainly on corn, as well as other cereals, hay and silage. Zearalenone is distinguished by its fairly low acute toxicity. Zearalenone does not play a major role in poultry nutrition, as birds are resistant to large amounts of it in their diets.

Fumonisins (FB1, FB2) – a mycotoxin produced primarily by endophytes of corn, the species ***Fusarium proliferatum*** and ***Fusarium verticillioides***. Fumonisins have been shown to damage the sphingosine biosynthesis pathway and lead to damage to kidney function. They also contribute to the disruption of lipid synthesis in nerve cells.

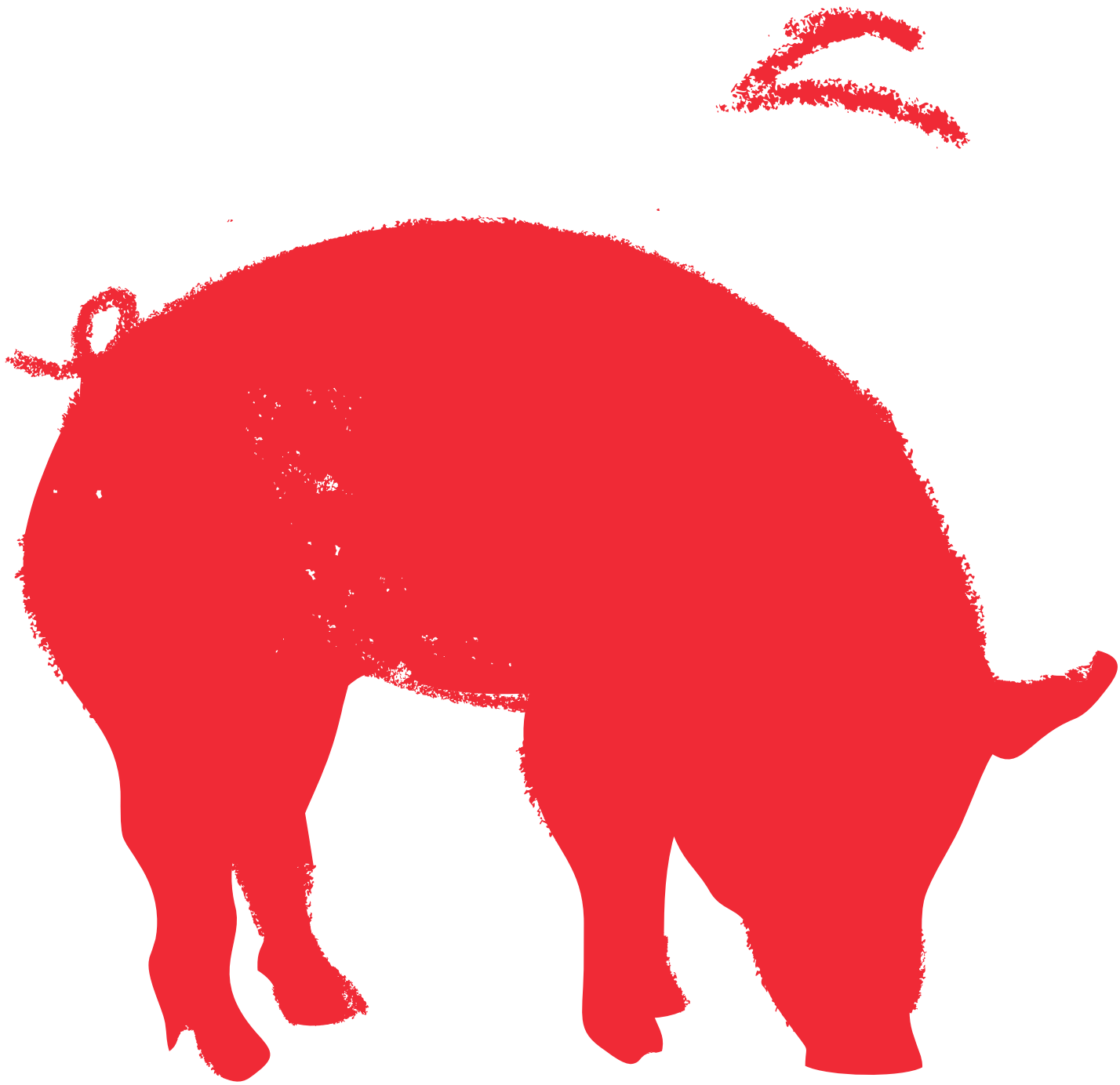
The effects of mycotoxins on organisms are often nonspecific and occur with many other disease entities of both viral and bacterial origin. In order to properly determine the underlying cause of the symptoms, it is important to make a proper diagnosis. When testing for mycotoxins in feed and feed materials, it is important to use certified laboratories.

Since there are no Polish standards for the content of mycotoxins in compound feeds for poultry, we rely on COMMISSION RECOMMENDATION (EU) 2016/1319 of July 29, 2016, which amends Recommendation 2006/576/EC with regard to deoxynivalenol, zearalenone, and ochratoxin A in feed for domesticated animals, published in the Official Journal of the European Union. The recommendations for OTA content for compound poultry feeds is 100 ppb. For Zearalenone values, there is no clear indication for poultry, but the recommendation indicates an average concentration for compound feeds of 300 ppb. The approximate values for the content of fumonisin B1 + B2 in feed with a moisture content of 12% is 20 ppm. Since there are no T-2 + HT-2 content standards for poultry feed in the recommendation, we rely on the opinion expressed in the Suggested citation: ***EFSA Panel on Contaminants in the Food Chain (CONTAM); Scientific Opinion on the risks for animal and public health related to the presence of T-2 and HT-2 toxin in food and feed. EFSA Journal 2011;9(12):2481. [187 pp.]*** On page 127 the LOAELs for poultry are given (the index of the lowest dose at which adverse effects are observed (LOAEL) means the lowest concentration of a substance at which adverse effects are observed in the exposed population). For T-2 + HT-2 toxins, it is equal to 40 µg/day/kg of body weight. These are toxins, the content of which is usually considered as the sum of individual results.

Due to the synergetic action of mycotoxins, the results obtained together are considered. Many companies that produce mycosorbents conduct research and publish information with data on the highest amounts of toxins that do not cause adverse symptoms despite the presence of different types. Another important aspect of the analysis of the results is the use of mycosorbents in feeds. Based on the results obtained, depending on the type and level of concentrations, appropriate products and dosages are selected for compound feeds. However, it should be borne in mind that despite the reduction by mycosorbents of the negative effects of mycotoxins on organisms, these products do not affect the level of content of mycotoxins in feeds and feed raw materials, and despite elevated concentrations, there will be no negative effects on the bodies of animals.

In this section you will read:

- Methods to reduce antibiotics in pig fattening
- Antibiotics in production – a necessity or a shortcut?



Methods to reduce antibiotics in pig fattening

Paweł Kamiński – Pig Nutrition Advisor Wipasz S.A.

The current regulations present pig farmers with a huge number of challenges: animal welfare, environmental and ecological requirements, economics, as well as reduction of the use of antibiotics.

A lot of heated discussions on this topic are emerging. What is certain is that the pressure from EU regulations is constant and will inevitably increase. However, let us look at this matter from the economic side. For several years, I have been making detailed observations on what effect feed has on the use of antibiotics. Colistin, tylosin, and thiamulin are among the most commonly used medicines. The decision to administer them is determined primarily by diseases of the digestive system. The most sensitive moments when the need to administer them arises are the early phase of fattening and the transition from one feed to the next. One should also remember about the need to maintain the required temperature at the time of placement, as well as cleanliness in the pig house and appropriate stocking rate.

If all the required welfare conditions are maintained during placement, then the focus should be on feed. An important aspect is knowing what compound feed the animals consumed before arriving at the fattening house. It is extremely important to use similar ingredients in order to minimize nutritional stress. Such a feed must not have more protein than the previous one, and fiber should be at a higher level. By sticking to these rules, it is possible to prevent diarrhea, edema disease, and ulcers, and to facilitate the adaptation of piglets to the new building. However, when one is not sure of the parameters of the compound feed given to the animals before they arrived for fattening, it is safe to start for a few days with a grower-level protein feed.

Another difficult moments in the fattening phase is the transition from starter to grower feed and from grower to finisher feed. The problems often observed during this period are a decrease in appetite, restlessness among animals, diarrhea, and a slowdown in the weight gain rate. As at the time of placement, the composition of the compound feeds must not differ significantly from each other.

A number of requirements must be met, e.g. feed parameters must be selected according to the rules, i.e. protein content must not be higher, fiber content must be lower, and amino acids content must be used according to the amino acid profile. It is important to mix the various feeds a few days before changing the feed, to prevent the silo from being empty at any given time.

An important factor to be observed is to ensure that cannibalism does not occur among the animals. The moment the animals start biting each other, a simple pathway is created for the streptococcus bacteria to enter the body, which requires the administration of an antibiotic. Most often, the problem is caused by a bad feed ration. The most common mistake is too little fiber in the feed and poor fiber quality. This is due to the growing prices of the ingredients that contain fiber.

An alternative is feed additives such as herbal products, probiotics, prebiotics, and phytobiotics, which are gaining popularity.

By following the above rules, one can significantly improve a farm's financial results and, at the same time, prepare for the challenge associated with the pressure to reduce antibiotics. Feed should be selected according to genetic requirements. Each breed has its own dietary guidelines that have to be followed. Proper fractionation and careful mixing are issues that absolutely must be monitored when preparing feeding mixtures on a farm.

Antibiotics in production – a necessity or a shortcut?

Tomasz Schwarz, PhD

Intensive livestock production generates a number of factors that can impair the health status of animals. The most important of these appears to be the large and sometimes huge number of animals kept in a confined space, which definitely facilitates the spread of pathogens, even when their initial presence concerns a relatively small number of individuals in the herd. This is a factor over which we have little influence, since the current norms optimize the relationship of economic production indicators with the most important parameters of animal welfare. Of course, we can decide to apply the so-called 'overstandard' and significantly increase the area per animal, but in large-scale production the number of animals within a single facility continues to be very large and thus the risk of spreading pathogens remains. Other relevant factors depend to a much greater extent on people and include the conditions created for the animals, such as the optimization of nutrition and microclimatic conditions.

Where did the idea come from?

Since the time of proliferation of large-scale livestock production systems and the observation of negative health implications, the search for simple and inexpensive methods to solve the emerging problems has begun. Due to the fact that for most of these problems, regardless of their root cause, the emergence at some stage of an infectious agent in the form of bacteria is crucial, attention was very quickly drawn to the potential use of antibiotics. Initially, as in human medicine, antibiotics in animal production were used as a method of medical treatment to solve problems that had already existed and had caused consequences that were usually associated with an increase in mortality and a decrease in the average values of production parameters. This has led to secondary negative economic consequences and a decrease in the profitability of production. Therefore, in parallel with the development of medical treatment methods, there has been an intense search for ways to prevent the development and spread of infectious diseases. In accordance with the principle of 'prevention is better than cure', vaccination programs involving prevention of the most important, i.e. most loss-generating, diseases have begun to be implemented. Very quickly, however, it became apparent that the number of potentially dangerous pathogens was increasing as the size of the farms increased, and that the treatment and prevention methods used also caused mutations that were responsible for an increase in the number of pathogenic serotypes within each species of bacteria. Since pathogens have always been one step ahead of pharmacology, which meant a reduction in the effectiveness of vaccination, other ways to reduce their negative effects on animals were sought. Thus, along with the concept of prophylaxis, the complementary concept of metaphylaxis has emerged, which covers the preemptive use of antibiotics to prevent the onset of a health problem. It was also quickly pointed out that in addition to improving health status, antibiotics help improve average herd production rates, especially with regard to increasing the rate of weight gain in slaughter animals. This has led to the emergence of the concept of antibiotic growth promoters (AGPs), along with an entire philosophy of their use as feed or water additives, either during sensitive periods or throughout the rearing and fattening production cycle. The basis of this philosophy was the continuous use of low doses of antibiotics. It seemed like a good and cheap solution and actually had positive results in production, so the system quickly became popular. Its flaws also quickly began to be noticeable. First, the antibiotics selected as AGPs appeared to lose their effectiveness over time. That is why new ones were constantly introduced. The pool of available substances was not unlimited, so the problem known from vaccination reappeared: pathogens began to get ahead of pharmacology. However, that was not the worst of thing that happened.

Antibiotic resistance

In the 1990s, human medicine saw the emergence of an increasing number of bacteria showing strong resistance to antibiotics. This has caused numerous problems both in the treatment of basic, relatively harmless infections of the upper respiratory tract, as well as in the much more difficult inpatient situations associated with diseases with a much more serious course and consequences, including deaths. Cases of sepsis, a systemic, very fast infection with bacteria resistant to treatment with any available antibiotics, were reported more and more often. In the search for the reasons for this problem, attention very quickly turned to the powerful AGP market. The demonstration of the relationship between the use of AGPs in livestock production and the antibiotic resistance of bacteria prompted a rapid response in the form of changes in legislation to restrict and later ban their use altogether. Unfortunately, these changes only applied to EU legislation, which resulted in a significant increase in the cost of livestock production in European countries, but did not solve the problem of growing antibiotic resistance of bacteria on a global scale. However, since 2006, AGPs have not been allowed in the EU. In some countries, the process of introduction of this ban was significantly accelerated. In Denmark, for example, the total ban took effect as early as in 2004. In the initial period after the imposition of the ban, most countries saw a strong increase in the use of antibiotics for treatment. So the philosophy of use changed, but not the total quantity of antibiotics used. The usual approach was that instead of continuous administration of small amounts, therapeutic doses were administered periodically, with the timing of the administration set to anticipate the possible onset of a disease. The change was therefore purely theoretical, as antibiotics continued to be used, and the amount of antibiotics remained unchanged, and sometimes there was even an increase in their total use. Seeing the ineffectiveness of the legislation banning AGPs, the European Commission responded by introducing a strategy to reduce the use of antibiotics, with the goal of reducing their market sales by 50% within a decade.

Effects of the strategy

Implementation of the strategy began in 2009, and its first effects began to be analyzed in the decade of 2011–2021. The EC has commissioned an independent institution operating in the EU, but outside the management structures of the Council of Europe or the European Commission, to develop the details of the strategy's objectives. As an independent institution, the European Medicines Agency (EMA) launched strategic and audit activities covering 31 European countries. Of course, the strategic activities in individual countries were outsourced to the relevant institutions that are part of the administrations of those countries, while the EMA, within the framework of the ESVAC (European Surveillance of Veterinary Antimicrobial Consumption) project set up for this purpose, handled the collection and processing of the metadata on the circulation of veterinary antimicrobial products in the European market and in each of the 31 countries. Importantly, the basic objective of the strategy was to determine the use in relation to the production volumes, which means that in some countries there was a downward trend resulting from the increase in animal populations with the same total use of antibiotics. This situation occurred in Spain, for example. A report summarizing the first decade of the strategy's implementation and covering the period of 2011–2021 was released in 2022, and its message was very optimistic. During the analyzed period, the total sales of antibiotics used in veterinary medicine was reduced from the initial value of 161.2 mg/PCU to the level of 86.2 mg/PCU at the end of the analyzed period. The percentage reduction of 46.5% was very close to the strategic target. However, a spoonful of tar can spoil a barrel of honey. This is because the above values are average values for the European market, but when the data was broken down by member country, it became apparent that the situation was not so good at all. For example, in Poland, during the period in question, the market sales of antibiotics for animal production increased from 126.3 mg/PCU in 2011 to 175.5 mg/PCU in 2021 (an increase of 38.9%). This was due in part to a decline in the quantity of livestock, especially pigs, but this does not explain such a dramatic increase. This means that Poland broke out of the general trend and avoided possible penalties in this regard only because the strategic goal for the entire EU market was close to being achieved. The problem is that the new target set for the next decade includes a renewed objective of a 50% reduction in the market sales of antibiotics by 2031, and this time it may be much harder to achieve, since the countries leading in the implementation of the strategy already have little margin for change, which means that responsibility for the results falls on countries that have done little or nothing in this regard so far – including Poland.

Why is the situation worse in Poland?

The answer to this question is not easy, because the problem is made up of a very large number of variables, and worse, each of them affects the overall situation to a different degree. Let us start with the fact that there are examples of farms in Poland that use absolutely no antibiotics in their production. These examples show that this can be done – it is not easy or cheap, but it is possible. It seems that the key thing is that solutions that enable antibiotic-free production are costly, and the customer does not necessarily want to pay for this in the price of the final product. Therefore, such activities can be afforded by entities that produce and process the livestock themselves, and then offer the products in the market. By dictating a higher price to the end consumer, they can make up for the losses suffered at each stage of production, including the initial one, thanks to the fact that the ownership of all intermediate links remains in the same hands. The condition for success is that the end consumer must be willing to pay more, and this niche is still quite small, so the number of players in the Polish market acting in this manner is also very small. Therefore, the first problem in livestock production in the conditions prevailing in Poland is the low level of affluence of the society and the resulting lack of willingness to pay more for a much better quality product.

The second problem relates to the complications associated with antibiotic-free production, or with the efforts to limit the use of antibiotics. Such production requires a very high level of competence in the organization and the management, the maintenance of microclimate, and the optimization of nutrition, including thoughtful and rational use of health-promoting substances, whether in the form of additives or as a properly composed set of basic raw materials. Few producers in Poland, even those operating on a large scale, have such broad and profound substantive competences. As a result, the use of antibiotics in the form of metaphylaxis or ad hoc therapeutic measures is an easy way to cover up problems occurring in other aspects of production. This is the situation we are currently facing in Poland. The problem is that it is an activity that has no end. The growing problem will continue to force a further increase in the use of antibiotics until the country sets its sights on a strategy aimed to reduce it by increasing the competence of producers.

What are the alternatives?

As demonstrated by examples from countries that are leaders in the reduction of the use of antibiotics in livestock production, there are a number of solutions that, when combined into a strategy, can help achieve very good health and production results while minimizing the use of antibiotics. During the years 2011–2021, Denmark reduced antibiotic use from 42.1 mg/CPU to 33.4 mg/CPU. On the one hand, the result does not seem impressive, as it is only 20.7%, but on the other hand, it should be noted that the starting level in 2011 was already three times lower than in Poland. This clearly confirms the thesis that in the next decade the key role on this matter will not be played by the leading countries, with Denmark undoubtedly being one of them, but precisely by countries like Poland, where there is still much to be done. Another example is the Netherlands. The country, where in 2011 the rate of antibiotics use was 146 mg/PCU, which is much more than in Poland, reduced this use level in 2021 to 47.6 mg/PCU, or by 67.4%, and became one of the key EU member states for the success of the strategy implemented by the EMA. Other large producers that achieved similar results were Germany (65.4%) and France (79.6%). The picture was slightly different for Europe's largest pork producer, Spain. Until 2014, the country's antibiotic use had increased from a very high starting level of 335.8 mg/PCU in 2011 to 418.8 mg/PCU. That is almost 4 times more than in Poland! However, from that year on it began to decline and in 2021, after a period full of fluctuations, it reached 157.2 mg/PCU, which was significantly less than in Poland.

How did they manage to do it?

First of all, it was necessary to implement a national strategy that was complementary to the European one, but was adapted to the unique regional characteristics of agriculture. It was necessary to improve livestock conditions, through appropriate equipment for livestock buildings, but also to improve the competence of the staff to properly control ventilation, heating, and cooling systems. In Poland, the issue of building equipment seems to be the smallest

problem, since we have the same systems. The real trouble is their professional operation, for which our producers and the workers they hire are not properly prepared. Poor competence also leads another major problem, i.e. biosafety. The ASF epidemic has forced decisions in Poland to protect facilities by erecting fences and securing windows and ventilation systems. However, it is worth noting that in countries such as Denmark and the Netherlands, solutions of this type have been used for a long time. This shows the difference in the professionalism of the approach to production. In those countries, solutions related to filtration, purification, and disinfection of the ventilation system's supply air are already in use. There is also no compromise on the rules of access to the facilities. Sanitary locks are the rule, not the exception, and everyone must abide by the applicable rules, regardless of social standing and occupation. The feeding standards are designed taking into account not only the nutritional needs of the animals, but also the health-promoting potential of the diet. This is the path that more and more EU countries are following, and Poland must also go in that direction as soon as possible.

In this section you will read:

- Roughage quality as a key element in efficient milk production and the improvement of cow welfare
- Welfare versus mastitis in dairy cows

Roughage quality as a key element in efficient milk production and the improvement of cow welfare

Krzysztof Białoń, BSc, PhD – FeedExpert

In the coming decades, climate change will have a major impact on crop production. Increasing global warming, increased CO_2 emissions, and abnormal precipitation patterns will increasingly have a direct impact on production and changing yields and parameters of individual crops. Indirect impacts of climate change will include plant diseases, pest activity, and increasing weed pressure. There will also certainly be changes in the geographic distribution of typical mycotoxin-producing fungi species. The most common fungi of our temperate climate zone are the Fusarium species. However, with climate change, we can expect an expansion of other fungal species and their metabolites, which are less common today.

Properties of roughages and their importance in cattle nutrition

Dry and juicy roughage makes up up to 80% of the raw material composition of a safe and healthy ration for a modern, high-yielding cow. Proportionately, with the reduction of roughage in the ration and the introduction of concentrate feeds, a dynamic change in rumen motility becomes natural. This is necessary in order to optimize and maximize production due to the highly competitive global dairy sector. Today's widespread ensiling is an unavoidable process of loss of feed material, and the goal is to minimize and ultimately produce the highest quality stable and highly digestible silage. Therefore, the very decision as to the growth stage of the plant and its destination as silage in the feed schedule have a key impact on how efficiently and how much nutrients the farmer delivers in the ration of high-yielding cows. 'Fermentation losses' – the often invisible gas losses and dry matter losses of the raw material – are the most important process that the farmer can control when applying good silage practices that improve the quality of fermentation and support the processes of proper stabilization of the raw material when it is fed throughout the cows' feeding period.

Risks in feed preservation and storage

In recent years, we have seen increased contamination of feed with fungi of the Fusarium genus, which in turn is the cause of the greatest amount of mycotoxin production. Contamination is already occurring in the field as a result of a number of changes brought about by modern technology and agricultural production systems, such as inefficient sowing practices, no-till farming, and the intensification of artificial fertilization at the expense of organic fertilizers. This process is inevitable and the possibilities to optimize roughage production have a huge impact on the importance of the dairy sector in Europe's future agro-climate policy.

Mycotoxins in feed and their importance – feed safety and animal welfare

Mycotoxins are toxic secondary metabolites of microscopic fungi that people encounter in everyday life. Currently, several hundred different mycotoxin molecules have already been described, but only a small fraction of them have been studied in detail due to the limited availability and sensitivity of analytical methods. Due to the high evolutionary variability of fungi (only 70 000 species are currently known and described, while their total number is estimated at 1–5 million species) and the lack of knowledge, it can be assumed that we know only a small fraction of species of specifically toxic fungi.

Mycotoxins can easily be transmitted from raw materials into feed and food, posing a huge health risk to

both animals and humans. The most common symptoms of chronic mycotoxicosis in animals are immunosuppression, which is a decrease in the animal's own immunity, reduced feed intake, impaired performance and productivity, damage to parenchymous organs – the liver and kidneys, and symptoms of nervous and endocrine system disorders with increased estrogenic activity of the body. Symptoms of acute toxicity are specific to the action of each group of mycotoxins; consequently, they lead to organ failure and death of the animal. As a rule, the intensity of the effect of mycotoxins depends on several factors, such as age, sex, breed, health status, time of exposure to the agent in the feed, environmental conditions, welfare, and the so-called synergistic (compounding and cumulative) effect of mycotoxins.

Exposure to mycotoxins in dairy cows

The quality of roughage, especially silage and haylage, depends on both technological and biological factors. The most important biological factors include the presence of bacteria of the *Clostridium* genus, which cause silage spoilage, and wild yeasts, which promote alcoholic fermentation and multiply in the presence of oxygen, thus reducing the energy value of the feed. The most dangerous biological factor is the activity of mold, which sustains further losses and causes an undesirable phenomenon, namely the production of mycotoxins.

Analyses carried out in recent years prove the increasing negative impact of the aforementioned factors on livestock. Ruminant diets consist of a wide range of roughage, grain meal, and complete compound feeds. Thus, the risk of increased concentration of mycotoxins in cow nutrition is higher than for monogastric animals.

The most important mycotoxins causing economic losses in production are deoxynivalenol (DON), zearalenone (ZEA), T-2 toxin, and aflatoxin.

In addition to the mycotoxins that are well-known and relatively easy to identify, feed often contains masked mycotoxins (so-called coupled mycotoxins). This type of mycotoxins has different physical and chemical properties and is not readily identifiable by commonly used classical analytical methods. Therefore, the actual level of mycotoxins in the ration may be much higher, and mycotoxicosis may already occur at lower detected levels. Coupled mycotoxins are formed in the process of detoxification of plants infected with fungi during vegetation, where their toxicity is reduced, but only in relation to their hosts. In the digestive tract of ruminants, due to the action of enzymes in the rumen fluid, the original form of mycotoxin – mainly ZEA and DON – is often reactivated.

Characteristics of mycotoxins

Deoxynivalenol (DON) – it is found on average in 90% of all samples tested and is widely considered an indicator (marker) of the presence of other mycotoxins. The negative effects of DON are associated with changes in rumen fermentation and slowed passage of digestive tract contents, with simultaneous reduction of intestinal digestibility of protein. Studies conducted as early as in the 1990s confirm and at the same time indicate that the presence of DON in feed above the level of 400 ppb/kg results in lower dry matter intake, reduced production of milk with higher somatic cell content in milk, and disturbances in cow reproduction. (Jones et al., 1994).

Zearalenone (ZEA) – it is produced by fungi of the *Fusarium* genus. Toxicity is mainly manifested by estrogenic effects, which cause abnormal occurrence of estrus, miscarriage, fetal malformations, as well as anomalies in the development of the mammary gland of heifers. Zearalenone derivatives (α,β-zearalenol) easily cross the placenta into the fetus and have the potential to pass into milk, creating a problem for the end consumer. Levels of ZEA >250 ppb/kg of the daily feed intake result in reduced cow reproduction.

T-2 toxin – is referred to as fusariotoxin, and mainly causes gastroenteritis and frequent painful bleeding in the gastrointestinal tract of animals. The presence of the T-2 toxin usually manifests itself in reduced milk production, increased levels of somatic cells, and inflammation of the digestive tract. Damage to the epithelium of the rumen wall occurs at higher concentrations of this toxin and is usually irreversible. Literature data indicate that the maximum allowed level of the T-2 toxin should not exceed 100 ppb/kg of the dry mass of the ration in the diet of dairy cows. Penetration into milk is quite long-lasting, but residues of the T-2 toxin and its metabolite HT-2 toxin (***Yoshizawa et al., 1982***) can be determined in insignificant amounts, which significantly impair the technological suitability of milk as a raw material.

Effective methods to improve feeding efficiency and eliminate possible hazards in silage

There are various techniques (attempts) to eliminate the negative effects of mycotoxins directly in the gastrointestinal tract or the liver of the animal, which include adsorption, detoxification, and biotransformation. The commercially available products are usually based on aluminosilicates or combinations of clay with specific microorganisms and/or enzymes that convert toxic compounds into non-toxic or less toxic ones; in addition, they very often contain immunomodulators. Extracts containing flavonolignans and biogenic amines are becoming a common active ingredient in compound feeds. Silymarin indirectly supports the processes of regeneration of liver cells – hepatocytes, reduces the level of free radicals, and counteracts the degradation of the structure of cell membranes, by lowering the concentration of cholesterol and triglycerides in the blood, while raising the level of glutathione in the liver. Silymarin has been found to have an active effect in protecting the liver from the harmful effects of mycotoxins, ethanol, and methanol, while also having anti-inflammatory and diastolic effects. This is particularly useful in livestock fed intensively with highly concentrated compound feeds. In addition, it has a natural and long-lasting lipotropic (improves and regulates fat metabolism) and hepatoprotective effect (protects liver parenchyma), thus intensifying liver metabolism (Białoń et al., 2022).

The ability of ruminants to metabolize mycotoxins has been confirmed. Depending on their physiological state and age, cattle are able to partially protect themselves from the effects of high concentrations of mycotoxins by degrading them (0-50% DON) through the action of the microbial ecosystems of the rumen. Unfortunately, the ability to degrade mycotoxins may be less effective with prolonged and continuous low levels of mycotoxins in the feed. Most mycotoxins are only partially degraded, and some metabolic products of this degradation phase remain more toxic with unpredictable individual effects on the body of the animal. An example is the aforementioned-zearalenol, which is up to 10 times more estrogenic than its original form (ZEA). Another example is the HT-2 toxin, which is also more toxic than the original T-2 toxin. In such cases, negative effects on animals manifest themselves in non-specific symptoms that differ from those known for the basic forms of mycotoxins. The real (standard physiological) causes of various health problems are thus masked. It should be emphasized that mycotoxin metabolites are largely and most often deposited in the spare fat, causing potential risks in cows immediately after calving by mobilizing milk production during the period of negative energy balance. These relationships are very specific, and the rumen and properly working liver ensure the correct metabolism of the conversion of a specific part of the mycotoxin, as a result of which ruminants are some of the more effective animals with the ability to detoxify fungal metabolites on their own compared to monogastric animals.

Mycotoxin monitoring on farms

Working with ADDICOO GROUP s.r.o., we have been dealing with the problem of the impact of mycotoxins on the health and performance of livestock for many years. Every year is different in terms of the presence of mycotoxins and contamination of both concentrated feed and roughage (different location conditions, environment, weather, season, climate change, etc.). Mycotoxin monitoring must be conducted continuously in order to be correct and effective. The year 2022 was certainly no exception and brought undesirable changes in the form of confirmed higher levels of ZEA, the T-2 toxin, but also DON – in haylage (diagrams 1–3). In previous years, deoxynivalenol was more common, both in haylage and in corn silage. We now have a significant number of samples of this year's haylage, and as we are starting to open the first corn silos this year, we will monitor and publish the first results of these very important raw material analyses.

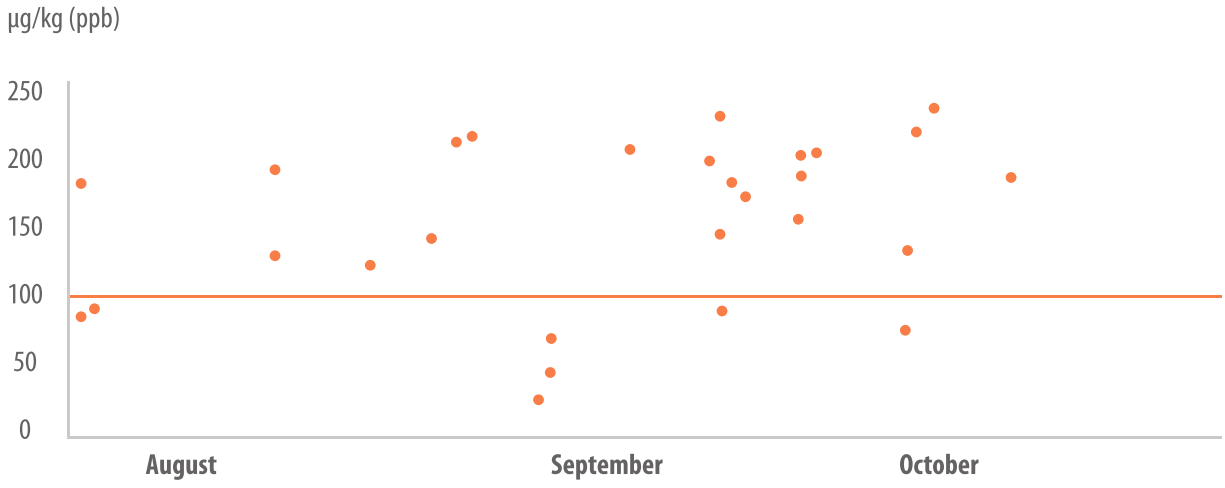


*Chart 1. **T-2** concentration – haylage 2022* *Number of samples 328; average content 154 ppb*

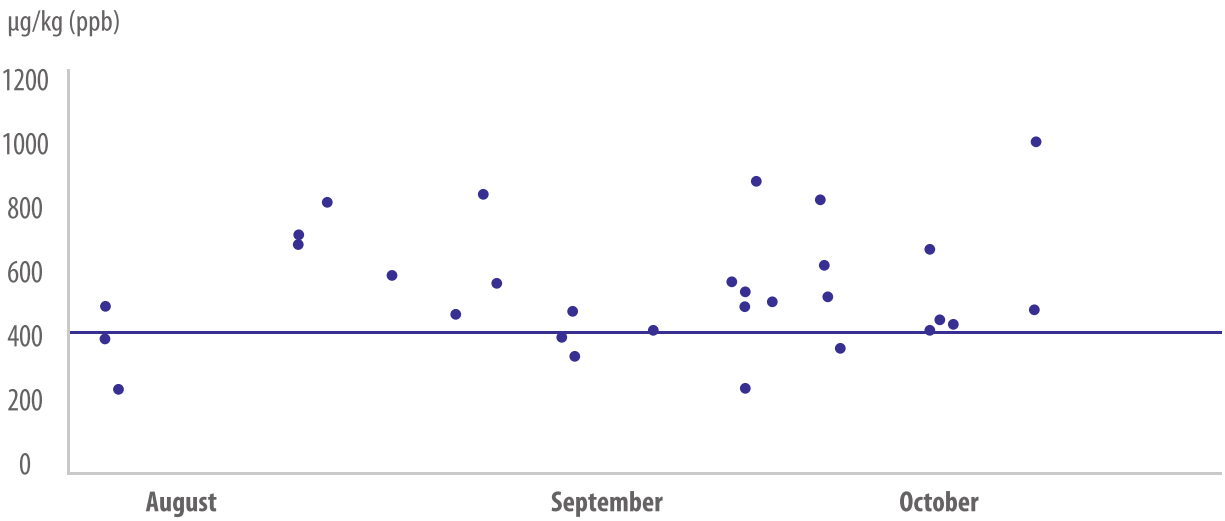


*Chart 2. **DON** concentration – haylage 2022* *Number of samples 330; average content 562 ppb*

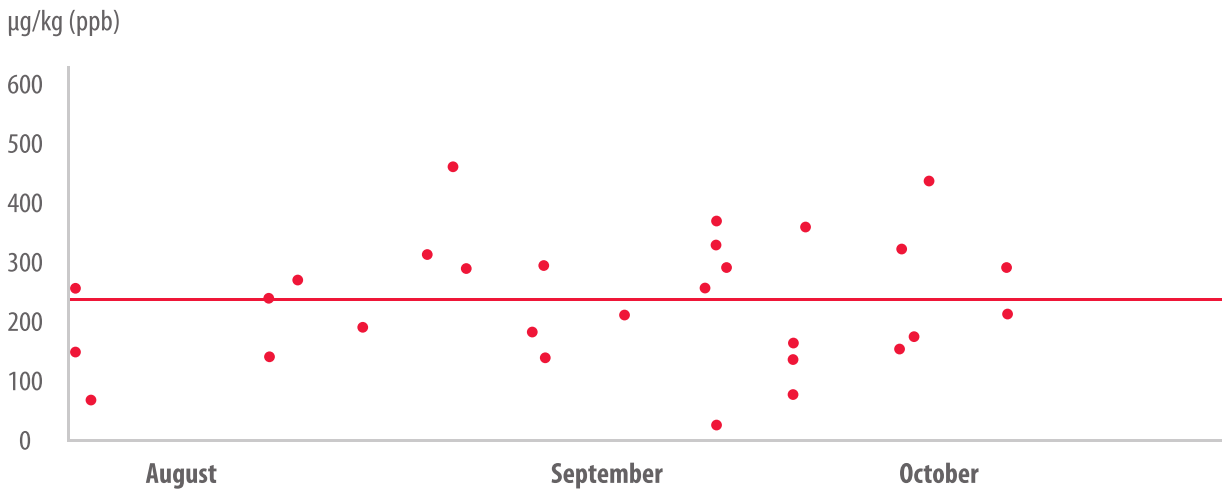


*Chart 2. **ZEA** concentration – haylage 2022* *Number of samples 589; average content 245 ppb*

There is a huge difference in the results depending on the region and the location, but also within each farm. The impact of the variability of weather conditions (variable humidity, periodic drought, wind, etc.) is not conducive to homogeneity of the material to be ensiled. Proportionately, a local mold problem was evident where silage was prepared under high moisture conditions, and the presence of *Clostridium* was often determined, mainly due to the higher soil content in the silage. In contrast, in areas of lower rainfall levels, farmers had up to 30% lower yields compared to the previous year. In conclusion, the dry conditions during the late spring and the hot summer in many regions contributed to the deterioration of the feed composition, culminating in a moisture deficit that resulted in high dry mass content in the harvested material, which was therefore difficult to compact in the silo, and the risk of adverse fermentation during silage storage and instability immediately after opening.

The key to obtaining the most objective assessment of the level of mycotoxin contamination in feed is continuous analysis of feed. Representative feed samples should be taken according to a specific scheme from the exposed part of the silo wall that is in contact with the external environment – oxygen. Since the feed is stacked and pressed in layers, it is necessary to sample not only the entire width, but also the different height levels of the wall from which silage is taken out. One must bear in mind that mycotoxins are not evenly distributed in the silo (Figure 1). Therefore, in order to obtain a valid sample for analysis, it is necessary to take samples from a large number of locations, thus obtaining a collective mixed sample. Quickly shipped vacuum-packed and chilled feed should be analyzed by an accredited laboratory in order to apply a proper program to counteract losses caused by the presence of mycotoxins in rations for dairy cows, fattening cattle, and young livestock.

The right approach to the problem of mycotoxins in feed requires comprehensive measures. A single application of periodically dedicated preparations does not bring the intended results, and the herd continues to be exposed to the risk of economic losses and deteriorating performance. In the case of elevated concentrations of mycotoxins in concentrate feeds and roughage, which are mainly silages, but also as a standard of good practice to mitigate the risks resulting from mold activity, it is recommended to include Fortisorb® Phyto in feeding programs. Its primary active ingredient is a purified, activated, and specially physico-chemically treated clay, whose effectiveness in preventing the toxic effects of zearalenone, the T-2 toxin, fumonisin, and deoxynivalenol has been confirmed scientifically in numerous field tests.

As a complex and comprehensive product, Fortisorb® Phyto contains yeast cell wall derivatives that stimulate the immune system especially during periods of long-term exposure, to even low levels of mycotoxins, and the related health problems, known as

Figure 1. Mycotoxin concentration levels in different parts of the silage front wall

immunosuppressive disorders. In addition, by using the product, farmers can reduce the consequences of economic losses during periods of worse health caused by lower productivity, reduced effectiveness of vaccines, and increased demand for the drugs.

Most toxic substances in the body are detoxified in the liver. Active protection of this organ is essential for animal health. As another active ingredient, Fortisorb® Phyto was enriched with phytogenic substances that provide hepatoprotective, anti-inflammatory, and antimicrobial effects.

Wipasz's feeding program based on Fortisorb® Phyto provides a highly effective and comprehensive solution that prevents the negative impact of mycotoxins on the health and performance of livestock, thereby improving the economics of their production.

Information worth remembering

Monitoring data from recent decades demonstrate a linear and increasing trend in the level of mycotoxin concentrations in the food chain of both animals and humans. Too little knowledge of the adverse effects on human health does not allow us the producers of feed and food raw materials, and the animal breeders, to downplay the importance of this area of broadly defined agricultural production. To counteract the negative effects of toxins on the health and performance of livestock, a number of preventive measures should be taken, such as good agrotechnology, adherence to good agricultural and husbandry practices, and optimization of the use of herbicides and fertilizers. Animal welfare and sustainable agriculture with low-carbon production inputs is a priority and should be considered as more important than any rules of 'predatory' economy and unfair competition. Unfortunately, some of the conditions for the emergence of risks caused by mold and their mycotoxins (climate, mutations, and concentration in a given area) are often beyond our control; this is yet another reason for us to join the global control of the food chain to effectively protect the planet, to benefit constantly from progress and the knowledge of good agricultural practices, and to constantly strive to reduce adverse factors, thus reducing the use of antibiotics in animal production. Animal health and natural plant production ensure human health with sustainable and safe food production.

The material is based on an article by ADDICOO GROUP s.r.o., Cz. Rep. 'Mycotoxins in dairy cow rations' and the author's own publications - the literature can be made available by the author KB/FE 10.23

Welfare versus mastitis in dairy cows

Tobiasz Wiśniewski – Cattle Nutrition Advisor Wipasz S.A.

Currently, herds in Poland are achieving higher and higher yields. Good milk parameters and a low LKS level of 100–200 thousand/ml are a major challenge, which can undoubtedly be met by farms by using proven feeding solutions that are rich in very good quality roughage, properly selected concentrated feeds, as well as mineral and vitamin supplements. Another significant factor is the broadly defined welfare in livestock buildings, which should be adapted and equipped to ensure the comfort of the animals, i.e., proper temperature, air quality, lighting, and optimal nutritional intake.

Access to clean and fresh water plays a very important role here. Drinking troughs should be located in the most accessible areas (tub drinking troughs with the ability to quickly tip over and pour out the soiled water). In addition, during the summer, it is recommended to increase the availability of drinking troughs in the waiting space and at the feed table. Another indispensable element is a properly constructed feed table that allows the entire dairy herd to take TMR at the same time. The use of a feed ladder reduces the risk of stronger cows dominating over weaker ones in the hierarchy. One must make sure to provide a good quality TMR on the feed table for 24 hours a day. During the summer, it is recommended to use preservative additives or mix a fresh TMR twice a day.

The feed corridor should be wide enough so that two milking cows can easily pass behind the eating cows. Cows need to feel safe and stable on the (grooved) floors, so they better manifest oestrus. It is necessary to provide the animals with a bedding of adequate comfort (e.g., a straw-lime mattress) and dimensions (single 250x120 cm, double 500x120 cm) that will allow the cows to rest at least 12 – 14 hours a day. Such facilities will allow healthy cows to produce more milk.

Adequate lighting in the buildings is extremely important. Cows exposed to light for more than 15 hours return to oestrus faster after calving and produce more milk, and heifers reach sexual maturity faster. It is also important to provide lighting in the facility at night – the herd will then be definitely more active and will take up more TMR.

An important element is ventilation in livestock buildings. It can be divided into gravitational and mechanical. Gravitational ventilation is one in which an exhaust opening (usually in the roof ridge) is used to provide an air flow that removes excess water vapor. The air supply openings are located in the building walls. Mechanical ventilation is used most often in old buildings where gravity ventilation does not work, but it is definitely more expensive. It uses various types of fans to set the air in motion. It is also necessary to insulate the roof, which will help on warm and hot days. Maintaining the right temperature helps avoid heat stress in the animals.

It is important to ensure that the facilities are not crowded. Too high a stocking rate reduces milk production and lowers the reproduction parameter. It is also associated with reduced rest for cows.

Proper hygiene in the milking parlor and among the animals is crucial for ensuring a healthy herd. It is also important to remember to correct the hooves at least twice a year, so that cows do not feel pain and do not become ill. This will ensure the comfort of the animals

and thus prevent the farmer from incurring losses. Animal welfare means lack of psychological trauma and pain. Calmer cows have better immunity and produce more milk. Bringing cows for milking is the first step to ensure this, even before the milking cluster is attached. During this time, no additional stress should be induced in the animals, and violence is prohibited even more so, as it would cause adrenaline to be secreted and the blood vessels of the mammary gland to become contract. This, in turn, prevents oxytocin from reaching the myoepithelial cells in sufficient concentration to induce the contractions necessary for the release of milk (over-milking). This is most noticeable when milking primipara cows. It is not unimportant to regularly replace the rubber liners and check the vacuum. This keeps hygiene at the right level and prevents the increase in LKS in milk.

Neglecting any of the above factors can result in reduced herd performance or increased LKS in milk. It can lead to a variety of conditions – well-known among breeders is mastitis, caused by pathogenic bacteria, which penetrate the udder sinus through the teat canal, causing pain. This definitely worsens the welfare of dairy cows, and in some cases can also lead to death.

The causes of high LKS in milk can be divided into infectious and non-infectious. The infectious ones include pathogenic bacteria such as ***Streptococcus uberis***, ***Streptococcus dysgalactiea***, ***Enterococcus***, ***bacilli E.coli***, ***Klebsiella***, and yeast-like fungi. Lameness, stress, inadequate zoohygienic conditions (heat stress, high humidity, and drafts), nutritional problems (acidosis, ketosis, etc.), faulty milking machine operation, and lack of proper milking skills or hygiene are the primary non-infectious causes of high LKS in milk.

Unfortunately, mastitis is currently one of the most common, as well as the costliest, diseases of cattle. In order to treat the herd, a great deal of veterinary knowledge is required. During a veterinarian's visit, the environment, the work of the milkers, the welfare of the cows, and the nutrition are inspected and evaluated in order to identify the cause of the mammary gland disorder. The number of pathogens that can get into the udder can be reduced by proper management of the barn and the bedding, as well as proper hygiene of the milking equipment and the staff.

Cow immunity, on the other hand, is enhanced by proper nutrition, welfare, and specific immunoprophylaxis. Infectious bacteria are transmitted through milking equipment, milking cups, and milkers. Dry cow (DC) therapy and post-milking disinfection of the teat cups after each milking improve the situation. Introducing prophylaxis definitely improves herd health and results in much lower costs.

Conditions that do not restrict the natural behavior and psychophysical needs of cows, combined with proper feed rations and hygiene in livestock buildings, make it possible to maintain a good herd condition and achieve high yields combined with low LKS in milk.

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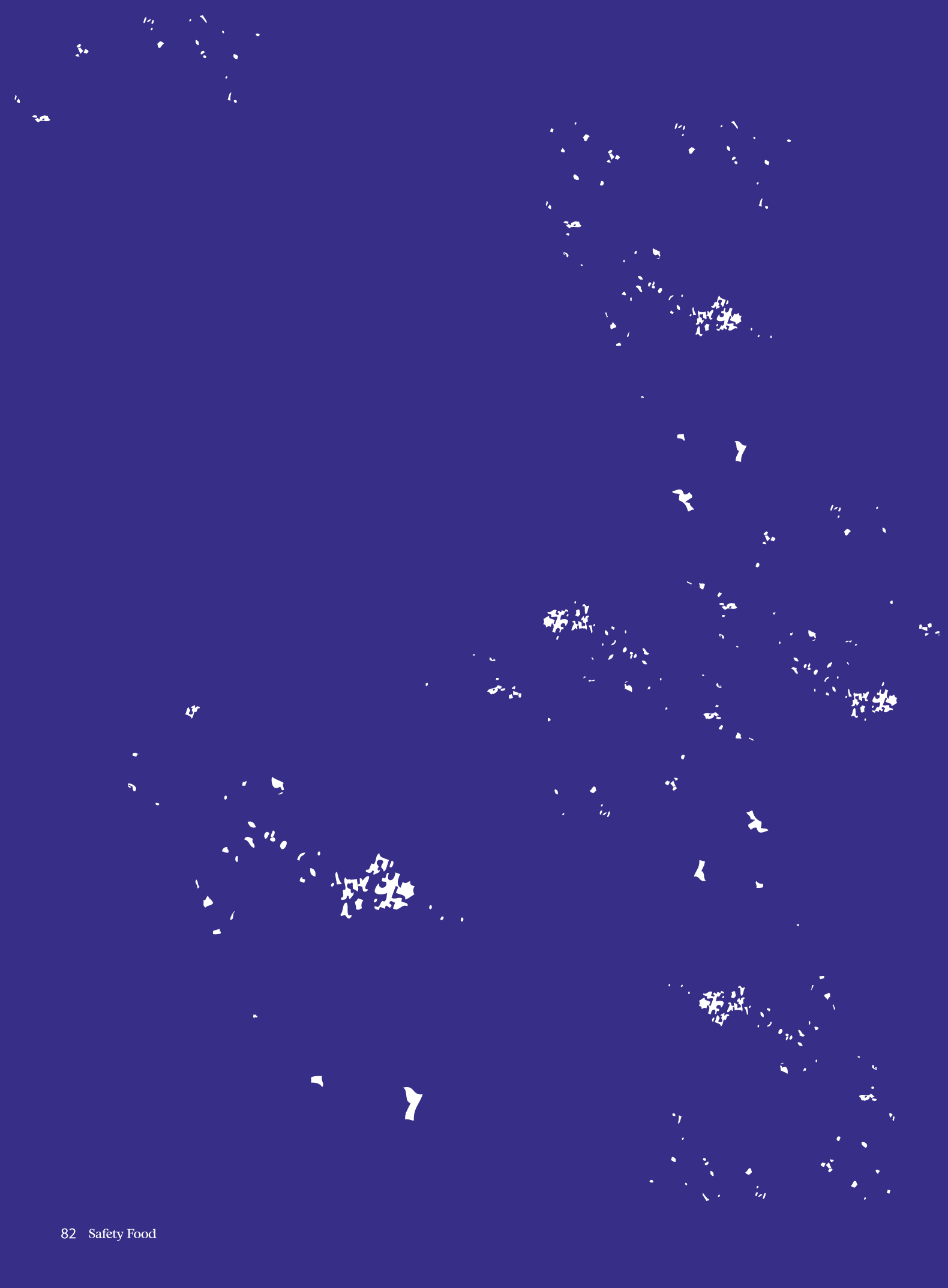


In this section you will read:

- Modernization of agricultural infrastructure – local zoning plans

Modernization of agricultural infrastructure – local zoning plans

Advocate Katarzyna Romaniuk-Grzęda

Every industry, in order to survive, unconditionally needs to grow. Some of the biggest obstacles to the growth of agriculture is barriers to the modernization of agricultural infrastructure. This modernization should include both the construction of new facilities and the reconstruction of existing ones.

This process was to be facilitated in part by an amendment to the Act on spatial planning and zoning, which came into force on September 24 of this year. The Act is one of the basic legal acts that govern the course and principles of the investment process.

A favorable solution for investors (farmers and entrepreneurs) (although it will become effective only in 2026) is the introduction of a so-called urban planning register. According to the Act, it is to be a tool that will make it possible to create, update, and share spatial planning and zoning data. The register is to be maintained in an ICT system, as well as to be open and free of charge. It is to be used to conduct the full planning process, that is, both to post information about draft acts at the commune level and to publish existing zoning plans. What does this mean? It means that any property owner (or potential buyer) will be able to track the legal and planning status of that property. He or she will not be surprised by a sudden change in or introduction of a local zoning plan.

Unfortunately, the Act also contains a number of provisions that may prove problematic for investors. So-called general plans have been introduced to replace the study of construction conditions (mandatory until December 31, 2025). It will be an act of local law (local regulations) defining planning zones (where and what to build) and municipal urban planning standards (how to build, general parameters, e.g., building density ratio). So far, the study has not been a source of law, but as a result of the new Act, a commune will be able to prevent, in a short time (a few months), the possibility to carry out a certain category of projects in its territory – even if the investor applies for an environmental decision.

An opportunity regarding the constraints of a commune's spatial policy is to be the so-called integrated investment plan. At the request of a large investor, a Commune or Municipal Council may determine, in a resolution, the possibility of carrying out an investment project (in this regard, the general plan is no longer valid). It will be necessary to have a so-called urban planning agreement in the form of a notarial deed, in which the investor will commit to a so-called complementary investment that fulfills the needs of the commune, e.g. in terms of infrastructure. Unfortunately, this will have a significant impact on the cost of the implementation of the investment project, which will have to include, for example, the cost of repairing a section of road infrastructure. What is more, no criteria for refusal to adopt an integrated investment plan have been introduced into the enumerated cases either.

These solutions could promote the development of investment processes if (at the statutory level) a minimum area was introduced that in rural communes must be allocated for livestock buildings (without specific restrictions on the number of livestock units, for example). This would prevent strange situations in which a commune council can prohibit building, for example, pig houses or poultry houses in a village, for example, in the aforementioned general plan.

An 'expiration date' for zoning decisions was also introduced: 5 years from the date on which they become final. That is how much time an investor will have to obtain, for example, a building permit or to start construction.

The legislation does not provide sufficient 'protection of acquired rights': the amendment should not apply to environmental proceedings initiated at the stage of the obtained environmental decision and construction conditions decision if a general plan is introduced.

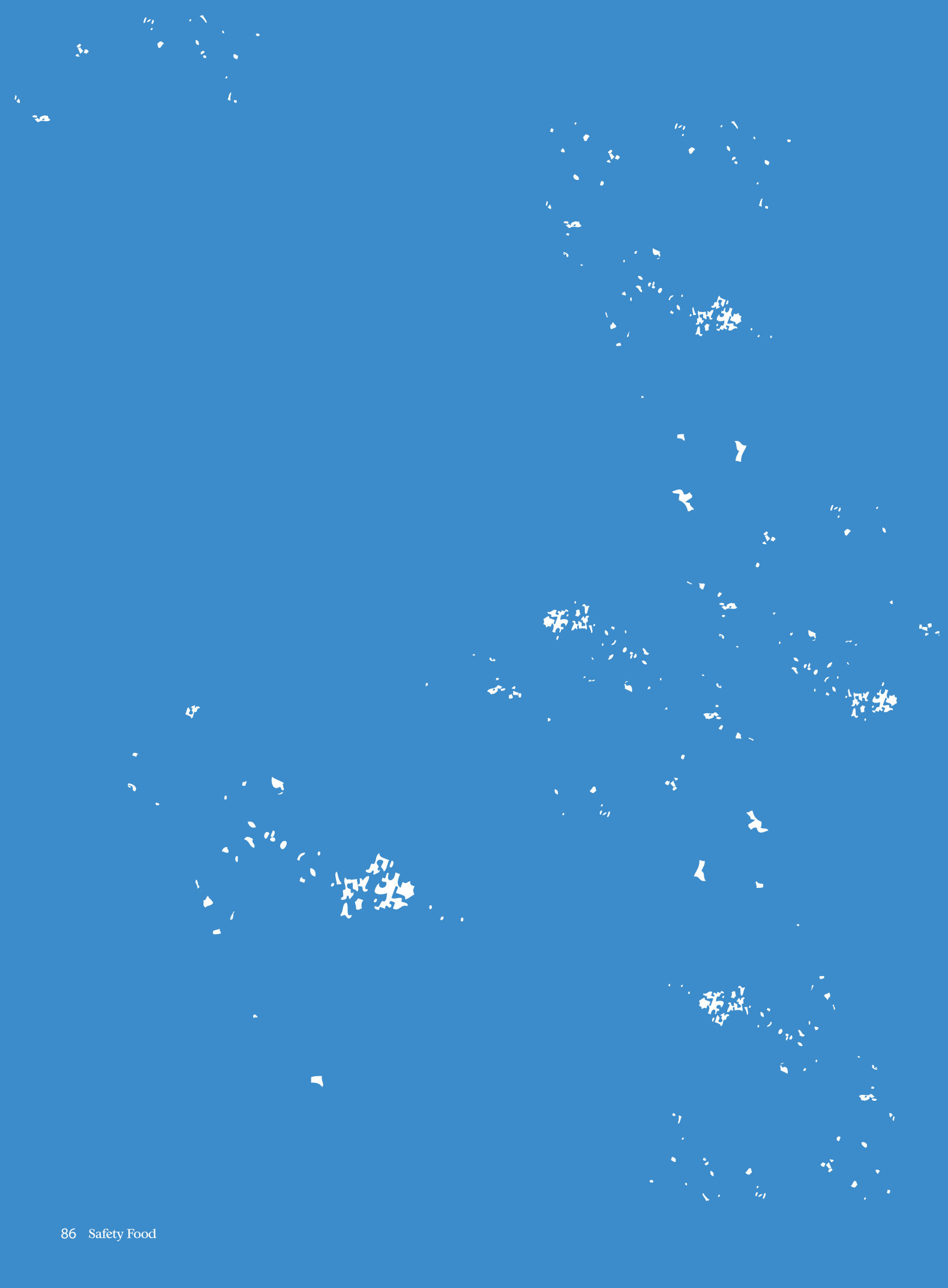
The change that may prove most unfavorable to farmers and entrepreneurs is increased public participation in the process and the local spatial policy. At the same time, an evolution of the character (nature) of rural areas in the public consciousness can be noticed: from a place dominated by agricultural activity to one dominated by recreation (leisure).

First of all, a group of residents will be equipped with a planning initiative and will be able to formally submit expected planning solutions to the competent authority. Much more extensive (and, as a result, probably longer) public consultations will be held.

This has important implications for the already existing regulations and ongoing planning processes. Most residents view the obligation to hold public consultations as an obligation to obtain public approval for a project. The problem could be solved by introducing a provision that would explicitly define public consultation as the process of agreeing with the local community on the terms and conditions of an investment project, rather than the consent of residents to its implementation. Practice shows that the authorities place a premium on the 'right of priority'. The owners who first developed their properties usurp the right to define the nature of the land use of the remaining areas, attempting to restrict the property rights of the new property owners outside the planning procedure through protests and pressure.

Currently, investment processes are definitely taking too long. This is most often due to the tardiness of the authorities (not only those issuing environmental decisions but also those that provide assessments). There is also a lack of an integrated investment procedure: in practice, proceedings for the issue of an environmental decision, as well as proceedings for the issue of a zoning decision largely overlap in terms of substance and procedure. With the active participation of litigants opposing an investment project, the process of obtaining decisions can drag on for as long as several years. At the same time, there are no serious sanctions (e.g., fines) for the tardiness of the authorities (with the exception of standard fines for protracted proceedings).

Meanwhile, for the investor, each month of delay means another month of lost potential profit, as well as an increase in the cost of the investment project (including changes in the prices of construction materials and services). It seems necessary to introduce a special provision allowing (and defining specific rules) for the investor to seek compensation from the authority (both the one issuing the decision and the one assessing and providing approval) for protracted proceedings. Unfortunately, according to the current legislation, the only thing left for the investor is to seek compensation from the authorities according to general principles, and such processes are extremely complicated and time-consuming.



Our experts

answer your questions

What should be the air change rate in a pig house?

One of the most important elements determining the living comfort of animals is undoubtedly the quality of air, which we can control with an efficient ventilation system. However, proper control of the ventilation system in a pig house is not easy, and any deviation from the norm can contribute to a deterioration of the animal production rates.

During the cold season 'breeders' attention is usually focused on maintaining the required temperature at the lowest possible cost. This usually means reducing the operation of the ventilation system to reduce heat loss. The associated deterioration of air quality (increased concentrations of carbon dioxide, hydrogen sulfide, and ammonia) has a negative impact on the health of animals. There may be a decline in the efficiency of the respiratory system and, consequently, the immune system, resulting in an increase in feed consumption per kilogram of weight gain. Saving money on heating a livestock building can be counterproductive.

In summer, too high a temperature reduces the animals' feed intake. If the temperature in the pig house is too high and ventilation control does not help, the air intakes can be provided with point cooling systems. These are called coolboxes, which are boxes containing a regularly sprinkled large-area cartridge that provides intensive evaporation of water and associated heat removal.

Maximum permissible gas concentrations in the pig house:

- ☑ CO_2 (carbon dioxide) – 3 000 ppm
- ☑ H_2S (hydrogen sulfide) – 5 ppm
- ☑ NH_2 (ammonia) – 20 ppm

Animal category	Temperature [C^0]		Relative humidity in % (optimal)
	Minimal	Optimal	
Heard boars	12	15	75
Non-pregnant sows and pregnant sows until the 90th days of pregnancy	12	15	70
Farrowing sows	15	19	70
Lactating sows	18	20	70
Piglets up to 14 days old	24	28	60
Piglets 14 to 28 days old	18	23	60
Older piglets	18	21	60
Weaners	17	19	60
Fattening pigs	15	18	70
Breeding boars and gilts	14	17	70

Table 1. The temperature and humidity requirements of pigs

Animal category	Air change rate in m^3/animal/hour	
	winter	summer
Boars, non-pregnant and pregnant sows	20	100
Lactating sows	50	150
Piglets weaned at up to 12 weeks of age	8	30
Breeding boars and gilts	20	90
Fattening pigs	15	80

Table 2. Ventilation and the required air change rate in pig houses

Regardless of the data in the tables, the most important thing is to maintain a stable microclimate, the control of which should be based on humidity, temperature, and air velocity sensors, as well as measurements of noxious gases. One should also bear in mind that pigs should avoid drafts!

It is important to use a ventilation system that will fit the design of the pig house. In addition to the overall technical condition of the building, it is important to

consider all equipment inside the building that may affect the airflow. At the same time, any unwanted leaks should be eliminated.

Dynamic fattening of pigs can be carried out in premises with suitable environmental conditions. Ventilation in a pig house, right after the feeding system, is an element that largely determines the performance of the herd. Animals do not show agression and develop properly only in a properly ventilated pig house.

Source: Journal of Laws of 2010, no. 56, item 344

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

What are the optimal microclimate parameters in a poultry house?

During the rearing of a broiler chicken, regardless of the season, appropriate microclimate conditions should be maintained that are suitable for the age and condition of the flock.

The most important climate parameters that should be continuously monitored are:

- ☑ temperature;
- ☑ humidity; and
- ☑ carbon dioxide level.

In addition, it is a good idea to measure:

- ☑ air flow speeds; and
- ☑ oxygen, ammonia, and hydrogen sulfide concentrations.

Too low or too high a temperature adversely affects production results, so it is necessary to constantly observe the behavior of hens. On the day of settlement, the temperature at the height of the birds' heads should be about 34°C, and the recommended bedding temperature is 30°C. The air temperature should be adjusted according to the condition of the chicks delivered. It should be gradually lowered so that on day 14 it is about 27°C, and at the end of fattening – – at the level of approx. 20°C. Humidity is inseparable from temperature and air movement. The optimum humidity in a building should be 50 – 70%. Increased humidity causes decreased productivity, increased susceptibility to disease, and dampening of the bedding, which in turn causes foot pad dermatitis (FPD). Too low humidity contributes to increased water intake, reduced feed intake, and dryness of mucous membranes which causes birds to be more susceptible to infections. According to standards, the carbon dioxide levels must not exceed 3 000 ppm, but we know from experience that the optimal level should be up to 2 500 ppm. The oxygen content should not be lower than 20.5%; for ammonia the maximum level is 20 ppm, and for hydrogen sulfide it is 5 ppm. Efforts should be made to keep ammonia and hydrogen sulfide levels as low as possible.

Air flow speed has a major impact on bird welfare: drafts in livestock facilities quickly make chickens cold. The speed of air movement should not exceed 0.2–0.3 m/s. In the summer, the air movement speed can be up to 0.6 m/s.

When considering the issue of microclimate, it is also a good idea to consider light. Although it does not directly affect the birds' perception of thermal comfort, it plays a very important role in broiler growing and is one of the factors responsible for welfare. During the first 24 hours, the light intensity should be 60 lux. As the chickens grow, the intensity should gradually decrease to 20 lux. The most important thing, however, is to constantly observe the chickens' behavior and react if they become more excitable with too much light.

The microclimate, health, and condition of birds are strongly influenced by the quality of the bedding in the building. The bedding materials should be characterized by high water absorption and the absence of mechanical and microbiological contamination. It is important that they have the right structure to prevent cuts to the soles of the feet and provide adequate thermal insulation; they should also be characterized by the absence of an intense odor. Throughout the production cycle, care should be taken to ensure a high quality of the bedding (dryness, ability to forage) as this is one of the key elements in the production of high quality livestock.

Joanna Trusiewicz
– Zootechnician, Polish Chicken Research Center, Wipasz S.A.

What is organic farming and what principles does it follow?

Organic farming is any method and technique of cultivation that contributes to the protection of the environment, animals, and people through sustainable measures. Farmers engaged in this type of agriculture are not allowed to use anything but natural substances, whether for crop protection or as fertilizers. This approach is much more demanding and results in noticeably lower yields compared to conventional farming. Compensation to the farmer for his or her efforts includes being able to sell the products at higher prices than conventional agriculture crops or receiving higher subsidies.

According to the International Federation of Organic Agriculture Movements (IFOAM), the most important principles guiding organic farming include:

- ☑ relying on relationships that ensure justice and dignity regarding the life processes and the environment;
- ☑ improving and sustaining the health of animals, plants, soils, and people as components of an indivisible whole;
- ☑ building on living systems and ecological cycles, helping to sustain them, imitating them, and cooperating with them;
- ☑ the farmer's prudence in the actions taken and sense of responsibility, and his or her use of environmental management methods that take into account the protection of health, the environment, and the welfare of present and future generations.

Organic farming also sets specific goals that the farmer should strive to achieve. Some of the most important include:

- ☑ ensuring the health and welfare of animals;
- ☑ maintaining and increasing the biological activity and fertility of the soil;
- ☑ producing healthy and safe food that does not contain agrochemical residues;
- ☑ protecting soils and aquifers, and ensuring biodiversity through sustainable management;
- ☑ reducing and eliminating the risk to farmers' health caused by exposure to toxic chemicals;
- ☑ conscious and sustainable use of natural resources and energy (e.g., water, soil, and organic matter).

Organic farming practices include avoiding the use of genetically modified organisms (GMOs) and products that contain them, crop rotation, recycling organic materials, using compost, and using green manures and alternative crop protection products. In all countries, organic farming is described in detail and defined by national or community law, and the commercial use of the term 'organic' is controlled by the government. Every prospective organic farmer must take specific steps to become certified. Even a slight deviation from the obligatory rules can result in the loss of the status of an organic farm. Those interested in organic farming can apply to their local certification body. If they meet the standards, after a certain period of time (usually 2 years), they can obtain organic farmer status. Those who follow the rules can sell their products bearing the organic certificate and earn the right to display the official organic mark on their product packaging.

The choice between organic and conventional production is not an easy one for the farmer, in terms of either the environmentally or the finances. Some farmers choose organic farming because of its philosophy, economic advantages, small land area for growing crops, or the desire to offer high-quality products. Some succeed, others do not. However, the success of an organic farm always requires an extensive analysis and knowledge, a special approach, training, advice, and a certain level of experience.

Sebastian Węgierski
– Procurement and Market Analysis Specialist
Wipasz S.A.

Environmental protection in corporate strategies. Does it pay to be 'green'?

Sustainable development is increasingly becoming an integral part of the long-term creation of company value. This phenomenon has intensified especially in recent months, with most companies (57% globally) raising the level of ambition of their environmental goals. Considering the pressure from the financial sector as a catalyst for change and the growing expectations from regulators, it can be concluded that environmental, social, and governance (ESG) issues, and primarily decarbonization goals, will be the main drivers of business transformation in the post-pandemic era.

Companies that downplay social and environmental responsibility may face penalties imposed by regulators and be overlooked by consumers who care whether a brand meets sustainability standards. Moving toward a low- or zero-carbon economy is costly, but entities that do not undergo the desired transformation will have significant problems in achieving growth and raising capital. Financial institutions, seeing the potential and realizing the upcoming changes, are increasingly willing to see themselves as a business partner and to finance 'green' solutions for borrowers. They are adjusting the products they offer, encouraging their customers to switch to more socially and environmentally conscious operations. In addition, they are beginning to refuse to lend money to non-green projects, such as the construction of coal-fired power units or other similar high-carbon projects. Financial products based on ESG scoring, i.e., those that enable a reduction in margins for companies when implementing changes toward sustainability, are starting to appear on the market. The idea is simple: if you are green, you pay less.

Insurance companies, in an effort to eliminate or reduce risk, have begun to limit insuring companies that have low ESG ratings. Entities that do not care about diversified growth will gradually be offered more costly policies, which will reduce their profitability. In contrast, insurance policies with more favorable pricing terms for 'green' products, such as photovoltaic panels and electric cars, are becoming more common.

In addition to financial institutions and insurance companies, institutional investors are also joining the ranks of supporters of the green transformation, which has a huge impact on the global economy through portfolio investments. Only 36% among the world's largest institutional investors expect to rely on traditional investing that does not consider the impact of the ESG criteria over the next few years. In contrast, the remaining 64% assume that they will carry out investments associated with sustainable development. Institutional investors are more likely to pay attention to environmental factors when investing their capital, in an effort to mitigate the risks resulting from neglecting to implement the ESG factors. Investors are equipped with increasingly precise indicators and data, which in turn make it possible to calculate the rate of return on investment in companies that implement ESG programs and to compare it to alternatives.

Sustainable development is becoming the foundation of many companies' strategies not only because of the high business potential, but also because of the human factor, i.e. employees who are looking for jobs that are in line with their philosophy and beliefs. The generational changes taking place are causing a shift in employee expectations regarding organizational culture, workplace relations, and prudent human resource management. In conclusion, companies that are socially and environmentally responsible and meet sustainability standards can count on many benefits compared to companies that have not implemented similar solutions. Higher revenues, lower costs, better financing, and policies are just a few examples. ESG issues are not a fad, but a long-term trend that is on the agenda of institutional investors and the boards of the world's largest companies. Sustainability and the pursuit of environmental protection are not new to Wipasz S.A., which is committed to follow the current positive trends.

It does pay to be green!

Sebastian Węgierski
– Procurement and Market Analysis Specialist
Wipasz S.A.

[1] https://ksiegowosc.infor.pl/obrot-gospodarczy/dzialalnosc-gospodarcza/5325188,Ekologia-coraz-wazniejsza-w-strategiach-firm.html

[2] „Where will wealth take clients next?" 2021 EY Global Wealth Research Report

How do modern methods for health and environmental management on farms affect the quality of poultry production?

Modern methods of health and environmental management in poultry farming introduce many innovative solutions that are aimed to improve the quality of poultry production, minimize environmental impact, and increase efficiency. Here are some aspects that can be considered:

1. Poultry health monitoring

Advanced bird health monitoring systems are used in modern farming. These technologies enable the early detection of diseases and abnormalities, allowing rapid intervention and reducing the risk of disease spread.

2. Automation

Automation in poultry farming allows for precise management of the farm environment. Automated climate, lighting, and feeding control systems optimize the birds' living conditions, which has an impact on their welfare and production.

3. Sustainable production

In modern poultry farming, there is an increasing emphasis on sustainable production. This includes minimizing the use of resources, recycling waste, and reducing greenhouse gas emissions.

4. Improved nutrition

Modern poultry feeding methods incorporate more advanced techniques, such as formulating diets based on the needs of individual birds. This helps optimize growth and egg production while minimizing food waste.

5. Alternative energy sources

In modern farming, alternative energy sources, such as photovoltaic panels and biogas plants, are considered as solutions that can help reduce the energy costs and the environmental impact.

These modern methods of health and environmental management in poultry farming help improve production efficiency, minimize environmental impact, and improve bird welfare, which is crucial in today's poultry industry.

Karolina Karbowska
– Director, Poultry Feed Sales, Wipasz S.A.

Can high nitrogen levels in the soil delay corn harvest?

The use of nitrogen fertilizers is a popular agronomic procedure. Nitrogen compounds are the main nutrients affecting the quantity and quality of corn yield. Over-fertilization of the soil with nitrogen is difficult and costly, but common. Its excess can cause plants to produce too much green mass, which significantly prolongs vegetation. The possible results are a delay in the harvest of corn and often higher moisture content and a higher content of harmful mycotoxins in corn. In addition, high levels of nitrogen cause a large number of cobs on a single shoot of the plant, which, in the event of a subsequent water shortage, results in the construction of incomplete cobs with low-quality grains. Given the above, investment in an additional dose of a nitrogen fertilizer does not make economic sense.

Paweł Górski
– Sales Specialist, Premixes for Poultry Wipasz S.A.

Is it worthwhile to use products that reduce onerous gas emissions on animal farms?

In order to reduce the amount of labor involved in breeding, it has become fashionable to keep animals on grate systems, thus keeping the manure in tanks under the grate. This involves very high emissions of gases including ammonia, hydrogen sulfide, and methane in the occupied premises, but also outside.

The use of biological additives (microorganisms) and chemical products that reduce gas emissions is a very important element in the efforts to improve the microclimate of the farm, which has a positive impact on animal health. This contributes to a higher efficiency of the respiratory system and significantly improves the working conditions for people who spend many hours in the building.

By frequently draining the manure to the storage area and using emission-reducing products, one can reduce the nuisance to nearby residents caused by the farm, while preserving the safety of the manure for use after such treatment. It is worth noting that these measures also have many other advantages:

- ☑ they unblock tanks with already solidified hard manure;
- ☑ they make it easier to empty tanks and pump manure;
- ☑ they prevent the progressive accumulation of solid fractions of manure at the bottom of tanks and canals; and
- ☑ they accelerate the process of manure mixing and pumping with a simultaneous reduction in the energy costs and wear and tear on machinery and process equipment.

Products that reduce the emissions of onerous gases can be added in animal feeds without causing any adverse effects, or can applied in specific doses of solution per 1 m^3 of manure and poured under the grate or directly into the tank where the fertilizer is stored.

As a company with extensive experience in animal nutrition and breeding, Wipasz has made sure that breeders are able to use these additives, either in feeds or directly, in the form of a product called Active N, which is known, proven, and recommended in the market.

Damian Rzeszut
– Pig Nutrition Advisor Wipasz S.A.

Why is it a good idea to use probiotics, prebiotics, and phytogenics in porker feed?

Probiotic supplements are used in the feeding of all pig production groups. Probiotics contain live or lyophilized cultures of symbiotic bacteria. Most often these are the ***Lactobacillus*** lactic acid bacteria and more rarely microorganisms from the ***Bifidobacterium*** and ***Streptococcus*** groups. Occasionally, probiotics are supplemented with yeast of the ***Sacharomyces Cerevisiae*** species. Probiotics work on several levels. First of all, beneficial microorganisms crowd out pathogenic bacteria from the digestive tract. Some of them also secrete natural antibiotics, such as acidophilin, lactobacillin, and bacteriocin. These compounds act selectively to eliminate cells of harmful bacteria without destroying beneficial microorganisms. Some of the microorganisms have the ability to synthesize lactic acid, which further lowers the pH of the digestive tract. The effectiveness of a probiotic depends on the presence of an acidifier. The microorganisms contained in probiotic products tend to prefer a lower pH, so probiotics may not be effective in the absence of an acidifier.

Prebiotics are nutrients that stimulate the growth or activity of beneficial bacterial flora. Most commonly, these are indigestible, fermentable sugars – oligosaccharides and fructooligosaccharides. Prebiotics undergo bacterial fermentation further down the gastrointestinal tract, stimulating the growth of lactic acid bacteria, especially of the ***Bifidobacterium*** genus. Feeding prebiotics to animals reduces the incidence of pathogenic bacteria ***Escherichia coli***, ***Salmonella***, ***Shigella***, ***Campylobacter jejuni***, and ***Clostridium perfringens*** and the toxins they produce, which improves animal immunity.

To enable efficient breeding without antibiotics and to improve the appetite and welfare of animals, it is a good idea to use phytogenic feed additives. These are products of plant origin that have a beneficial effect on the digestive and respiratory systems and the entire immune system. They are a natural alternative to antibiotic growth promoters, while boosting appetite and increasing daily weight gain. The use of phytogenic feed additives is an effective way to increase the efficiency of breeding while reducing its costs. Animals that receive phytobiotics have improved immunity and make better use of the feed they eat, so they are less likely to get sick and achieve higher weight gains. All these factors have a direct impact on the efficiency and economy of breeding.

Łukasz Nykiel
– Pig Nutrition Advisor Wipasz S.A.

Can mycotoxins cause udder inflammation in cows?

Mycotoxins are toxic metabolites of microscopic fungi that are found in both concentrate feeds and roughage. They pose a major threat to animal health. The gastrointestinal tract is the first to be exposed to their effects. Their presence in the rumen has a killing effect on some of the microorganisms there, reducing the digestibility and utilization of the feed ration. This has a negative impact on the cow's metabolism, and thus on her health. Mycotoxins cause inflammation of the intestinal epithelium, damaging its cells and leading to damage to the intestinal barrier. Mycotoxins then enter the bloodstream and travel to all organs, impairing their function. This also happens in the udder, which can manifest as an increased number of somatic cells in the milk and inflammation. In such a situation, the elimination of the source of feed contamination or feeding appropriate absorbents result in improved milk quality. Mycotoxins cause immunosuppression, i.e. a decrease in the animal's immunity. This situation facilitates the development of udder inflammation caused by environmental pathogens that the immune system would normally cope with. In this case, only the right drug therapy can restore the proper condition of the udder. Of course, it is worth supporting antibiotic therapy with nutritional supplements that absorb toxins and boost immunity, such as for example Farmvital.

Filip Kula
– Product Manager Wipasz S.A.

Can the bedding size affect cow productivity?

The living conditions of livestock should ensure proper animal welfare that allows to meet their biological and behavioral needs. Providing dairy cows with adequate comfort is necessary to realize their full production potential. The bedding area is of particular importance because cows spend a half of the day lying down. The bedding must be large enough and comfortable enough to encourage prolonged rest, which contributes to health and milk production levels. The resting time accounts for 80% of the rumination time, which determines the proper buffering of rumen contents and prevents the occurrence of acidosis. In addition, the lying position promotes increased blood flow through the mammary gland. The size of the bedding depends on the size of the animals kept. Depending on the location of the spot in the facility, the length of the bedding should be equal to the height of the cow at the small of the back multiplied by two for beddings next to a wall or multiplied by 1.8 for those next to other beddings. No less important is the width, which should be equal to twice the width of the cow measured between the points of hip. The depth is also specified and is determined by the neck tube, which should allow the animal to stand up and lie down freely, while limiting soiling of the bedding with feces. If the neck tubes in the barn are 'polished', this indicates their improper location because cows regularly rub or bump against them. Lying cows relieve the pressure on their hooves, which has the effect of reducing the incidence of lameness in the herd. Inadequate beddings quickly become the cause of hoof problems, more frequent mastitis, and lower reproduction rates.

Filip Kula
– Product Manager Wipasz S.A.


9498

Chocolate muffins with red wine and cinnamon cream

Ingredients

- 180 g of wheat flour
- 2 eggs
- 60 ml of oil
- 30 g of cocoa
- 160 g of brown sugar
- 220 ml of dry red wine
- 1 teaspoon of baking powder
- 1/2 teaspoon of baking soda

Cinnamon cream ingredients

- 250 ml of 36% cream
- 250 g of mascarpone cheese
- 3 tablespoons of powdered sugar
- 1 teaspoon of cinnamon

Additionally

- 1 tablespoon of cinnamon to dust the muffins with

Preparation

Step 1

Preheat the oven to 175°C, line a muffin tin with paper liners.

Step 2

Sift the flour, cocoa, baking powder, and baking soda into a bowl. Pour in the brown sugar and mix, set aside. In a larger bowl, mix the eggs with the oil, add the wine, and mix until the ingredients are combined (with a whisk). Pour dry ingredients into the wet ingredients and mix thoroughly.

Fill the liners with the batter to 2/3rds of the height. Bake for 20–25 minutes, until the stick is dry.

Step 3

Put all the ingredients for the cream into one container and whip until a thick cream is obtained. Transfer the cream to a syringe or a confectionery sleeve with a decorative tip and squeeze the cream onto the cupcakes in a circular motion. Sprinkle with cinnamon on top.

Enjoy it!

Pumpkin Thai soup with roasted Green Farms Chicken

Ingredients

- 1 package of Green Farms Chicken Legs
- 500 g of peeled pumpkin
- 1 can of coconut milk
- 1 onion
- 2 cloves of garlic
- 2 cups of broth
- 1/4 teaspoon of sweet paprika
- a pinch of cayenne pepper
- 2 tablespoons of oil
- salt and pepper
- 2 teaspoons of curry
- 1/2 teaspoon of salt
- 1/2 teaspoon of pepper
- 1 teaspoon of sweet paprika
- 3 tablespoons of oil

Additionally

- 1 orange
- a bunch of chives

Preparation

Step 1

Combine all the marinade ingredients. Marinate the chicken, sprinkle with the juice from one half of the orange and set aside for 15 minutes. Then place in an oven preheated to 220°C and bake for 75 minutes.

Step 2

Dice the pumpkin, cut the onion lengthwise, and slice the garlic. Peel the other half of the orange (leaving no white, bitter parts) and dice it. Pour 2 tablespoons of oil into the pot, fry the onion and the garlic, then add the pumpkin and fry for about 5 minutes while stirring. Pour the broth and cook for about 20 minutes until the ingredients are soft. Finally, add the orange and the coconut milk. Season with salt, bell pepper, paprika, and cayenne pepper.

Step 3

Separate the chicken meat from the bones. Cut into smaller pieces and add to the finished soup. Serve with chopped chives.

Enjoy it!

Caesar salad with Green Farms Chicken

Ingredients

- 1 package of Green Farms Chicken Breast Fillets
- 3 tablespoons of olive oil
- one head of romaine lettuce
- 10 tablespoons of grated Parmesan cheese or grana padano
- one baguette
- 2 teaspoons of mustard
- 3 teaspoons of lemon juice (or 1 tablespoon of wine vinegar)
- 2 teaspoons of Worcestershire sauce

Ingredients for the Caesar dressing

- 8 tablespoons of mayonnaise
- 2 cloves of garlic

Additionally

- salt
- pepper

Preparation

Step 1

Cut the chicken fillets into 4 pieces, season with salt and pepper, and grease with olive oil. Heat a frying pan (a grill pan or a regular pan), put the fillets and fry for about 4 minutes on each side. Put the finished meat aside on a plate.

Put the diced baguette on the same pan, reduce the heat to the minimum and fry for about 5 minutes, stirring every now and then, until the croutons are crispy.

Step 2

Squeeze the garlic through a press and mix with mayonnaise, mustard, lemon juice or wine vinegar, and Worcestershire sauce. Season with salt and freshly ground black pepper. Mix everything thoroughly.

Step 3

Rinse the romaine lettuce, dry it, chop it, mix it with half of the dressing, put it in salad bowls or plates. You can season it with salt if necessary. Add the sliced chicken, drizzle with the rest of the sauce, sprinkle with grated Parmesan cheese and croutons.

Enjoy it!

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Wipasz S.A.
Wadąg 9
10-373 Olsztyn

+ 48 89 543 56 50
info@wipasz.pl
www.wipasz.pl