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

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Ladies and gentlemen:

The current geopolitical situation, climate change, and consumer expectations make it necessary to change traditional farmland cultivation and livestock farming.

The Earth demands the use of fewer artificial chemicals and more natural fertilizers. Livestock farming needs to provide better living conditions for animals. This will make them less ill and result in a dramatic reduction in the use of antibiotics. This in turn will bring benefits to consumers, who will eat healthier food, to the environment, which will be less polluted with chemicals, and to animals, which will have better living conditions.

The Green Farms is an example that this approach to livestock production is possible. We encourage you to learn more about Wipasz's Green Farms. We are convinced that this farming philosophy and technology are the future of poultry and other livestock farming in Poland and the European Union. The entire concept was developed and researched by a group of scientists, animal husbandry specialists, and veterinarians. We will gladly share the results of our research and our experience free of charge with all those who would like to conduct farming in this way and bring Polish agriculture to the position of world leader in the 21st century.

President
of the Management Board

Safety Food

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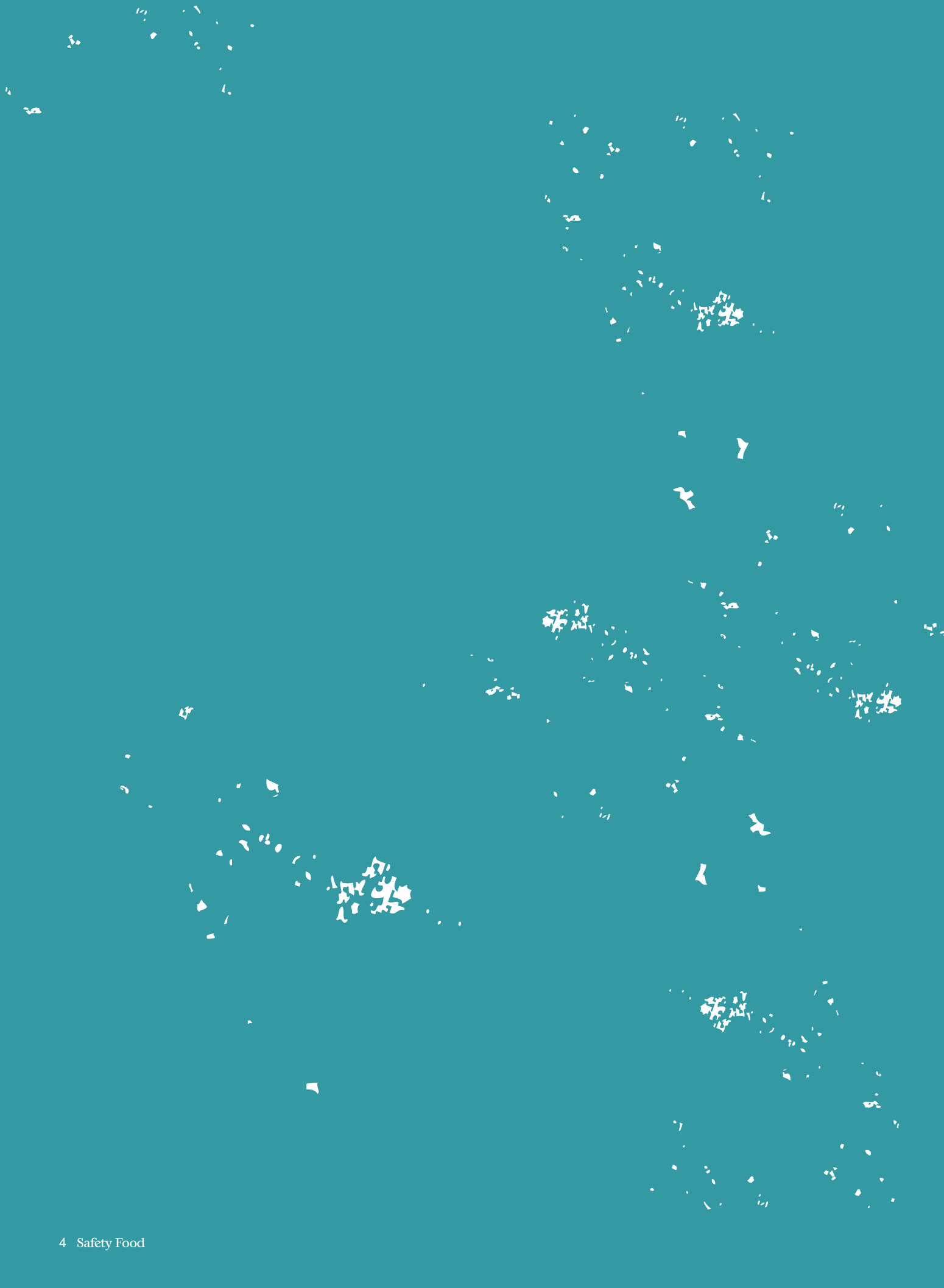
Małgorzata Chrostowska – Director, Cattle Sales Department Wipasz S.A.



In this section you will read:

- Wipasz S.A. as an exhibitor at the Polagra 2024 trade fair

Wipasz S.A. as an exhibitor at the Polagra 2024 trade fair

Agata Jędrzejewska – Key Account Manager, Meat Division Wipasz S.A.

The end of September was a very intensive period for the Meat Division's Sales Department at Wipasz S.A. due to its participation in the Polagra trade fair in Poznań. For 3 days, customers and business partners had the opportunity to visit our company's booth, taste Green Farms Chicken products and Wipasz Convenience dishes, and, of course, meet our sales staff.

Polagra is a place to present products that meet the needs of consumers, new technologies that help maintain the highest standards in food production, and solutions that improve the work of catering facilities. The common denominator is taste, around which new business relationships are built to facilitate the development of the industry and the promotion of Polish food abroad.

Our booth was bustling with activity and attracted visitors from all parts of the world. Representatives from the HoReCa, retail, and many other sectors visited our space with great interest. What certainly attracted attention was the giant LED display that showed information about our company and philosophy, the Green Farms, and the innovative Convenience line of products. This allowed the visitors to learn about our products and services, as well as our values. It was a great opportunity to highlight our passion and great commitment to high quality products and sustainable development. The bedding that our chickens walk on was withing reach, and catalogs and reports on the environmental impact of our Green Farms were available to anyone who wanted to explore the topic.

All visitors coming to our booth had the opportunity to taste a wide range of products from our latest Convenience line, as well as dinner dishes based on the Green Farm Chicken cooked by a prominent chef. Drinks and original cocktails served by the bartender were an excellent addition to the meals. The visitors enjoyed the flavors we offered, with a nice gift waiting for everyone at the reception, including honey from our Green Farms beehives. The atmosphere that accompanied the meetings with customers made our booth the true heart of the fair.

The culmination of our success was winning the award for the best booth at the Polagra fair! During the opening ceremony of the fair, Wipasz won the ACANTHUS AUREUS (GOLDEN ACANTHUS) statuette, which was proudly received by Dawid Dudek, the Vice President of the Meat Division. Awarded by the MTP Group, this distinction is designed to reward the best architectural and graphic solutions that foster direct communication with customers and emphasize a positive corporate image. A well-thought-out booth makes work easier and is crucial for a positive marketing effect. It is worth noting that the award is given by a committee that includes prominent experts in the fields of design, marketing, and trade show exhibiting.

This award motivates us to continue on our path and we are already starting work on the design of the booth for the next fair. We are raising the bar and will present the results as early as March next year, at the IFE trade fair in London, and then at Anuga in Cologne.

We are looking forward to seeing you there!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An environmental
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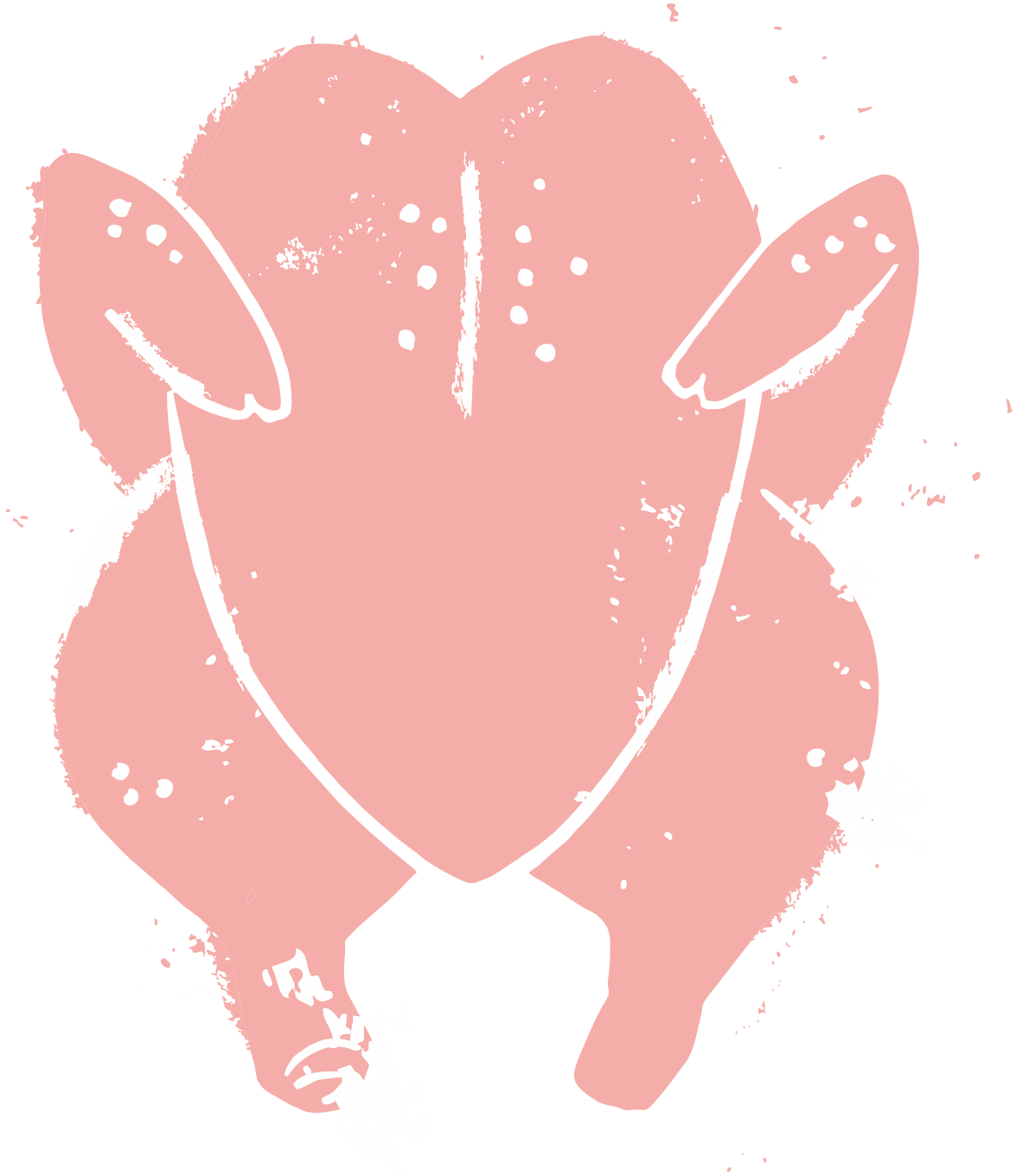
- The second Wipasz Convenience production line
- Meat transportation logistics in 2024



Welfare audit conducted by McDonald's at the Green Farms with a 100% score

Karol Grzęda – Representative of the Management Board for Welfare and Bioassurance, Manager of the Poultry Veterinary Office Wipasz S.A.
Mariusz Mystkowski – Operations Director Wipasz S.A.

The increase in the world's population to more than 8 billion people requires the production of safe food. Production processes must be supervised and controlled, as confirmed by quality assurance systems. The safety of a product, such as poultry meat, characterized by its high nutritional value for humans, is a priority for the poultry sector. The development of the poultry industry, the increase in the size of poultry flocks, and the volume of products made are determined by the demand. Poultry flocks must be maintained in a way that satisfies all the needs associated with the growth and development of the animals, while maintaining good health and behavioral conditions. This can be achieved by ensuring compliance with all the required standards, which are referred to as welfare.

According to the definition of the World Organization for Animal Health, welfare is 'the physical and mental state of an animal in relation to the conditions in which it lives'. The best health and proper farming conditions for poultry flocks are as important to the quality of poultry products as they are to maintaining an ethical strategy for conducting safe food production. The increasing consumer awareness and ever-increasing demands pose a challenge associated with the ever higher standards of flock care and improved knowledge of the management of quality food production.

At the stage of poultry flocks maintenance, proper care provided by qualified workers is crucial, which is closely linked to the need to ensure a high standard of zoohygienic conditions, feeding with complete feeds, watering with clean water, and constant veterinary care with preventive strategies in line with the principle that 'an ounce of prevention is worth a pound of cure'. The production of quality food starts at the stage of poultry flocks maintenance.

Key to maintaining high chicken welfare are:

☑ Providing a well-balanced feed that contains all nutrients at each stage of rearing. High-quality feed enables the proper development and growth of chickens and significantly affects the quality of the meat produced and its technological value.

☑ Ensuring proper zoohygienic conditions in a livestock facility, which are crucial to the health and welfare of the animals. The right temperature and humidity adapted to the birds needs or heating and ventilation systems that provide thermal and respiratory comfort to the chickens thanks to continuous automatic monitoring. This makes it possible to reduce the occurrence of stress factors and factors that promote the development of diseases in the flock.

☑ Regular monitoring of flock health and condition, which enables immediate interventions that minimize the possibility of disease occurrence and development in the flock.

☑ Eliminating the use of veterinary antibiotics and synthesized chemicals, which makes it possible to completely eliminate the risk of bacterial resistance phenomena, thus helping avoid risks to human health.

☑ Improving hygienic standards as a result of the correct choice of washing and disinfection of the facility, as well as the correct choice of the bedding material. High-quality bedding is not only part of the environment in which chickens are kept, but also an important factor that constantly affects the health of the flock.

The above elements are components of the modern poultry farming technology, which is based on welfare. This strategy brings visible results, as confirmed by the health of the chicken flock, the reduction of veterinary activities associated with the need to treat the flock, the elimination of veterinary antibiotics, but also the reduction of dangerous stress by providing comfort to the birds, as evidenced by high production rates, low mortality rates, and the classification of the product sent to further stages of meat processing.

Today's highly aware consumers attach importance to how food is produced. They values empathy and responsibility for animal welfare, but also pay attention to environmental responsibility. As a result, they choose products that meet their expectations, are characterized by reproducible quality, and are safe.

The Green Farms project implemented by Wipasz S.A. is an initiative aimed at developing sustainable agriculture in the poultry industry in Poland. The Green Farms are distinguished by the way chickens are kept, so that the poultry meat produced is of high quality and safe throughout the production chain. Wipasz S.A. is a company specializing in advanced technologies for maintaining poultry on a full scale, under fully controlled and repeatable conditions, which allow to obtain products of the highest quality. The safety of the Green Farms' products is made possible by the highest standards that are part of the biosafety programs in place. These principles are part of the triad of values adhered to at the Green Farms, which is based on the interdependence between humans, animals, and the environment.

In conclusion, proper farming conditions are crucial to the health and welfare of chickens kept at the Green Farms facilities. the proper living conditions, nutrition, and veterinary care are the solid foundations of the modern chicken farming technology used at the Green Farms. The achievement of these objectives is confirmed by the system of independent internal and external audits, which allows for an independent assessment of adherence to high standards. The strict audits conducted at the Green Farms include a mandatory welfare audit, during which the compliance with all parameters of the chickens' living environment is assessed in great detail. This detailed audit is designed to assess the compliance with the welfare standards, including feeding, as well as the correctness of the animal handling and care. The result of such independent monitoring is the continuous improvement of poultry flock conditions and ensuring the high standards that set the Green Farms apart from other such facilities.

As the world's leading buyer of poultry meat, McDonald's has had a tremendous impact on shaping the chicken farming standards and conditions. It sets directions for standardizing food production while contributing to the improvement of poultry flock welfare by introducing a number of reasonable broad initiatives that encompass aspects such as continuous improvement of the standard of farming, ensuring that birds kept in livestock facilities have access to natural light and space to enable natural behavior. Another important condition for McDonald's is to limit the use of antibiotics during poultry farming. The values on which these activities are founded are the same as those prioritized at the Green Farms. The daily work of the Green Farms team, the training, and the continuous efforts made to raise the standards have been confirmed by the positive result of the audit conducted by McDonald's representatives. The 100% score obtained is a confirmation of the value of responsible and purposeful implementation of Green Farms' objectives. It will motivate us to work hard in the future and commit to the ambitious objective of maintaining our high standards in the future.

The second Wipasz Convenience production line

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

Salt&chili shredded, crunchy Tabasco strips, multigrain finger, three peppers chunks, smoky bbq thigh, lemon and sweet chili bits – the new flavors in the Wipasz Convenience range gain a group of new fans every day. Discovering new chicken products is our passion. The highest quality ingredients, Green Farms Chicken meat, and the commitment of the Wipasz team, which is constantly looking for new flavors with its partners – these are the keys to our success.

The just-completed investment in a second production line opens up new possibilities. The increased production capacity provides, on the one hand, security for the current business by strengthening the supply chain security expected by the customers, which guarantees product availability despite the increased market demand, and on the other hand, the possibility of launching new products and expanding the product mix.

With a production capacity of more than 2 000 tons per month, Wipasz has just become one of Poland's largest producers of breaded chicken products. When it comes to product quality and innovation, we have been a leader for a long time, supplying our products to international restaurant chains or the largest retail chains in the UK.

What sets us apart from the competition is innovativeness. It was Wipasz that introduced breaded thigh meat to a leading retail chain in the UK. Thigh chicken meat in convenience products could not gain a place for a long time in a market dominated by breast fillet products. Breaded thigh meat, with a suggestion of a sophisticated sauce, packed in a small unit carton with a unique package design is one of Wipasz's best-selling products in this category today.

New opportunities are created by our extensive equipment in the preparation section, which was commissioned with the launch of the new line. Utilizing the latest precision meat-cutting technology, Wipasz is expanding its portfolio with premium products intended for the demanding Horeca market.

The product development department's comprehensively equipped kitchen allows us to conduct workshops together with our business partners. Having at our disposal the equipment that each of our customers has in their restaurant or household, we are able to develop a tailor-made solution. At Wipasz Convenience, we often conduct workshops at customers' restaurants to further understand the specific characteristics of our partners' products and business.

Both convection-microwave ovens and so-called airfryers are gaining popularity. Therefore, the key is to prepare products which qualities will be fully rendered when prepared by the final customers. Today, more than 30% of UK households own at least one airfryer, and their sales have increased by more than 20% in 1.5 years.

Wipasz Convenience listens to its customers' comments and follows market trends. We no longer offer our customers only chicken meat, but also ready-made concepts, with a variety of sauces and a wide possibility of application. We introduce innovative recipes, limiting ingredients to achieve the so-called clean labels and focusing on pro-health aspects and nutritional values. The company's access to its own meat from the Green Farms allows it to guarantee the reproducibility of the quality of such premium products.

Innovation and the growing use of convenience products are the factors that guarantee growth and stimulate demand. Today, price is no longer the only factor in purchasing decisions. Customers pay more and more attention to the quality of the product, its ingredients, health issues, and the delivery of new flavors as part of the so-called culinary tourism, which is a reflection of social media experiences. On the other hand, customers want to be sure that farming is carried out with the highest animal welfare, and modern technology ensures sustainable development, keeping production within the optimal range, reducing production losses and negative impact on the environment.

The trend of interest in ready-made chicken products has been observed for at least several years. The growth rate of the convenience segment is estimated to be three times faster than that of the entire grocery market. The so-called 'take-out' meal sector is expected to grow most rapidly in the next few years. It is precisely the 'food to go' sector that is expected to witness the greatest activity, overtaking traditional pubs, hotels, and restaurants. The factors that are causing the market for ready-made chicken meals to experience near double-digit growth in the coming years are clear. The products find their place not only in households but also in the restaurant sector. There are also increasing possibilities for the use of these products as stand-alone dishes or as an ingredient in many serving concepts. New product development, innovation, and the associated customer partnerships lead to long-term expansion strategies. Another factor is strategic investment in integration with modern technology ensuring optimization, cost reduction, decrease of production losses, and sustainability. Caring about the environment, higher animal welfare – adapting the business to changing regulations, but also customer expectations.

High-quality products and building a business focused on long-term growth are the pillars of development. Wipasz Convenience wants to make its mark on the culinary map of Europe for years to come!

Meat transportation logistics in 2024

Bartłomiej Kaczan – Logistics Department Director, Meat Division of Wipasz S.A.

Meat transportation logistics is a complex process that plays a key role in ensuring food safety and maintaining a high quality of meat products. Given the increasing competition in the market and ever higher consumer expectations, effective management of this process is becoming an indispensable part of the business of meat companies, which requires precise management and consideration of many important aspects.

1. Preservation of quality: the most important thing is to maintain the right temperature (refrigeration or freezing) during transport to prevent product spoilage.

2. Sanitary and epidemiological regulations: transportation of meat must comply with public health regulations, which includes appropriate certifications and inspections.

3. Packaging: proper packaging protects meat from contamination and damage, and helps maintain the right temperature.

4. Route planning: effective planning of the transportation route, which helps minimize the delivery time and the cost, is of key importance.

5. Supply chain management: coordination with suppliers, warehouses, and customers to ensure smooth delivery and availability of products.

6. Monitoring technology: using real-time temperature and humidity monitoring systems to detect abnormalities immediately.

7. Transportation safety: ensuring the safety of the cargo and the drivers to minimize the risk of theft or damage.

8. Environmental awareness: taking care of the environmental aspects of transportation, such as reducing CO_2 emissions and lowering the carbon footprint.

The year 2024 brings many challenges, but also opportunities for optimizing the distribution process of our products. We are constantly expanding our transportation services, which allows us to easily build our own less than truckload (LTL) distribution channels. Thanks to the use of logistics warehouses both in Poland and outside our country (a cross-docking system), and to our direct groupage lines, we are able to deliver goods to any place in the EU.

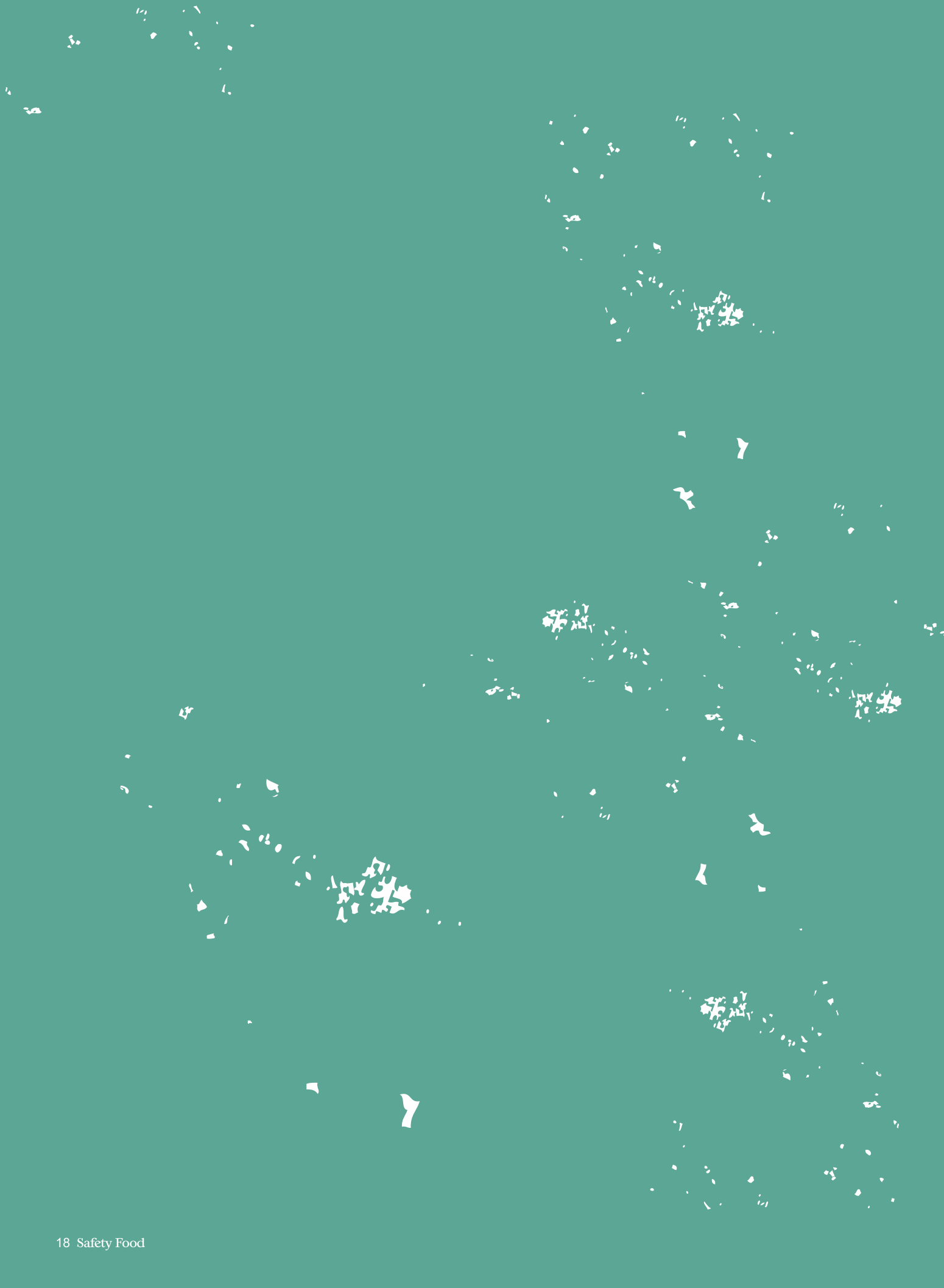
The goods distribution system is based on two temperature ranges for fresh and frozen goods, respectively. With specialized multi-temperature trailers that allow us to transport fresh and frozen goods simultaneously in the same cargo space, we significantly optimize transportation costs.

The Logistics Department of the Meat Division of Wipasz S.A., aware of how important it is these days to maintain the highest quality throughout the supply chain, relies on the use of two driver crews for international transportation. The benefits of such a solution are:

- ☑ delivery time reduced to a minimum (for example, we are able to deliver goods to the most distant destinations, such as Spain or Portugal, in no more than 72 h);
- ☑ by reducing the 'transit time', we deliver fresher product to our customers;
- ☑ the time for unloading goods is reduced by nearly 40%, thanks to the efficient operation of two drivers;
- ☑ the presence of two drivers contributes to safety by allowing more frequent changes behind the wheel, which greatly reduces the risk of fatigue.

In our work, we face different challenges. However, a key problem affecting the transportation industry regardless of its specific characteristics is hiring drivers. Two driver crews are becoming less and less available every year. This is due to a decline in the number of drivers willing to work in international transportation and the increasingly high cost of maintaining driver crews. The reduction in the availability of drivers from neighboring countries is also having a significant impact on the market, forcing the search for workers from countries located even further.

Meat transportation logistics is a complex process that requires advanced management and attention to many aspects. With effective strategies and innovative solutions, it is possible to ensure the high quality of products, which is essential in meeting the increasing expectations of consumers and maintaining competitiveness in the market.



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- Bees test the Green Farms – we create a good climate

An environmental impact report for the Green Farms

Prof. dr. hab. Marcin Weiner

In March 2024, an environmental impact report for the Green Farms was published. It was intended as a source of information for decision-makers and people with influence on the development of the Polish countryside. This report is the culmination of many months of detailed research conducted at the Green Farms. The authors of the research were independent and internationally recognized laboratories and research units, such as the Institute of Fundamentals of Environmental Engineering of the Polish Academy of Sciences in Zabrze, the National Veterinary Institute National Research Institute in Puławy, the Institute of Technology and Life Sciences National Research Institute in Falenty, the Laboratory Gradko International Ltd. in England, and DAC System Telemetria Procesów Środowiskowych. The rationale for the research was the words of Józef Wiśniewski, the President of Wipasz S.A.: "It is better to use science that serves the planet and its inhabitants than demagoguery that aims to create fear." The report emphasizes that according to the Sustainable Development Goals promoted by the United Nations, the production of food of adequate quality and quantity should in no way lead to environmental degradation.

The Green Farms concept is fully in line with this trend, as it provides modern breeding without the use of antibiotics, with the highest animal welfare, carried out in modern facilities that are a proprietary concept of Wipasz S.A., and without adverse impact on the surrounding environment.

The Report presents the results of studies conducted by the aforementioned leading independent research centers that covered air quality (ammonia and hydrogen sulfide and implementation of environmental monitoring), manure testing, water (groundwater and surface water resources), olfactometry (odorant impact and odorant nuisance level assessment), and improved welfare assessment. In 2019, the World Health Organization (WHO) published a list of the 10 most significant threats to human health in the European Union, with environmental pollution and climate change at the top (WHO, 2019). According to the European Environment Agency (EEA), the agricultural sector is responsible for 90% of ammonia emissions in Europe. This position has been exploited by a number of pro-environmental organizations that, without a sound, scientifically supported knowledge, present the view that intensive livestock production is the main cause of ammonia emissions. To address these views, an assessment of the state of air quality in and around the Green Farms was carried out by the Institute of Fundamentals of Environmental Engineering of the Polish Academy of Sciences in Zabrze. The measurement campaign included, in particular, the measurement of the concentrations of ammonia, which is the main substance emitted from the production process, and hydrogen sulfide, which is an indicator of odor nuisance. During the study, it was shown that at the farm in Kwasówka the concentration of ammonia was only 38.4% of the maximum value allowed by Polish regulations, while in Leszczanka the value was even lower and reached 31% of the maximum allowed value. The concentrations in the immediate vicinity of the farms were shown to be even lower, at 7.46% of the limit value. With regard to the measurements of hydrogen sulfide concentrations, it was found that in most cases the concentration of that substance was below the detection limit of 0.05 µg/m³, and the average value for the tested samples was 0.1 µg/m³ for the Kwasówka farm and 0.09 µg/m³ for the Leszczanka farm. This means that the average measured values for

the Kwasówka facilities were only 2% and for Leszczanka only 1.8% of the maximum val-ue allowed by Polish regulations. Regardless of the measurements of ammonia and hydrogen sulfide carried out by the Institute of Fundamentals of Environmental Engineering of the Polish Academy of Sciences in Zabrze, the independent laboratory DAC System Telemetria Procesów Środowiskowych implemented a monitoring system at all Green Farm facilities to conduct a 24/7 monitoring of important parameters such as airborne particulate matter and the aforementioned gases. As a result of the tests, it was found that the maximum allowed concentrations of 50 µg/m³ for PM10 and PM2.5 were not recorded at the farms monitored. The recorded concentrations of ammonia did not exceed 0.5 ppm and were 10 times lower than the detection threshold of 5 ppm and 40 times lower than the limit of 20 ppm specified by the Central Institute for Labor Protection. The recorded concentrations of hydrogen sulfide did not exceed 0.025 ppm and were 4 times lower than the detection threshold of 0.100 ppm and 200 times lower than the limit of 5 ppm specified by the Central Institute for Labor Protection.

Intense poultry production results in the production of certain amounts of waste organic matter, i.e. droppings (pure excrement) and manure (excrement with litter). On the one hand, these are by-products, but on the other, they are a cheap, easily available, and valuable source of renewable organic matter. These materials are characterized by a high content of macro- and micro-nutrients present in bioavailable forms for plants and have deacidifying properties. For this reason, they can be successfully used as fertilizers to provide ingredients that improve soil properties and fertility. However, it is important to keep in mind certain risk factors limiting the agronomic use of organic waste, including the content of nitrogen, hydrogen sulfide, fat, and fiber, and the presence of pathogens. For this reason, the Department of Pharmacology and Toxicology at the National Veterinary Institute. National Research Institute conducted analyses of residues of antibiotics from the β-lactam group, macrolides, aminoglycos-ides, tetracyclines, polypeptides, sulfonamides, fluoroquinolones, phenicols, and nitrofurans, as well as coccidiostats. No antimicrobial drugs or coccidiostats were found in any of the samples

tested from the Green Farms. In addition, the content of such elements as lead, cadmium, mercury, and other heavy metals, i.e. chromium, nickel, zinc, and copper, was determined. In all measurements and for all analyzed elements, their content was relatively low and complied with current regulations.

As a result of the studies, it was clearly concluded that the analyzed chicken droppings produced during the breeding of chickens according to the Green Farms technology is in compliance with current regulations, and when used for agricultural purposes they do not pose a potential environmental risk in terms of the tested antimicrobial substances and chemical elements.

An integral part of the Green Farms concept is to conduct responsible water and wastewater management that minimizes the impact of operating facilities on groundwater and surface water resources. The achievement of the stated goal is possible by introducing appropriate structural and infrastructural solutions in the facilities. As their result, water consumption will be reduced, manure storage on the farms will be eliminated by collecting and transporting it directly from the buildings, and wastewater will be stored in approved sealed underground tanks. An analysis of underground water was performed by the National Veterinary Institute. National Research Institute in Puławy to determine the presence of residues of antibiotics from the β-lactam group, macrolides, aminoglycosides, tetracyclines, polypeptides, sulfonamides, fluoroquinolones, phenicols, nitrofurans, coccidiostats, and hormones. No antimicrobial drugs, hormones, or coccidiostats were found as a result of the testing, so it can be concluded that the operation of the Green Farms does not affect groundwater quality.

As a responsible poultry producer that listens to the opinions of local residents related to concerns about the deterioration of living comfort in the vicinity of its farms, Wipasz S.A. commissioned olfactometric evaluation of the Green Farms. The evaluation was carried out by the Institute of Technology and Life Sciences National Research Institute in Falenty. The evaluation was designed to assess odor concentrations in ventilation air and free air, and was conducted at a functioning Green Farms facility that was fully stocked with birds that were 41 days old, i.e. in the last phase of breeding, which is perceived as significantly onerous. What is more, this evaluation was conducted during the summer, a time when weather conditions often strengthen subjective odor impressions and perceptions. The obtained results for the perceptibility of odorants emitted during the breeding of chickens at the Green Farms are at a lower level than provided for by the normative reference standards, which clearly indicates the absence of nuisance. No noxious, irritating, or pungent odors were found during the analyses. The high welfare standards, the efficient ventilation system in the livestock facilities, and the proper feeding of the animals do not change the respiratory comfort in the area of the farm, and the properly conducted chicken breeding at the Green Farms does not reduce the comfort of living in their vicinity. Although olfactometric evaluation of air on chicken farms is not mandatory, Wipasz S.A. has nevertheless assumed that it is essential. Therefore, monitoring of air quality, including the possible odor nuisance, has become a routine part of raising the organizational standard of the Green Farms.

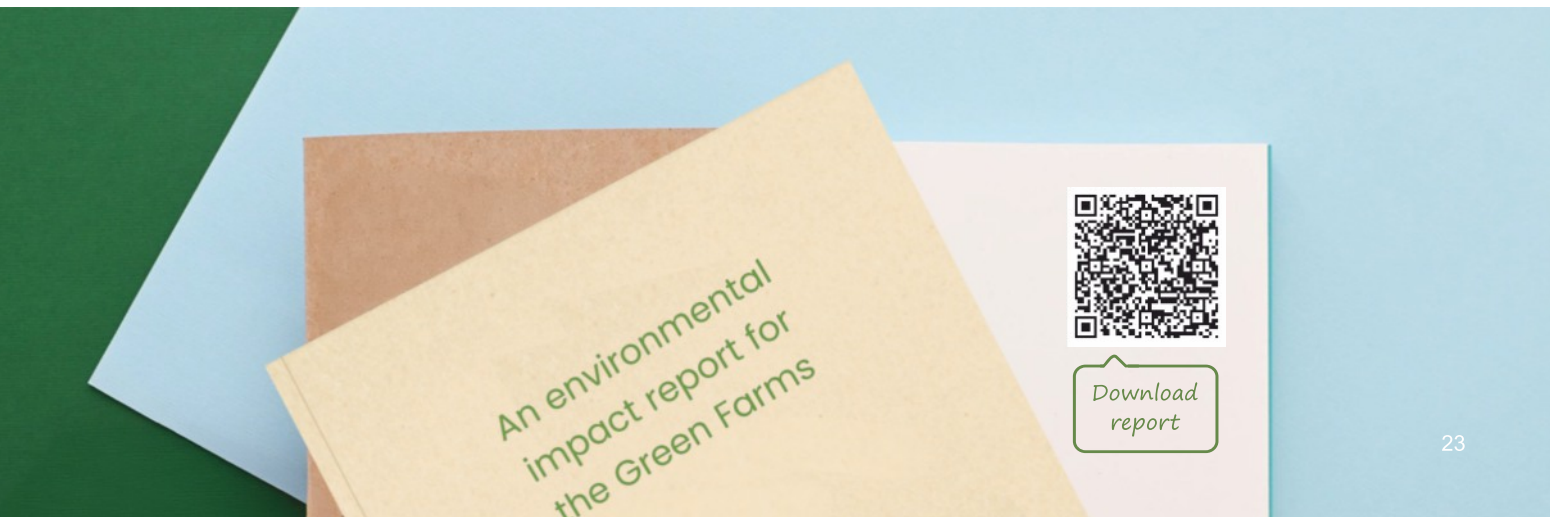
Welfare is one of the most important elements of sustainable livestock production. Environmental responsibility, attention to high quality and food safety, and dialogue with the public are not only a challenge, but also an obligation for modern poultry producers. The Green Farms are located away from residential buildings and do not interfere with the daily living space of the local community.

The potential impact of the Green Farms on the environment is monitored on a continuous basis. The aforementioned monitoring results clearly confirm the absence of odor nuisance and

negative impacts on air, water, and soil quality. Proper fencing of the Green Farms that restricts access from the outside, the use of disinfection mats, and the presence of buffer zones result in the fact that the animal production methods in use at the Green Farms ensure harmony between the welfare of the animals and attention to health through veterinary prevention and prophylaxis and bioassurance. All Green Farms breeding facilities have adequate acoustic insulation, which prevents sound nuisance in the environment, but most importantly protects the chickens from stressful outside sounds, and thus has a positive effect on their health. All Green Farms breeding facilities are built using modern building materials, which ensure minimized energy consumption and, consequently, reduced carbon footprint, while ensuring that the thermal comfort of the flock can be properly managed. All Green Farms breeding facilities are equipped with heated floors, and the floor surfaces are smooth and durable, which ensures ease in maintaining a high sanitary regime while reducing the need for water during its cleaning. After the washing is completed, the water is drained into sealed tanks, which guarantees no environmental impact. The modern, efficient, and quiet ventilation systems used at the Green Farms ensure a constant change of air inside the facilities, and thus access to fresh air for both the chickens and the workers. At the Green Farms, natural light determines the chickens' diurnal rhythm, and the right photoclimate influences their health, promotes rest, ensures movement, and allows the birds to freely manifest all behavioral behaviors. The strategy of using natural light implemented at the Green Farms is extremely beneficial to the birds, but also reduces electricity consumption, and thus reduces the carbon footprint. The Green Farms use a high-quality, modern bedding material in the form of multi-component plant pellets, mostly with the addition of biocarbon that reduces odor and aluminosilicate fossil materials that absorb excess moisture. As a result, the formation of harmful gases and emissions of odorants and dust have been significantly reduced at the Green Farms, as confirmed by studies conducted by independent scientific centers. The chickens breathe clean air, and their feet, one of the components of welfare assessment, are healthy. In addition, the bedding material used allows them to satisfy their natural foraging and pecking needs. At the Green Farms, chickens are fed non-GMO feed, which provides them with all the ingredients they need for proper growth and development. In the composition of the feed, the use of imported soybeans has been significantly reduced in favor of Polish legumes, which translates into a reduction of the carbon footprint already at the feed production stage.

Ensuring the highest level of animal welfare at the Green Farms, the high hygienic status of the facilities, and the veterinary prophylaxis activities have eliminated the need for medications. The result is antibiotic-free farming at the Green Farms, and after each cycle the pellets are used as either a safe fertilizer or a good raw material for biogas plants. By practicing antibiotic-free breeding, the Green Farms pursue a global strategy of elimination of antibiotics in livestock production, thereby combating the growing antibiotic resistance in the society and the emergence of new super resistant bacteria.

I encourage you to read the entire Report, which is posted on **www.wipasz.pl**.



Bees test the Green Farms – we create a good climate

Karol Grzęda – Representative of the Management Board for Welfare and Bioassurance, Manager of the Poultry Veterinary Office at Wipasz S.A.

Any responsible company should be aware not only of the quality of its products, but also of their impact on local communities, the natural environment, and animals. We are currently witnessing to an irreversible dynamic transformation of the food system and peoples' worldviews. The things that count now are modernity, efficiency, awareness, and care for the environment. Corporate environmental responsibility and food safety are key issues that have a significant impact on both public health and sustainable development. This includes, among other things, the reduction of greenhouse gas emissions as well as water and energy consumption, and responsible waste management.

In its efforts to promote sustainable production, Wipasz S.A. as a responsible producer and a leader in the production of feed and high-quality poultry meat, has implemented an innovative project aimed to create a friendly environment for the endangered species of honey bee.

The honey bee (*Apis mellifera*) is of great importance to the safety of food production. What is more, the species plays an important role in complex ecosystems, mainly through plant pollination. Bees are dependent on the biodiversity of flora, with a particular focus on flowering plants that provide them with food. While foraging for food, the honey bee provides cross-pollination to plants, which guarantees the preservation of their genetic diversity. As an insect that acts as a pollinator, the honey bee has a huge impact on sustaining biodiversity and, moreover, indirectly ensures the stability of the ecosystem, which is necessary for the functioning of other animal species.

The safety of the honey bee requires constant human attention. The population of this insect in the environment is directly affected by:

- ☑ infrastructure development;
- ☑ climate and habitat changes;
- ☑ the formation of monocultures of agricultural crops;
- ☑ the presence of harmful pesticides or other chemicals used in agriculture.

Understanding the need to reduce the intensity of environmental impacts, creating strategies to protect the honey bee, information campaigns, and efforts to raise public awareness give positive results for the protection of the environment in which honey bees live. The initiatives have the desired effect, which can contribute to ensuring the safety of the honey bee as a strategic species for the world of plants, animals, and humans alike. The presence of a foraging bee is a sign of a safe and clean environment. The honey bee can act as a bioindicator an indicator species that confirms the safety of the environment in which it lives.

Our continuous efforts to reduce the environmental impact of chicken farming at modern Green Farms facilities have enabled us to launch the initiative aimed to establish apiaries directly adjacent to the farm infrastructure. The livestock facilities are fully protected, allowing the creation of honey bee refuges in close proximity. A variety of melliferous plants has been provided in the surroundings of the apiaries.

The presence of honey bees is not a coincidence, since Wipasz has been consistently implementing

its environmental protection objectives. The honey bee is an excellent bio-indicator, and its introduction into the immediate vicinity confirms the safety of the environment, which is only possible thanks to the high standards of the chicken farming carried out at the Green Farms. The technological solutions used in facilities for rearing chickens have been proven in many scientific studies to reduce the environmental impact of animal production. Wipasz has decided to do this on a larger scale. The establishment of the first honey bee refuge at the Polish Chicken Research Center and the placement of apiaries in the vicinity of the Green Farms will make it possible to assess the quality and safety of the bee products obtained. This initiative is unprecedented, but can contribute to both the preservation of biodiversity and the conservation efforts for the honey bee species. The honey bee has a typical flight range of 2–5 km. The flight range is crucial for the surrounding ecosystems as well as effective beekeeping.

Moreover, we are also planning to take steps aimed at adding selected bee products in chicken nutrition. The antibacterial properties of bee products can eliminate potential microbial risks present during the rearing of chicken flocks, as well as risks to the poultry meat produced.

Selected bee products will provide a strategic supplement to reduce the use of antibiotics and chemotherapeutical products in global poultry production. The properties of bee products can have a significant impact on the reduction of the formation of so-called super bacteria, and additionally affect the properties related to the microbiological safety of the final product. The bee products known to man may therefore be a determining factor in the development of Polish poultry farming. The benefits of bee products have been confirmed on a smaller scale in selected studies, but no poultry producers' organization has fully exploited the advantages of these products so far. The honey bee has been an ally of man for centuries, but in this case this alliance will provide benefits on a larger scale.

The innovative approach to the placement of apiaries near operating poultry farms will bring new opportunities. Bees will proportionally fulfill the role of a pollinator, improve the status of the ecosystems surrounding the Green Farms, and provide invaluable support for the health of poultry flocks. On the other hand, the sites and surroundings of the Green Farms will provide a safe refuge for bee colonies. Honey bee products can find their permanent place in poultry production, supporting the maintenance of poultry flocks without antibiotic veterinary drugs or chemotherapeutical products, thus reinforcing a responsible approach to the production of highly safe food products such as the poultry meat from the Green Farms.

Sources:

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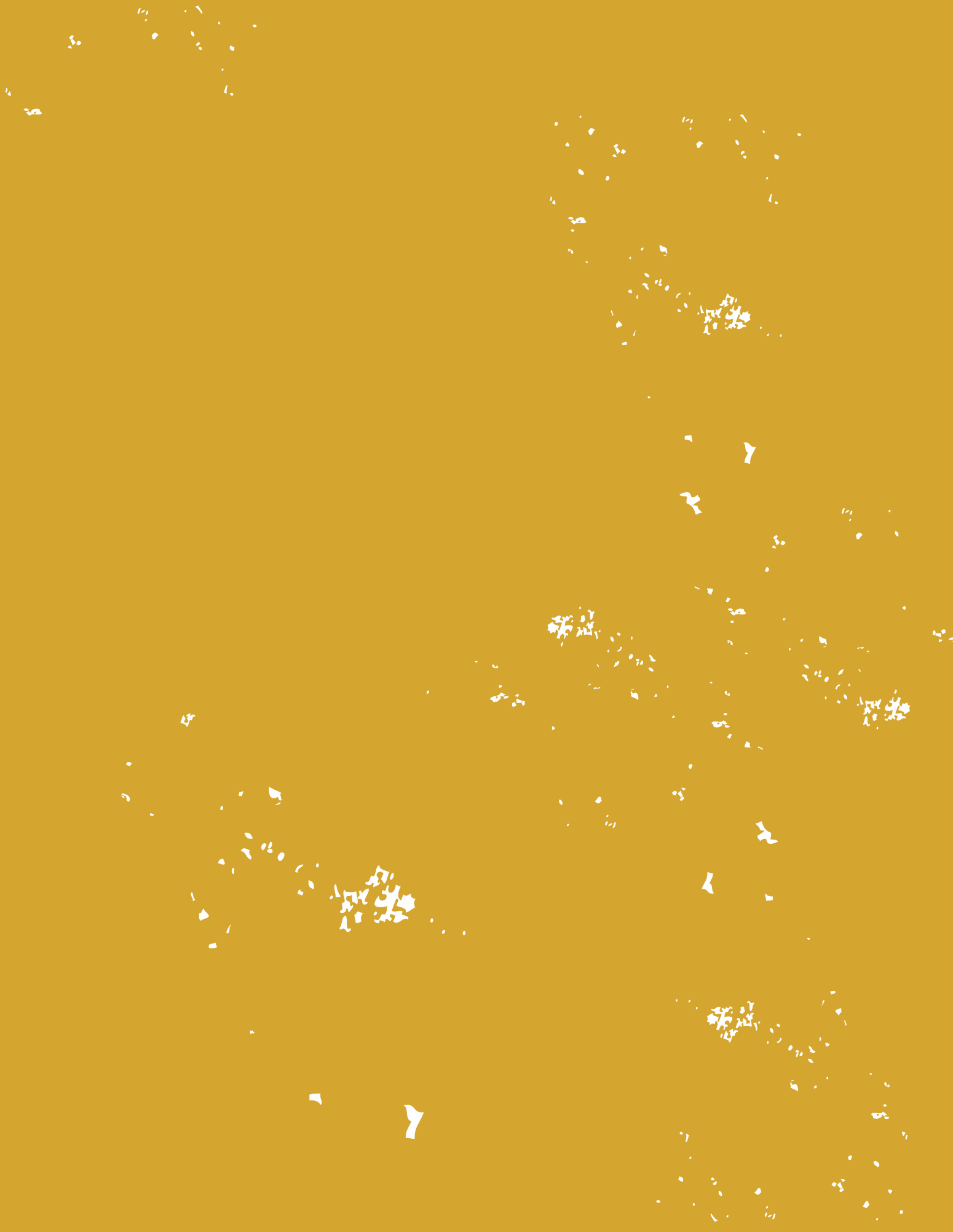


In this section you will read:

- Polish field beans and soybeans in animal feeds – a new trend of replacing primary materials from America

Polish field beans and soybeans in animal feeds – a new trend of replacing primary materials from America

Adrian Dąbrowski – Animal Nutrition Specialist at Wipasz S.A.

Due to the dynamic changes in the global feed market and the growing environmental awareness, the search for sustainable and local sources of plant protein for animals is gaining attention. Global feed markets are dominated by soybean meal, with production concentrated mainly in North and South America. However, intensive soybean meal production poses numerous environmental, economic, and logistical challenges, prompting the consideration of alternatives. Field beans, a native leguminous crop, and soybeans grown in Poland are becoming increasingly popular in Poland, and can provide a valuable alternative to imported soybean meal.

Field beans

The field bean (*Vicia faba*) is one of the oldest crops grown in Poland. Its cultivation dates back to prehistoric times, and the plant has long been an important part of the diet of humans and animals. Field beans are valued for their high protein content and their ability to fix nitrogen in the soil, which improves soil fertility and structure. It is also a plant that is resistant to adverse climate and soil conditions, making it a reliable source of food.

In the 20th century, with the development of modern agriculture and the introduction of new, more productive crops, the importance of field beans began to decline. The introduction of chemical fertilizers and pesticides made it possible to increase yields of other crops, such as wheat, corn, and potatoes, which gradually began to dominate the crop structure. In addition, globalization and the expansion of international trade have made soybeans the preferred protein source for animal feed.

However, in recent years, with the growing interest in sustainable agriculture and local protein sources, field beans are beginning to return to favor. In 2023, the area of bean cultivation was about 40 thousand hectares. Its cultivation is supported by the Polish government and EU programs that promote native bean crops as environmentally friendly and beneficial. In Poland, research institutes and agricultural support programs encourage farmers to grow field beans by offering training, advice, and financial subsidies.

Soybeans

Soybeans (*Glycine max*) are one of the most important feedstocks in the world, valued for their high protein content and favorable amino acid profile. Cultivation of soybeans has a positive effect on the soil, improving its physical and chemical properties, increasing humus content, and breaking the unfavorable crop rotations. Although Poland is not a large producer of soybeans, its cultivation in the country is of growing importance, especially in the context of the drive for greater protein self-sufficiency and reduced dependence on imports.

Soybean cultivation in Poland began on a larger scale relatively recently, in the second half of the 20th century. Initially, soybeans were treated mainly as an experimental crop to assess their suitability for cultivation under Polish climatic conditions. However, over time, thanks to advances in the selection of varieties and better agricultural practices, soybean cultivation started to develop.

The area of soybean cultivation in Poland has been steadily increasing in recent years. According to Statistics Poland, the area of soybean cultivation in

Poland has increased from about 16,000 hectares in 2017 to about 45,000 hectares in 2023. This is mainly due to increased interest from farmers and the development of new soybean varieties that are better suited to Polish climatic conditions.

Comparison of the nutritional values of field beans and soybeans

In terms of nutritional value, field beans and soybeans have much in common, although there are also some differences. Both plants have a high protein content. Field beans contain 25–30% of protein, while soybeans contain 33–37%. The protein in field beans is rich in amino acids like lysine and arginine, but has lower levels of methionine, cysteine, and threonine compared to soybeans. Both field beans and soybeans are sources of important vitamins and minerals, such as vitamins in the B group, iron, magnesium, phosphorus, and potassium.

Most of the data is shown in the table below. These values are approximate and may vary depending on the plant variety and the growing conditions.

Nutrient:	Soybeans	Field beans
Protein [g]	34	25,6
Fat [g]	18,3	1,1
Fiber [g]	6,4	8,1
Ash [g]	5,4	3,5
Starch [g]	0	44,6
Lysine [g]	2,07	1,59
Methionine [g]	0,47	0,18
Cystine [g]	0,53	0,27
Threonine [g]	1,34	0,89
Tryptophan [g]	0,46	0,22
Isoleucine [g]	1,53	1,01
Leucine [g]	2,58	1,86
Valine [g]	1,63	1,17
Histidine [g]	0,9	0,67
Arginine [g]	2,48	2,39
Calcium [mg]	260	120
Phosphorus [mg]	620	530

Table 1. Comparison of the nutrients in 100 g of soybeans and field beans

The biggest difference between these two plants is the fat and starch content. Field beans contain a relatively high amount of starch, with its content at about 43%, but little fat only up to 2%. In the case of soybeans, the situation is the opposite. The grain of this plant contains a relatively high quantity of fat, up to about 20%, while starch is virtually absent. Instead, the main carbohydrates in soybeans are oligosaccharides, such as raffinose and stachyose, which are not easily digestible for monogastric animals.

Most varieties of this plants contain a high amount of anti-nutritional compounds that reduce nutrient digestibility or affect feed intake. In field beans, the main anti-nutritional substance is tannins, which are concentrated in its husk. Tannins react with proteins, causing the digestibility of feed and the availability of individual nutrients decrease. In addition, the tannins impart an acerbic taste to the feed, which reduces its consumption. However, thanks to the selection of varieties, it has been possible to obtain low-tannin varieties of field beans. In raw soybeans, the main anti-nutritional substance is the trypsin inhibitor a protein that inhibits the action of digestive enzymes trypsin and chymotrypsin. This leads to reduced absorption of dietary proteins, as well as health problems caused by pancreatic hypertrophy, among other things. Soybeans are virtually impossible to use as feed when they are raw.

To increase the nutritional value of these crops, a variety of refining methods are used. In the feed industry, it is mainly dehulling and expanding for field beans and degreasing, extruding, and fermenting for soybeans. All these processes are aimed at reducing the anti-nutritional substances such as tannins and trypsin inhibitors, thus improving the digestibility and flavor.

Controlling the refining processes gives us a great advantage in knowing the physicochemical or biological properties of the feedstocks, which we do not have when we buy imported soybean meal. Imported soybean meal can have some variability, which results from the quality of the grain, the country of origin, and the incorrect fat extraction process. Sometimes soybean meal is overheated, which reduces the assimilability of its nutrients, or insufficiently processed, so that it contains too many anti-nutrients. No rapid analytical methods have yet been developed to assess the quality of soybean meal in terms of a properly performed heat treatment when it is received at a feed plant. An analysis of basic nutrients is sometimes inadequate. Hence the need to invest in barothermal processing facilities for soybeans and other leguminous plant seeds.

The experience of Wipasz S.A.

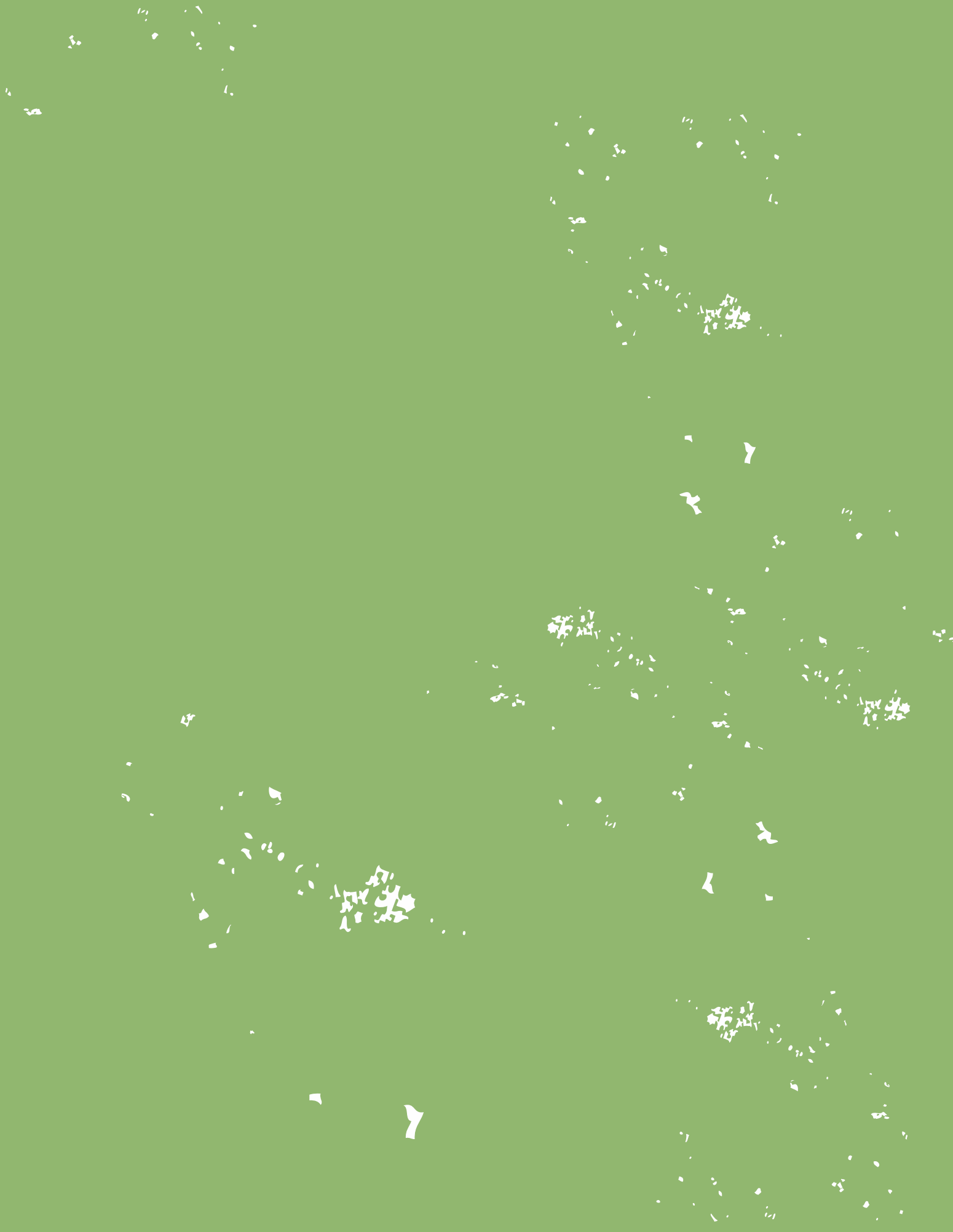
Due to the abundant literature on the use of processed soybeans in livestock nutrition, Wipasz S.A.'s main focus in its research is on field beans and other domestic protein feedstocks.

In the years 2021–2022, Wipasz implemented the project POIR.01.01.01-00-1071/19 titled 'Development of the Polish poultry industry through the development of a standard breeding model for the Polish Chicken'. According to the project, a number of studies have been carried out with the aim, among other things, of replacing some of the imported soybean meal in feed for slaughter chickens with domestic protein feedstocks, while maintaining consistently high production results. A team of specialists prepared proprietary recipes with a reduced proportion of soybean meal and an increased amount of such feedstocks as field beans, peas, white lupins, and rapeseed meal.

The results obtained are promising and allow us to conclude that the share of soybean meal in feed formulations for slaughter chickens can be significantly reduced. In this regard, recipes containing both refined and raw field beans were the most effective. The reduction in the proportion of soybean meal in feed relative to standard feed has reached and even exceeded 50%. With a significant reduction in soybean meal, it was possible to maintain a high level of the production parameters of chickens, and the use of processed field bean grains made it possible to obtain better results than in the case of feed with standard levels of soybean meal. The lowest feed conversion ratio (FCR) was obtained with these feeds at similar body weights as with the standard feed.

The main protein feedstock in Poland is still imported soybean meal. A change in this trend is possible thanks to the development of new varieties of these plants that are better adapted to grow in Poland's climate and that contain fewer anti-nutritional compounds, as well as thanks to investments in technologies for processing domestic protein feedstocks.

At Wipasz S.A., we are prepared to buy and store field beans, peas, and soybeans. Field bean and pea grains have been an integral part of our feed recipes for many years. Unfortunately, field beans, peas, and soybeans still account for too low a share of crop area in Poland, despite the fact that farmers have no problems selling their crops. Without sowing them on adequate areas, Poland cannot meet the growing demand for these feedstocks.



In this section you will read:

- Summary of the 2024 harvest in Poland
- What factors affect grain prices in Poland?

Summary of the 2024 harvest in Poland

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

This year's staple grain harvest went smoothly and without delays. July's thunderstorm-like rainfall occurring across the country helped improve soil moisture. However, this has not had a fundamental effect on crop condition improvement. In the first decade of July, the harvest of rapeseed and agrimony started, followed by individual cereals. During the harvesting work, varied weather conditions were observed, which undoubtedly affected the quantity and quality of the harvest and made it a poor harvest in terms of both productivity and the quality of the harvested grain. In most regions, average grain and rapeseed yields were lower than last year's. Wheat has generally good density and falling number, but lower than expected protein content is being reported in many regions of the country. While in the north of the country the share of wheat with consumption parameters in the total harvest of this grain can be estimated at about 80%, in the center and southwest the share is down to 50%, and in the southeast as low as 20–30%. Thus, there are many indications that the share of wheat with typical consumer grain parameters in the total harvest of this grain will be smaller than expected and may amount to 50–55% in the entire country. Therefore, a quality premium in the current 2024/25 season should be expected.

According to preliminary estimates, in 2024, the area under cultivation of staple cereals including cereal mixtures amounted to 5.7 million hectares, about 2% less than last in the previous year:

- ☑ wheat – approx. 2.4 million ha;
- ☑ triticale – 1.2 million ha;
- ☑ rye – 0.7 million ha;
- ☑ barley – 0.7 million ha;
- ☑ oats – 0.5 million ha; and
- ☑ cereal mixtures – 0.3 million 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 are slightly better in the south and in the western and north-western regions of Poland, and worse as we move towards the central and northern regions. It is estimated that this year's yield of staple cereals including cereal mixtures was 4.48 t/ha, which is 2% less than in 2023. The biggest yield declines occurred in winter barley (-7% y/y) and winter wheat (-4% y/y). The yield of winter triticale (-1% y/y) and rapeseed (-3% y/y) also decreased. On the other hand, the largest y/y yield increases occurred in spring triticale (+6%) and oats (+5%). Higher yields were also achieved for spring wheat, spring barley (+2% y/y), and rye (+3% y/y).

Designation:	2010	2015	2019	2020	2021	2022	2023	**2024***	2023 =100
	In decitonnes from 1 ha								
staple cereals with cereal mixtures	35,1	36,7	35,2	44,8	42,6	45,9	45,6	**44,8**	98
winter wheat	45,7	47,6	46,4	54,2	51,8	54,4	54,8	**52,5**	96
spring wheat	34,3	33,5	32,6	41,7	39,6	42,4	40,4	**41,2**	102
Rye	26,9	27,8	27,2	35,1	33,1	36,0	35,5	**36,5**	103
winter barley	40,7	41,3	43,0	51,1	47,7	49,6	50,7	**47,4**	93
spring barley	33,0	33,0	32,1	40,0	37,8	39,5	37,9	**38,8**	102
Wheats	26,4	26,5	24,9	33,2	31,4	32,8	30,8	**32,4**	105
winter triticale	35,2	36,3	35,9	45,0	43,1	45,5	45,4	**44,8**	99
spring triticale	28,4	28,4	27,5	36,4	33,7	35,6	33,1	**35,2**	106
winter cereal mixtures	30,9	30,9	30,6	38,1	36,6	37,5	37,3	**37,8**	101
spring cereal mixtures	30,5	27,2	26,2	34,5	33,7	33,8	31,5	**32,8**	104
total rapeseed and agrimony	23,6	28,5	27,1	31,9	32,1	33,8	33,9	**33,0**	97

Table 1. Total yields of cereals, rapeseed, and agrimony in 2010–2024 **Preliminary estimate of the 2024 yield*
Source: 'Preliminary estimates of the key agricultural and horticultural crops in 2024', Statistics Poland 2024

Because of a slightly smaller cultivated area and lower yields, it is estimated that this year's production of staple cereals may amount to 25.6 million tons – 3% less than in 2023. Despite the large amount of grain harvested, this is the lowest result since 2019, when the harvest amounted to 25.1 million tons. This year, wheat production will reach 12.3 million tons and that of triticale – 5.1 million tons, about 7% less than last year.

Designation:	2010	2015	2019	2020	2021	2022	2023	**2024***	2023 =100
	In million tonnes								
staple cereals with cereal mixtures	25,1	24,7	25,1	28,6	27,0	26,9	26,5	**25,6**	96
winter wheat	8,5	9,9	9,5	12,0	11,3	12,6	12,5	**11,6**	93
spring wheat	0,9	1,1	1,5	0,6	0,9	0,9	0,7	**0,7**	105
Rye	2,9	2,0	2,5	3,0	2,5	2,4	2,6	**2,5**	98
winter barley	1,0	1,0	1,0	1,4	1,4	1,5	1,8	**1,9**	108
spring barley	2,4	2,0	2,4	1,6	1,6	1,3	1,1	**1,1**	95
Wheats	1,5	1,2	1,2	1,7	1,7	1,5	1,5	**1,7**	111
winter triticale	4,2	4,7	4,1	5,9	5,2	5,3	5,2	**4,9**	95
spring triticale	0,4	0,6	0,5	0,3	0,2	0,2	0,2	**0,2**	104
winter cereal mixtures	0,3	0,3	0,2	0,4	0,4	0,2	0,2	**0,2**	96
spring cereal mixtures	3,0	1,9	2,3	1,7	1,9	1,0	0,7	**0,7**	96
total rapeseed and agrimony	2,2	2,7	2,4	3,1	3,2	3,6	3,7	**3,4**	91

Table 2. Total harvests of cereals, rapeseed, and agrimony in 2010–2024 **Preliminary estimate of the 2024 yield*
Source: 'Preliminary estimates of the key agricultural and horticultural crops in 2024', Statistics Poland 2024

The largest % y/y decrease was recorded for rapeseed, of which 3.4 million tons were harvested (-9%). This was influenced by April and May frosts, as well as the shortage of precipitation recorded in the second half of April and May. The harvest of barley and oats, in contrast to other cereals, was larger than last year, and amounted to 3 million and 1.7 million tons, respectively.

The domestic grain market continues to operate under conditions of a clearly reduced supply of grain. Many farmers have decided to store grain in anticipation of higher prices, thus showing great dissatisfaction with current grain prices. Due to the severely depleted supply of grain in the market, both processors and exporters are having great difficulty buying raw materials. It is difficult to purchase grain in larger batches of several hundred tons. The current trade basically takes place on a spot basis, in small batches, as these are the only ones mainly offered by farmers. Domestic grain prices offered by processors are often above port parity, hence grain purchases for export are difficult. According to data from the Ministry of Agriculture and Rural Development, during the harvest period, the average purchase price of feed wheat was equal to 800 PLN/tonne, which was 19% lower than in the same period of 2023. On the other hand, the average price of rye was PLN 552/tonne, 22% lower than last year. For triticale and barley, the price decreases were equal to 12–13% y/y. In July/August this year, the average purchase price of barley was PLN 667/tonne, while that of triticale was PLN 673/tonne. Dry corn and oats recorded a 14% drop in price this year, down to PLN 854/tonne and PLN 670/tonne, respectively.

The commodities traded on the broad market are primarily cereals under pre-harvest contracts with processors and trading companies. Trading companies are more likely to sell grain than farmers. On the other hand, demand for grain from processors has weakened somewhat recently. It seems that some feed producers have stockpiled grain for the coming weeks, while others are willing to buy grain all the time. With the end of the harvest of staple grains, market participants are turning their attention to the condition of the grain corn crops and the expected yield and harvest of this grain this year. Corn plantations in Poland look good, and locally even very good. The estimated smaller corn acreage harvested than a year ago should be compensated to some extent by a good yield. As a result, this year's corn harvest in Poland should exceed 7.6 million tonnes, compared to the record harvest of 8.7 million tons in 2023.

Grain type:	July – August 2023	July – August 2024	% change y/y
Wheat	954	800	⇩ 19%
Triticale	759	673	⇩ 13%
Rye	674	552	⇩ 22%
Barley	750	667	⇩ 12%
dry corn	970	854	⇩ 14%
Wheats	766	670	⇩ 14%

Table 3. Average prices of feed cereals during the 2023–2024 harvest
Source: Prepared by the author based on data from the Ministry of Agriculture and Rural Development (MARD)

What factors affect grain prices in Poland?

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

With Poland's accession to the European Union, Polish agriculture became subject to EU regulations. This was of crucial importance to agriculture as a whole. EU regulations include all instruments related to the Common Agricultural Policy (CAP), such as the system of direct payments to agricultural producers, internal intervention instruments, and, for a certain period, a system of subsidies to support exports. One should also bear in mind that accession to the European Union also involved the lifting of restrictions on trade with EU countries and a common customs policy toward third countries. The integration of the Polish grain market with the global market has resulted in external factors increasingly determining the domestic grain prices and a simultaneous decrease in the importance of local factors. Grain prices primarily depend on economic, climatic, political, and market factors, the most important of which include:

MATIF exchange and currency exchange rates

The biggest influence on prices of agricultural crops in Poland is exerted by two exchanges of international importance: the American CBOT and the European MATIF. The prices of consumer wheat, corn, and rapeseed in Poland are fixed precisely on the basis of data presented on the MATIF exchange. The French MATIF exchange is the European equivalent of the American CBOT exchange. It was created to consolidate efforts aimed to strengthen agriculture throughout the Old Continent. Most operations involving the purchase or sale of large quantities of agricultural crops are based on the quotations of the aforementioned exchange. It is worth mentioning, however, that MATIF itself is not a place where grain or rapeseed is physically traded. Instead, contract transactions are concluded there, which must be for a minimum of 50 tons, while prices are quoted in euros per ton. Besides, people buying or selling commodities there do not transact in selected agricultural crops, but in specifically regulated and structured contracts. Stockbrokers and grain trading companies base their predictions, as well as determine specific prices, precisely on the basis of the current situation on the exchange. It is estimated that 90% of the customers buying the aforementioned products in Poland rely precisely on data from this source. Those responsible for valuating products based on prices on the MATIF exchange perform a series of calculations. The first calculation is the conversion of the price from euros to zlotys – at the current exchange rate, of course. What is more complicated, however, is that a premium is also added to each such operation. It includes a number of additional costs such as transportation, handling, storage, and insurance. The premium is not a fixed value, and is determined on the basis of the current situation in the domestic market as well as the international market. The valuations of grain futures on the MATIF exchange, which is a benchmark for domestic prices, is one thing, but the strength of the euro compared the US dollar and the zloty is also an important consideration. A weak euro usually raises grain prices in the Eurozone. Since the international grain market is settled in US dollars, EU countries can benefit from a weak euro exchange rate, as this grain costs less in US dollar, while the reverse is true for a strong euro. On the other hand, when the EUR/PLN exchange rate is high (weak zloty), an increase in futures prices results in a stronger increase in domestic grain prices compared to a situation where the PLN exchange rate is low. Thus, the final price of agricultural crops is affected by many variables that must be taken into account by specialists and analysts.

Speculation by investment funds

The MATIF exchange is a place where many market participants conduct transactions. They include agricultural producers, processors, traders (exporters and importers), and financial investors. Of the aforementioned groups, financial investors (speculators), who have access to enormous funds, have the greatest influence on the quotations. Speculators buy contracts for commodities

(including agricultural ones) to sell them at higher prices or sell them with the hope of buying them back cheaper in the future. Massive speculative selling drives price decreases, while buying drives price decreases. Other market participants seek to take advantage of price levels that they find attractive and secure future sales (e.g., farmers) or future purchases (e.g., millers) of a commodity (e.g., wheat). Therefore, it is worth watching what direction of price changes this group is betting on and how the market position (net long or short) of the largest speculators changes. A net long position indicates that there is a preponderance of buy contracts within a given group of participants of the exchange. This means that more of them are betting on price increases. A net short position, on the other hand, means that more participants in the futures market assume that prices will drop and that they predominantly conclude sell contracts (they intend to buy them back at lower prices).

Volume of domestic and foreign production

Other key factors affecting grain prices are the volume of domestic and foreign production, the level of global stocks, and the level of consumption. Valuations take into account the magnitudes of these variables in the previous

season and at present, and forecasts for the next year. This determines the supply of grain on the domestic market, although its value is also affected by grain imports from abroad. This is due to the fact that the grain market is globalized, so the high global supply of grain also influences purchase prices in the domestic market, where low production in a given season can herald an increase in prices. Large quantities of grain can then enter the country from abroad, whether from other member states of the European Union or from the United States, Ukraine, or Russia, all of which are major players in the global grain market. In addition, cheap grain – e.g., from Poland's eastern neighbors – is sold in markets to which Polish grain has also been exported, causing the commodity, which was destined for export, to remain in Poland and go to domestic processors or stay in grain stores, causing prices to drop in the domestic market.

Weather during the growing season

Grain purchase prices are also affected by information on the condition of crops, both in Poland and abroad. Weather is the most unpredictable of the factors that determine grain prices. Weather in autumn, during the winter crop sowing season, has an impact on the crop yield and the subsequent purchase prices. Rainy weather makes it difficult to carry out agrotechnical operations, which are often carried out in a hurry, in the short periods when it is not raining. If the weather does not allow sowing of winter crops at the optimal time, later sowing may result in poorer plant health before the winter. Diseases are a big problem in autumn, as they weaken plants and make them more susceptible to frost damage during the winter. Wintering is another factor affecting the buying prices. The level of losses in sown crops makes it possible to estimate the level of future yields, which is not without influence on grain prices in the spring. In the spring and early summer, precipitation and temperature are factors that regulate grain supply. Droughts, floods, or other unfavorable weather events that occur abroad can cause large price fluctuations on global markets, which is not without impact on the domestic market as well.

Geopolitical factors

The armed conflict between the two countries seen as the granaries of Europe has had a particularly strong impact on the global agriculture. According to market experts, Poland's food security in the new geopolitical situation is not at risk, but events in the eastern part of the continent have not left the market unaffected, both globally and domestically. Prior to the war, an upward trend in grain quotations (punctuated by smaller or larger corrections) prevailed on global exchanges as a result of, among other things, the recovery of national economies after the coronavirus pandemic. After the Russian invasion on Ukraine, the prices of fossil fuels skyrocketed, and with them – the prices of grains and other staple foods and fertilizers. The blockade of Ukrainian ports by the Russian navy prevented exports, which were mainly transported by sea. This caused great concern for the food security of millions of people around the world and contributed to the rise in prices even further, reaching stunning levels at the peak (in the case of wheat, it was 2,048 zlotys per ton – an increase of 57 percent since the day before Russia's attack). This shows how much of an impact armed conflicts can have on the grain market, even more so if some of the major exporters of agricultural crops are involved in the war. A few months later, the very good (as it turned out later – historically record-breaking) forecasts of global grain production, the expected global economic slowdown/recession triggered in part by a very strong increase in the price of energy carriers and, in addition, the opening of the so-called humanitarian corridors for grain exports by sea from Ukraine, as well as the opening of the borders of the European Union to imports, among other things, of grain from Ukraine lead to a change in the trend and strong declines in grain prices worldwide and in Poland.

As one can see, in today's globalized world, many factors can have a significant impact on grain prices in Poland. All of these elements can determine how buying prices and thus the profitability of production will evolve. That is why it is a good idea to stay up-to-date with the market trends and not ignore what is going on in the world. This enables making appropriate business decisions to keep production profitable.

In this section you will read:

- Basic factors affecting the quality of day-old chicks and the hatching performance of broiler chickens
- Newcastle disease – one of the most dangerous viral diseases in poultry

Basic factors affecting the quality of day-old chicks and the hatching performance of broiler chickens

Mariusz Woźniak – Technical Consultant, Raw Materials Supply, Meat Division of Wipasz S.A.

The quality of day-old chicks is one of the basic elements affecting the production and economic performance of broiler breeding. Therefore, it is necessary to constantly monitor all factors that potentially affect the day-old chicks production process. It should be noted at the outset that the decisive factor in any type of production is the quality of the input material used. Chick production is no exception, and the first defects in the entire production chain should be looked for already on the reproductive farms. Even the most modern hatcheries with well-adjusted hatching parameters will not be able to achieve ideal results if they do not purchase good input materials from properly managed parent flocks. The vast majority of hatcheries use a provision for a discount for the 'biological value of hatching eggs' in their contracts with external farms. It can be both an additional surcharge for eggs with a high average rate of hatching from the set eggs (good qu lity input material) and a financial penalty for supplying eggs with a low hatching rate (low quality input material).

Bioassurance on a reproductive farm

There are many variables one can look for in the parent flock, but one should always start with the ABCs of farm cleanliness and proper bioassurance. The duration of a single production cycle from setting to handover in this case is between 58 and 64 weeks (depending on the condition of the flock, the contract with the hatchery, and the demand for hatching eggs). Any negligence and potential introduction of pathogens into the poultry house in the first weeks will cause losses throughout the cycle. Proper washing and disinfecting of the poultry house and equipment between stockings is all the more important because it takes place just once per calendar year. Failure to do this means that any health problems affecting the old flock can very quickly occur in the new flock and negatively affect the performance from the beginning of production.

Age of the parent flock

The primary factor determining the outcome of hatching and the weight of the day-old chicks obtained is the age of the parent flock. From the start (weeks 24–25) to the peak of laying (approx. week 34), both egg hatching rate and egg weight increase. The most desirable in terms of the biological quality and growth potential are day-old chicks from flocks at about the peak of laying and immediately thereafter (weeks 34–42). Later, the weight of hatching eggs increases further, but this is accompanied by a decrease in the laying rate and the hatching rate of the eggs.

Age of the parent flock	Hatching rate	Average egg weight	Average chick weight
week 24	60–70%	51 g	34 g
week 34	88–92%	61 g	40 g
week 60	70–75%	70 g	46 g

Nutrition of the parent flock

With a view to ensuring proper conditions for the parent flocks, it is important to remember to provide high-quality feed that is designed for reproductive farms. Nutrition errors directly contribute to the deterioration of the laying performance in flocks, followed by a reduction in the quality of the

hatching eggs. Among other things, low-quality feed can fail to provide the ingredients required for the proper formation of the egg shell, and therefore be the cause of the formation of micro-cracks, which provide a pathway for microorganisms from the environment to enter the egg. If such eggs are sent to the hatchery, some of them will die during the course of incubation due to excessive water loss through these cracks. The others may also experience excessive growth of bacteria that have penetrated the egg and numerous infections during incubation. Such infections tend to cause the egg to explode during the hatching, due to the accumulation of gases produced by the microorganisms, and thus the infection spreads throughout the hatching equipment. This process negatively affects the quality of all chicks from this flock.

Rooster condition

Proper nutrition is also key to keeping roosters in a good condition. If age-appropriate weight is not maintained and males become too fat, they will not fulfill their reproductive role. Not only do overgrown roosters tend to damage much lighter females during copulation, but they stop copulating with them due to their own weight and are much more competitive at feeders compared to lighter roosters in proper shape. This phenomenon is reflected in a lower rate of fertilization of hatching eggs and a deterioration in the production performance of the parent flock. For this reason, it is important to emphasize the importance of systematic selection of roosters to maintain the appropriate number of roosters not only of the right age, but also of proper health.

Selection of hatching eggs

Another factor that determines the desired hatching outcome is the proper selection of eggs both on the reproductive farm and at the hatchery. The required evaluation criteria are:

☑ weight – the optimal weight should be in the range of 50 to 70 grams, depending on the age of the parent flock (the older the flock, the heavier the eggs); the weight of the egg directly determines the weight of the day-old chicks obtained. Under working conditions, it can be assumed that the weight of a chick obtained from an egg will be approximately 2/3rds of the weight of the egg (for example, eggs weighing 60 g will produce day-old chicks with an average weight of 40 g). It is necessary to discard low-weight eggs before setting them, as the resulting chicks will be too small compared to the rest. Eggs that are too large are most likely two-yolk eggs and will not produce a chick. Therefore, they should be discarded;

☑ shape – the egg should have the right shape (the length to width ratio should be approximately 1:1.309) with a clearly marked blunt end and sharp end. If the eggs are too spherical, this will prevent the chicks from hatching in the last phase of incubation;

☑ air chamber – it should be located in the blunt end of the egg, which must face upward on the transport/hatching trays to provide the embryo with proper orientation during development. If the eggs are arranged otherwise, the chicks will not be able to puncture the air chamber and get out of the egg during hatching;

☑ shell – it should be free of cracks and impurities, of adequate thickness, smooth, and free of rough spots. Proper shell quality ensures the protection of the embryos from excessive drying, infection, and shock during transport or transfer of the eggs. Contaminants on the shell can cause increased infection during incubation, which can later contribute to health problems in the day-old chicks.

Storage and transportation of hatching eggs

After obtaining hatching eggs of adequate quality, the next critical point is the proper storage of eggs on the farm, during transport, and in the storage room of the hatchery. The purpose of cooling the eggs is to lower their temperature below the 'physiological zero' (25–26°C) in order to stop the development of the embryo before the eggs are placed in the incubator. At each step of this chain, the temperature should be gradually reduced and the humidity level of the air in which the eggs are stored should be controlled, in order to prevent the phenomenon of condensation on the surface of the eggshell. The parameters should be as follows:

Poultry house/egg collection room	24–29°C (75–85°F)
Egg storage room on the farm	21–25°C (70–77°F)
Transportation of hatching eggs	20–23°C (68–73°F)
Egg storage room at the hatchery	15–19°C (59–66°F)

If the chain is disrupted at any stage, the water droplets accumulating on the shell become a very good place for pathogens to 'attach' to, giving them both a suitable environment to live in and a chance to get inside the egg through the porous shell. This process is so dangerous that it potentially threatens all eggs in the storage space, regardless of their quality.

During periods of high supply of hatching eggs with disproportionately lower demand for chicks, or limited hatchery capacity, it may be necessary to store hatching eggs for long periods. While a short storage period (3–5 days) is beneficial for the hatchery to normalize the temperature of all the eggs in the batch, longer storage (more than 6 days) begins to negatively affect the performance of the hatchery. The hatching rate decreases by 0.5% for each additional day, and after 10 days – by 1% for each day (greater impact on older flocks). After 7 days of storage, the incubation time should be extended by 1 hour for every 2 additional days. If eggs are stored for more than 12 days, the impact on the production result of broilers becomes significant (up to 200 g less carcass weight per slaughter day). Storage of hatching eggs should be limited to 14 days from the date of laying (not to be confused with the date of arrival at the hatchery).

All of the above factors affect the quality of day-old chicks before the egg is placed in the incubator. Therefore, when choosing a hatchery from which to order day-old chicks, it is a good idea to also be guided by the quality of the reproductive farms from which it purchases its eggs.

Incubation systems

As far as factors that depend solely on the hatchery are concerned, one of the most relevant is whether the hatchery uses a single- in a single-stage or multi-stage incubation system. In a single-stage system, one incubator is set entirely at one time. This makes it possible to set parameters appropriate not only for a given stage of embryo development, but also to make adjustments for the age of the parent stock and the duration of egg storage. This allows for better hatching results and promotes bioassurance, which improves the quality of the chicks obtained. In the multi-stage system, eggs are put in the incubator after the first few days of incubation. From an economic point of view, this is cost-effective for the hatchery, but it does not allow for fine-tuning of the parameters and maintaining full bioassurance, which results in a deterioration of the hatching performance (by up to 2%) for all input material. It is generally recommended to move away from the multi-stage system, but in exceptional situations, or in case of very high hatchery load, this system continues to be used.

Incubation parameters

An indispensable part of the operation of any hatchery is the ongoing monitoring of all parameters set in the incubators. Ongoing calibration of temperature, humidity, and CO_2 sensors is one of the most obvious tasks that ensure reliable readings for monitoring the hatching. Even the smallest disturbances (sometimes occurring locally, i.e., in some hatching trays due to imperfect technology or too-short preincubation) can contribute to the deterioration of the production results. The most common mistakes include:

☑ overheating – in the brood, there are noticeable weak and lethargic individuals; visible reddening of the upper part of or entire feet; inappropriate sealing of the so-called 'navel' with swollen abdomens; and numerous deformities of beaks and limbs;

☑ overcooling – high embryo mortality; late and irregular hatchings; numerous deformities due to irregular organ development; frequent 'navel' infections associated with improper sealing;

☑ too low humidity – low hatching rate and poor quality of chicks; small and pale chicks; high chick mortality during the first two days after setting; very high proportion of incubated eggs with visible dried membranes (chicks too weak to get out of the egg during hatching);

☑ too high humidity – about 10% of small chicks with very swollen bellies as a result of too little moisture loss during incubation; chicks looking sluggish, wet, with low reflexes (not getting up after falling over on bedding);

☑ no tilting of eggs – a significant decrease in the hatching rate (by 30–40%); the surviving chicks are small and with significant yolk residue. The lack of tilting in the first days of incubation causes the embryo to 'stick' to one side of the shell, which promotes overheating and disruption of yolk resorption. Tilting and its correct angle should be checked manually, several times a day, by hatchery personnel.

Selection of chicks – Pasgar assessment

The chicks are taken out of the hatching baskets by hatchery staff (or an automatic machine in modern facilities) and subjected to selection. The goal of the selection is to discard chicks that are unsuitable for intensive production and those that are crippled. However, the selection conducted by the hatchery staff is highly subjective and dependent on experience. In order to normalize the assessment, different assessment systems are used to compare flocks with each other. A commonly used method of assessment of the quality of chicks is the Pasgar score (inspired by the Apgar score commonly used in humans), which consists of five factors in a zero-one system (a good score is worth 0 and a bad score is worth 1):

Charac-teristic:	Good score (0)	bad score (1)
Reflex	After the chicks are tipped over onto their backs, they get up on their feet within 2-3 seconds.	After being tipped over, the chick does not get up for a long time or remains motionless.
Navel	Fully sealed with no visible trace.	Fully sealed with no visible trace.
Feet	No change, strong with normal skin tone.	No change, strong with normal skin tone.
Beak	Clean, normal color and shape.	Crooked or flattened beak; traces of blood, a visible red dot on top of the beak; plugged nostrils.
Belly	Soft and slender to the touch.	Hard and/or heavily swollen.

Each chick starts with a score of 10 and one point is deducted for each defect. In the working evaluation at the hatchery, 5 to 20 random chicks are selected and the quality of the produced chicks is determined based on the average score (>9 – good quality chicks; 8–8.95 – average quality chicks; <7.95 – poor quality chicks). This system makes it possible to quickly determine the quality of day-old chicks and for the specialist in charge of hatching to identify any problems.

Transport of chicks

After selection, the chicks are placed in a storage room and await further transport to the destination farm under strictly controlled conditions. Loading and unloading should be done as quickly as possible to avoid exposing the birds to temperature fluctuations. Modern vehicles for transporting chicks are equipped with climate control systems to maintain an appropriate microclimate even during the summer. This stage usually poses the least risk in the entire chain, although random situations in land transportation or vehicle breakdowns can happen. To avoid this, it is recommended to ensure the technical inspection of the vehicles according to the recommendations of their manufacturers. During unloading for inspection, it is recommended that the driver show a printout from the computer regarding temperature changes during the transport.

In summary, the quality of day-old chicks is determined by a number of factors, which start occurring even before the parent flock is placed in the livestock building and end with the transport of broiler chicks to the destination farm. At any of these stages, acts of negligence can occur that will negatively affect the quality. Good quality of chicks can only be guaranteed the highest quality of the input material delivered to a properly operated hatchery. The entire process must be carried out in accordance with the principles of bioassurance and cleanliness to prevent the spread of pathogens.

Newcastle disease – one of the most dangerous viral diseases in poultry

Katarzyna Falkowska – Field Veterinary Consultant, Poultry Sales Department of Wipasz S.A.

Newcastle disease (ND) is one of the most dangerous diseases in poultry and other bird species posing a huge threat to poultry production. No new outbreaks if this disease have been reported for a very long time – since the 1970s – but last summer it reminded everyone of its existence.

ND is caused by pathogenic strains of avian paramyxovirus of serotype I. It shows variable pathogenicity, from mild to causing with very high mortality. The disease spreads mainly through direct contact with infected birds, through inhalation, as well as through the gastrointestinal route from contaminated litter. Indirect contact involving transmission of the virus along with contaminated equipment and clothing between facilities also plays an important role. The virus causing the Newcastle disease is not pathogenic to humans, but mild conjunctivitis and irritation of the upper respiratory tract are possible after contact with the virus as well as the vaccine serotype.

Symptoms and classification according to pathogenicity

The Newcastle disease is a highly contagious disease for many species of farmed, exotic, and wild birds. In particular, seasonally migrating birds are an important vector affecting the transmission of the virus. The severity of symptoms and the course of the disease depend on many factors, the most important being the health of the flock, the species of the infected birds, and the characteristics of the virus strain. ND virus isolates have been divided into five pathotypes associated with the severity of the symptoms in the infected animals:

- ☑ viscerotropic velogenic strains – with high virulence and mortality, with post-mortem visible acute pathological hemorrhagic lesions in the gastrointestinal tract;
- ☑ neurotropic velogenic strains – highly virulent, with high flock mortality rates, and with respiratory and nervous system symptoms in the course of the disease;
- ☑ mesogenic strains – moderately virulent, causing lower flock mortality (25%), but often causing acute respiratory symptoms, a moderate decrease in egg laying rates, and not very strongly expressed neurological symptoms;
- ☑ lentogenic strains – with low virulence; the infection is often asymptomatic or with a mild form of respiratory infection and no or a slight decrease in the egg laying rates;
- ☑ non-pathogenic enterotropic strains– viruses that are not virulent and multiply in the gastrointestinal tract, but do not cause the disease in the clinical form.

The boundaries between the different groups are not clear. Depending on the type of affinity to the tissues, the disease can have a varied course and virulence, and the symptoms and anatomopathological changes show a visceral or neurotropic character.

The clinical picture of the neurotropic form is mainly dominated by symptoms caused by paralysis of the nervous system. In the flock, birds can be observed with motor incapacity, paresis,

limb paralysis, or torticollis. The mortality rate is very high and exceeds 70%. This is accompanied by respiratory and gastrointestinal symptoms with prominent multiple petechiae in the rectum, bloody hemorrhages, and enlargement of the cecal tonsils. The droppings of sick birds contaminating the environment are another source of infection.

In the viscerotropic form of the disease, the mortality rate is also very high, with petechiae visible in the mucosa of the gizzard and numerous diphtheroidal and hemorrhagic lesions throughout the gastrointestinal tract. There is swelling, mucus, and petechiae on the mucosa.

The picture of the disease caused by infection with meso- and lentogenic strains is less severe and varied, and the first symptom is often a change in eggshell color to white with a moderate, almost invisible decrease in the egg laying rate.

The Newcastle disease, however, is mainly a disease of the respiratory tract. The virus enters through the mucous membrane of the upper respiratory tract, multiplies intensively, destroys it, and then attacks internal organs. An important role in this case, in addition to the immunity of the whole body and specific antibodies circulating in the bloodstream, is local immunity. It provides full protection of the respiratory system.

Treatment and prevention

There is no cure for the Newcastle disease. Given the level of the associated risks, the only effective method of fighting it is to take immediate administrative action: designate a protection and surveillance area, cull flocks at the place of the outbreak, destroy eggs, clean, disinfect, and control movement.

The ND virus is sensitive to most disinfectants, but it can survive in contaminated bedding for up to 2 months and in the bodies of dead birds for up to 12 months. The primary prevention is therefore based on the use of effective bio-security methods and preventive vaccinations.

Vaccination programs, based on the use of live, inactivated, or vector vaccines, are in place to effectively prevent the disease. Vaccines are administered by injection, orally, or by spraying.

Live vaccines are created from a complete, still alive but weakened (attenuated) virus that is capable of infecting a cell and producing strong immunity without causing the disease. They stimulate both general (humoral) and local (cellular) immunity.

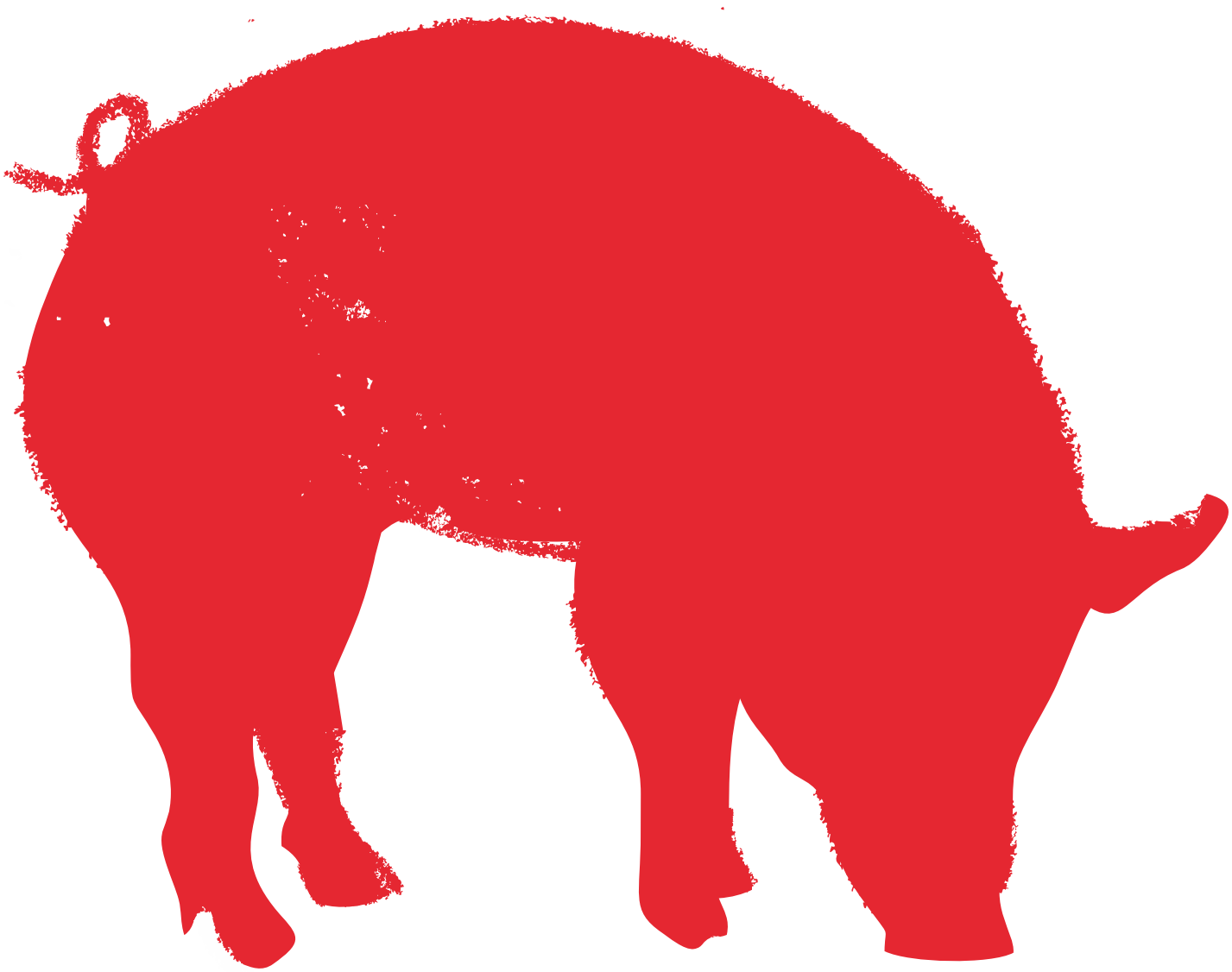
In inactivated vaccines, the ability of the virus to infect birds is eliminated, but it is capable of initiating the production of antibodies circulating in the blood, thus stimulating the body's general immunity. Vector vaccines can be briefly characterized as produced by inserting isolated donor's genes into the material of another vector microorganism (avian pox virus or turkey herpesvirus). In this case, the body's immune response to the donor's genes and the vector is stimulated.

The Newcastle disease virus causes one of the most dangerous diseases in farmed and wild birds. It poses a huge threat to poultry production in Poland and around the world. The occurrence of the disease can cause restrictions in international trade, thus resulting in losses for the global economy. Economic performance is affected not only by the direct damage associated with the losses suffered by farms, but also by damage that is hard to quantify and is associated with disruption to the chain of supply, poultry production and its broadly defined image.

Effective prevention of this disease is based on strict bio-security methods and proper sanitation procedures, as well as preventive vaccination. Only through extensive action can this disease continue to be controlled for many years.

In this section you will read:

- How to breed happy pigs? Latest trends to improve piglet and sow housing conditions
- Organic acids (SCFA/MCFA) and their derivatives in practical pig nutrition (part I)
- Heat stress in pigs: causes, symptoms, and management



How to breed happy pigs? Latest trends to improve piglet and sow housing conditions

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In 2007, at the 75th General Session of the International Committee, the World Organization for Animal Health (WOAH) developed a new definition of animal welfare. In May 2008, at the 76th General Session, after amendments, the General Committee adopted the following definition:

Animal welfare is how an animal is coping with the conditions in which it lives.

It is defined as good if the animal is:

- ☑ safe;
- ☑ healthy;
- ☑ satisfied;
- ☑ well nourished; and
- ☑ able to express is natural behavior.

Also, the animal may not experience:

- ☑ pain;
- ☑ fear; or
- ☑ exhaustion.

Animal welfare requires preventive and veterinary care, as well as proper housing, rearing conditions, feeding, and transportation. According to welfare requirements, animals in breeding conditions are to be free from hunger, thirst, cold, heat, space restrictions that prevent the manifestation of natural behavior, as well as pain, injury, fear, frustration, and disease. Reduced well-being is therefore the same as physiological deficits in varying intensity and proportions. These factors overlap to produce a sum of the burdens. Activation of the immune system under deteriorated welfare conditions is the result of the cumulative impacts of multiple stimuli of an intensity that exceeds the ability to maintain homeostasis, leading to the onset of disease and thus to a decline in production.

So how can we improve welfare in pigs and allow natural behavior to manifest, and thus breed happy pigs?

Welfare can be divided into four areas: nutrition, health, behavior, and the building in which the animals are housed. This applies to all technology groups. All deviations in these areas can cause long-term stress, which negatively affects all production results, animal health, and ultimately meat quality as well.

Essential elemets in pig diet are fiber (both soluble and insoluble fractions), organic acids, feed enzymes, probiotics and prebiotics, phytobiotics, and an adequate supply of protein, amino acids, and micro and macro elements. All of these components have a decisive effect on proper growth and, consequently, on the health of the animals, which translates into higher welfare. Balanced nutrition tailored to specific technology groups and genetics based on nutritional recommendations is the key to efficient and profitable production. One thing that should be commented on is the use of fiber, which is responsible, among other things, for peristalsis of the digestive tract and, through fermentation, lowers the pH of the intestinal contents. Fiber also gives a sense of satiety and reduces the risk of incidents of aggression (cannibalism) in the herd.

Also worth mentioning is oxidative stress, which is influenced by, among other things, dietary stress related to inflammation caused by feed of poor quality, such as undigested protein, oxidized fat sources, mycotoxins, and various anti-nutritional factors. It is essential to provide feed of high quality and digestibility, which leads not only to better health and animal welfare but also to higher productivity.

The second area that is responsible for proper welfare is well-designed and equipped facilities. Buildings need to be equipped with new technologies to ensure an optimal environment and proper microclimate, which includes lighting, temperature, humidity, noise, and concentration of noxious gases. Increasingly these technologies use Precision Livestock Farming systems, which use microsensors, cameras, and microphones. They are becoming a tool that helps manage animal breeding and enables continuous automatic monitoring and adjustment of environmental conditions in farm buildings and the health and welfare of animals in real time.

Very important from the point of view of the animals' needs is their living area, i.e. the stocking rate in group housing or the pen area in individual housing. Based on many studies conducted and the experience of breeders, we know that the system of maintaining individual sows leads to hormonal dysfunction of the body, stomach ulcers, lowered immunity, reduced immune response to vaccine antigens, arrhythmias, and myocardial degeneration. In addition, hormonal dysfunction at the time of stress leads to reproductive disorders, and an area of 3.5 m² area seems insufficient for sows kept in farrowing pens. These are some of the reasons why new EU guidelines on animal welfare are being implemented. Last year, the European Food Safety Authority's (EFSA) panel on animal health and welfare published a comprehensive report on the welfare of pigs on farms in the EU, suggesting that sows should be kept loose in the future. If the European Commission follows these recommendations, many changes can be expected in future regulations on pig housing and management. For loose sows, group pens should be designed according to the lot size and, if possible, gilts should be kept separate from sows. Pens must include space for sows to escape in the group area and a type of stand to protect the sow while eating, and for lactating sows, the area of the pen is to be equal to 6.5 m². In addition, the pen walls must be 1 m high in the sow area and there must be a roofed bedding area of about 1m². Sows in the farrowing sector should have access to manipulable material.

The next important area in terms of animal welfare is health. It means the absence of specific reactions of physiological systems to the presence of a pathogenic agent or other damaging factors, and completely fits within the concept of animal welfare. Poor health always means inadequate welfare. One example illustrating the relationship between poor welfare and deteriorated animal health is the increased frequency of diseases under factory farm conditions, which are influenced by overstocking, windowless, no-bedding, and enclosure-free housing, constant manipulation of individuals and groups (separating, weighing, driving, moving, trapping, tattooing, ear cutting, tooth and tail clipping, vaccination, and castration), operation of mechanical equipment, and inappropriate attitude of people to animals. This is expressed in animals by a large number of conditions called technopathies, which only occasionally occur outside of these systems (locomotor, cardiovascular, and metabolic conditions), as well as infectious conditions (mycoplasma pneumonia, coli diarrhea, and MMA). The effectiveness of the prevention of these diseases depends on properly conducted monitoring of herd health, preventive measures resulting from the monitoring data obtained, and constant technical monitoring of equipment. Welfare-oriented animal care is of great importance. It requires additional work, but in the end it is cost-effective.

The last area described is animal behavior. Pigs are highly motivated to search in their surroundings. The strong propensity for exploration and rootling in pigs, is most often expressed by rootling in the

bedding under bedded housing conditions and by throwing feed out of the trough or feeding machines under non-bedded housing conditions. Animal behavior is the most authoritative source of information on the degree of tolerance of the living conditions, and in zootechnical and veterinary practice it is very important to know how animals' senses function and how animals perceive the world, and to know the natural forms of animal behavior. Intensive breeding conditions lead to a decrease in the welfare of pigs, as they prevent them from fulfilling most of their innate behavioral needs, including:

☑ Food–related: searching for food, biting and chewing it; insufficient fiber in the feed;

☑ Exploratory: rootling in the bedding or other substrate (inability to perceive sensory, smell, and taste stimuli at the level of the snout);

☑ Maternal and caring: building a nest before birth, nurturing, and defending the offspring, communication between sows and piglets through vocalization;

☑ Mobility: limitation of the living space prevents free movement and play;

☑ Correct defense and escape reactions: they are formed during play and pretended fights by piglets, starting from the second week of life.

Sows kept in yoke-type pens, express their negative emotions resulting from the restriction of movement, as well as the inability to rootle in the ground and nest before parturition, by heating their heads against obstacles, trampling, sniffing, or slamming into objects above the floor level. These stereotypes are common and highly undesirable. The lack of manipulable material in yoke pens also promotes abnormal piglet behavior due to reduced opportunities for exploration and play. As a result, piglets show interest in the body parts of other piglets, which can lead in the later period of breeding to biting of tails and ears, and injuries of the genital area. Prevention of behavioral abnormalities should be done by eliminating the risk factors and enriching the environment, for example, with manipulable material that improves the welfare of pigs. All pigs kept in no-bedding systems (sows, piglets, fattening pigs, and boars) should be able to have constant access to material that allows them to rootle (straw, hay, peat, or sawdust bedding) or other materials that enrich the pigs' environment to meet their behavioral needs. It is important to remember that the material should be edible, chewable, and manipulable.

An animal is a living organism that needs more than just the minimum conditions of existence regulated by applicable regulations. The more calm, care, and safety we provide to the animal, the more efficiently it functions. Taking into account all of the above-mentioned factors, which often act in combination, it is important to realize that all technology groups, especially sows, are most often subjected to strong stress factors, resulting in severe emotional disorders.

Therefore, it is a worthwhile endeavor to take care of welfare in the areas mentioned above in order to breed happier pigs.

Organic acids (SCFA/MCFA) and their derivatives in practical pig nutrition (part I)

Ewa Gulbicka-Ilczuk – Product Manager, Pigs Sales Department Wipasz S.A.

Organic acids and their derivatives have found, due to the very wide range of their effects, a permanent and undeniable place among feed additives that have been used for almost two decades in the practice of supplementing feed mixtures for pigs, with particular emphasis on feeding piglets in the peri-weaning period and sows during high pregnancy and lactation, as well as fattening pigs. They are effective successors to alternative formulations of antibiotic growth promoters and even some therapeutic antibiotics. At the same time, acids are the most natural feed additives, not only because of their occurrence in nature (as functional substances of plants, insects, components of vegetable oils, etc.), but because of their chemical properties, compatible with the metabolic processes in the organisms of higher animals (mammals) in which they are formed (microbial fermentation processes in the gastrointestinal tract), but also on the course of which they have a direct influence (forming the pH, buffer capacity of the gastrointestinal tract, and stimulating the enzymatic and histological processes of the intestinal tract, influencing the formation of the microbiome).

In the practice of pig feeding, unquestionably the most sensitive period for the health and life of the animals is the time of separation of the piglets from the sow. The piglets are subjected to severe stress due to the absence of the sow (behavioral aspects), lack of milk (although they have been fed solid feed in parallel), combining litters (new hierarchy), and many other factors. The body's response is the occurrence of stress mechanisms, which, in addition to immunodepression and over-stimulation, also result in a sizable proportion of young animals with reduced feed and even water intake. The entirety of body's specific reactions is referred to as the post-weaning syndrome. The aforementioned disruption in feed intake during that period, which lasts from several hours to 2–3 days, often causes strong and even irreversible changes in the degree of histological development of the structures of the digestive system (inhibition of intestinal epithelium development and lymph cell division), a deficit of the adipose tissue used for the metabolic process, and an accumulation of compounds resulting from those transformations that are not properly removed from or neutralized in the body (due to the lack of other substances needed for these processes, such as too low levels of sugars to reduce ketone bodies, etc.). At the same time, the disruption of this delicate systemic homeostasis leads to a dynamic imbalance of the microbiome, followed by the development of the gastrointestinal microflora referred to as conditionally-pathogenic (beta-hemolytic *E.coli*).

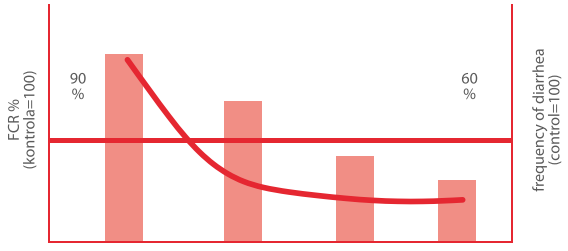

Table 1. Frequency of diarrhea in piglets and correlation with the FCR (Bolduan, 1999)

The digestive system of piglets in relation to the body weight is very important, and its so-called allometric (physical) parameters change dynamically with age. For example, after birth,

the weight of the intestine (large intestine) is 10 g, its length is 0.8 m, and its capacity is 40 ml, but after just 20 days of life, these parameters increase to 36 g, 1.2 m, and 100 ml, respectively, which corresponds to, for example, 1.2% of the animal's body weight. However in the post-weaning period, with proper intake of solid feed, these values increase to 2–2.5% of the body weight; when the animal weighs 100 kg, its digestive system weighs 1.3 kg, is 5 m long, and its capacity is up to 10 l, and when it weighs 140 kg, these values are 2.8 kg, 7.5 m, and 25 l, respectively. Therefore, proper physiological condition and health of the digestive system, as an important tissue unit in the body that is in contact with the environment (feed and water), is of the highest importance. At the same time, digestive capacities change in terms of the secretion of enzymes and bile salts, affecting the processes of hydrolysis and absorption of components from breast milk and then from feed. Therefore, deep knowledge of animal physiology allows for optimizing the nutrition and adjusting feed additive systems to effectively support the function of the digestive system, in correlation with its development (e.g. fermented protein compounds vs. organic acids and short-chain inorganic acids, reducing the pH, or triacylglycerols of medium-chain acids C6, caproic acid vs. long-chain fatty acids).

If a strong impact of the post-weaning stress syndrome occurs during the weaning period, then such piglets are characterized by a retarded function of the digestive system, which involves too low secretion of gastric juice (HCl), too poor conversion of pepsinogen to pepsin (this results in pH of about 2.5–2.8), a decrease in the number of duodenal secretory cells (a decrease in the secretion and activity of native amylase, lipase, and proteases), thus a broad alkalization of the digestive system in the pH range above 5.0–5.5. The measurable, negative effect is a further decrease in feed intake, with a concomitant process of disruption of the proportion of the intestinal microbiome, and the visible changes are increased diarrhea, dehydration, cachexia, and, consequently, death of metabolically exhausted or poisoned piglets. Dysbacteriosis caused by hemolytic bacteria *E.coli*, mentioned in an earlier paragraph, is just the tip of the iceberg. Clostridium spp., bacteria from the Proteus spp. group (systemic sepsis), grow fast in the remains of undigested feed ingredients (as a result, intestinal digestibility decreases by up to 40–50%), and even the Lawsonia bacteria can be present in the terminal intestine. The totality of these phenomena coupled with a pH-acidity imbalance as the initial etiological factor, progresses dynamically, aggravating the disorders of the gastrointestinal walls through inflammatory reactions, excessive secretion of water with chlorine ions, and impaired osmosis.

Disease groups	Number of identified cases in 2012–2014	Proportions (%)
Digestive tract	886	52.9
Respiratory system	353	21,1
Diseases of the nervous system	119	7.1
Other	99	5.9
Blood system	91	5.4
Genitourinary system	54	3.2
Skeletal system	52	3.1
Skin diseases	22	1.3

Table 2. Reasons for financial losses in pig production – piglets (weight up to 35 kg)

Thus, the pH value in the various sections of the digestive tract of pigs is a key element for controlling the functions, the health, i.e., the microbiome, and ultimately the productivity.

The pH value is also a basic indicator that determines the characteristics of chemical compounds with pH value of 7, i.e. acidic.

Due to their unique characteristics, such as pH values, polarity, length of the carbon skeleton, and number of functional groups, organic and inorganic acids, the so-called short- and medium-chain acids and their derivatives (salts and esters), are an effective nutritional tool supporting and regulating this parameter in the digestive system, and counteracting excessive buffer capacity of feed.

$$\text{buffer value (mea x } 10^{3}) = \frac{\text{quantity ml HCl x concentration HCl (mol/l)}}{\Delta\, pH}$$

where:

pH = pH change in the course of titration to pH 3.0 or pH 4.0

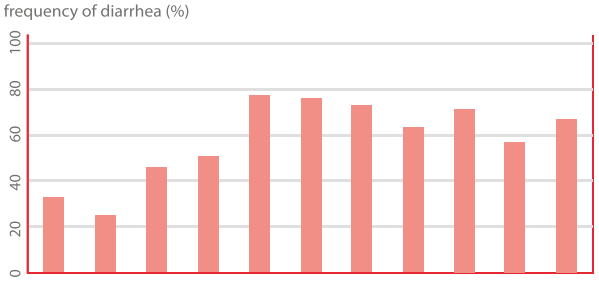

Chart 1.

Optimal control of the pH value and the buffer capacity of weaning feeds and feeds given in the subsequent rearing period supports the maintenance of the physiological pH of the stomach, which in turn affects the digestibility of proteins, amino acids, minerals and the efficiency, i.e. effectiveness of the anti-microbial barrier of the stomach:

Organic and inorganic acids are additives that help maintain the proper pH of the stomach, and thus the proper microbiological barrier of the digestive system.

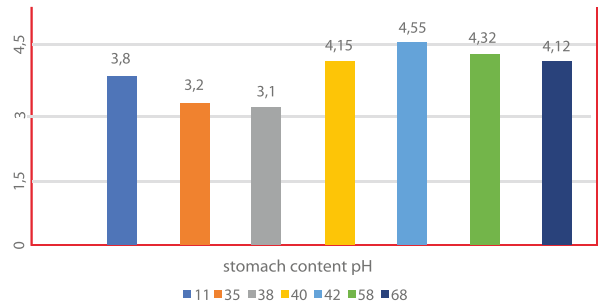

Chart 2. Changes in the pH of the stomach in time (days)

This barrier, thanks to the right pH, plays a role in the shaping of the proportion and abundance of the various species and strains of microorganisms that populate the digestive system.

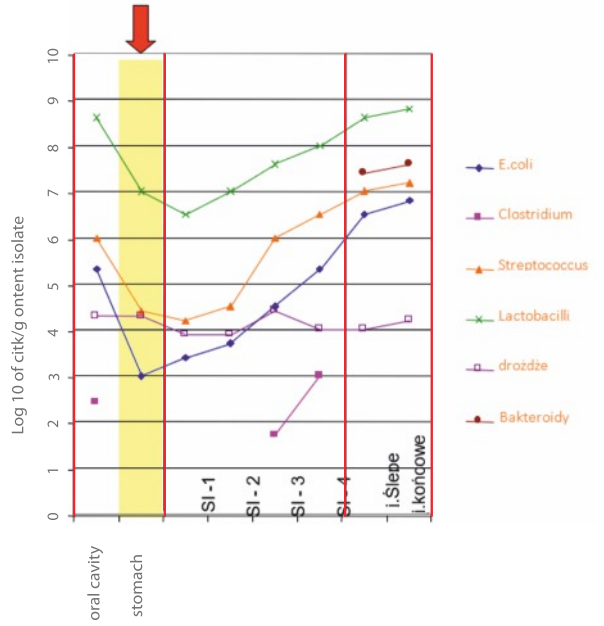

Chart 3. Power of individual acids (pKa)

With respect to the pH, the real value of the strength of an acid's effect on ambient factors is the so-called acid power, which is the negative decimal logarithm of the dissociation constant (pKa):

The lower the pKa is for an acid, the 'stronger' that acid is in shaping the pH, and therefore in reducing the buffer capacity of the environment and the anti-microbial effect.

For example, the pKa is equal to 3.75 for formic acid, 4.75 for acetic acid, 4.87 for propionic acid, 4.82 for butyric acid, 3.83 for lactic acid, 3.02 to 4.40 for fumaric, 3.13 to 4.20 for citric acid, and 4.20 to 4.45 for benzoic acid.

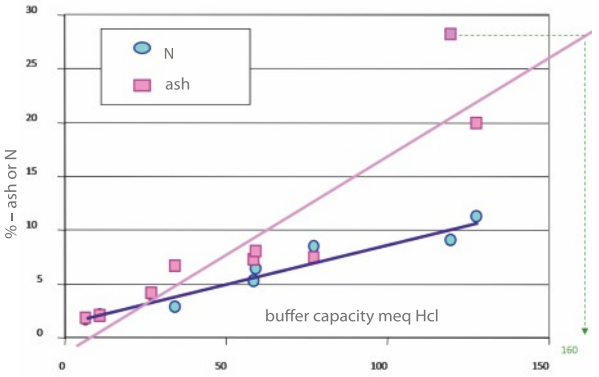

Chart 4. Increase in the buffer capacity relative to the nitrogen and ash content of the feed

In feed, nitrogen and ash (Ca, P, and Mg) are substances that increase the buffer capacity.

The aforementioned acid power, expressed as the dissociation constant, refers to the actual protonation of the environment, through the release of the hydrogen ion (H+). This ion exhibits strong acidifying properties, and these are a direct factor affecting microbial growth. It is the pH lowered in the intestinal sections to about 4.0–4.2, and in the stomach to 2.2–2.6, that shapes the microflora of the digestive system, stimulating the development of symbiotic flora (including microorganisms that also produce organic acids) and reducing the development of conditionally pathogenic flora. Also, it affects the degree of activity of native enzymes of the digestive system (and their secretion), which translates into improved digestibility of feed ingredients

In addition to the mere protonation of the gastrointestinal tract environment, undissociated acid parts have the ability to penetrate into the cells of bacteria (mainly pathogenic ones), which derive energy for the metabolism of their cells from the uptake of acids. This process is a kind of 'perpetual motion machine' because the more acid part the bacterial cells take up, the more their need for energy and other ions (sodium, chloride, potassium) increases in order to remove the dissociated acid protons from the cytoplasm, which, once inside the bacterial cell, have a destabilizing effect on metabolism and even on the processes of changing gene expression and mRNA replication and osmosis. This process in the parallel action of some acids at the bacterial wall and cell membrane on the outside (e.g. orthophosphoric acid) very quickly leads to

the loss of metabolic capacity and death of the bacterial cell. Some types of bacteria, referred to as Gramm (+) bacteria, are characterized by a quite different structure of the cell membrane, which is a so-called pH resistant barrier, so some of this type of microflora can survive and maintain cellular functions in an environment characterized by external acidification. Then, of the organic acids group, the medium-chain fatty acids (MCFA) (triacylglycerols/their esters), which depolarize the cellular exchange channels, become effective tools in reducing these bacteria through the so-called secondary protonation, and thus only their action sensitizes bacteria to the direct influence of short-chain acids (SCFA).

Thus, organic and inorganic acids are characterized by another parameter, referred to as minimum or effective inhibitory concentration.

The concentration of the acid at which the growth of bacterial colonies is inhibited is the so-called minimum inhibitory concentration (MIC), which is correlated with the pH of the environment and is an individual value for a given acid.

Type of microorganisms:	The pH value of the cell's environment		
	min	optimum	max
Salmonella spp.	4,0-5,0	6,0-7,5	8,0-9,0
E. Coli	5,0-6,8	7,0-7,5	8,0-8,5
Clostridium perfringens (G+)	4,9-5,5	6,0-7,6	8,5
Clostridium botulinum (G+)	4,8-5,9	6,0-7,0	8,0-9,0
Pseudomonas areuginosa	4,5-5,6	6,6-7,0	9,0
Staphylococcus spp.	4,2	6,8-7,5	9,3

Table 3. Minimum inhibitory concentration for individual microorganisms

Bacteria and fungi, as living organisms, exhibit a certain metabolic activity in an appropriate pH range of the environment. Both acidification and the opposite phenomenon – alkalization – from the optimal values lead to the arrest of processes and inactivation of the bacterial cell. Since typically there is no alkalinization (pH above 8) under the physiological conditions of the digestive system of pigs and other monogastric animals, the only route of action is the aforementioned acidification - reduction of pH below 5.0.

The pH value at which the growth and multiplication of bacteria is inhibited, in relation to the concentration of the agent (acid) acting on them, is the basis for optimizing feed preparations in the form of mixtures of additives from the group of preservatives (SCFA/MCFA acids and their derivatives) and other functional groups of additives (acid salts) and feed materials (acid esters).

Proper selection of these substances, taking into account, among other things, their solubility properties, the correlation of their molecular weight and dissociation constant (up to and including the third degree), interactions referred to as synergy and dissociation cascade, and the MIC, allow for the development of an effective solution based on organic acids, inorganic acids, and their derivatives in pig nutrition.

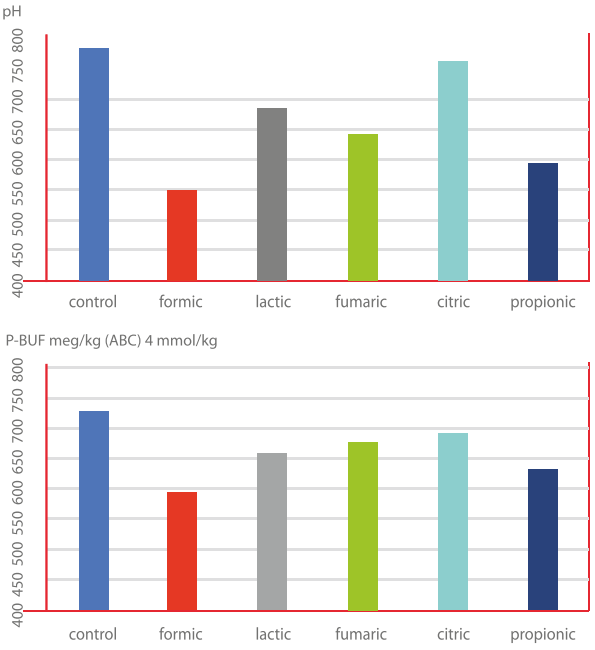

Chart 6. Effect of selected acids on the value of buffer capacity of piglet feed (at 3.5 kg each)

Each of the acids can exhibit a different ability to reduce not only microorganisms, but, in the first phase, the buffer value of the feed. Hence, in products developed with a high level of chemical and technological expertise, several acids and their chemical forms are combined in a single formulation for mutual additive action, a cascade of dissociation.

The aforementioned cascade of dissociation of acids and their derivatives in formulations is based on such selection of each ingredient that the percentage amount in the product related to the chemical concentration of that acid (e.g., formic from 85 to 94%, propionic acid min. 99%, lactic acid 80–85%, etc.) allows, first of all, to protonate the feed environment (or water if acids are used in watering lines) to an extent sufficient, as a minimum, to achieve a reduction in the pH per unit time equal to 1.1–1.5, a reduction in buffer capacity by 25–30%, and bacterial colony area (in plaque assays) by at least 45-50% (taking into account the mechanism of action of acids on the environment surrounding the cell, and also after penetration into the cell – in its cytoplasm). When

including in products in addition to short-chain acids, compounds with a carbon skeleton length of 5 to 12 atoms (C_6–C_8–C_{10}–C_{12}), the so-called 'metabolic kinetics' of these substances is also taken into account, which is based on the partial use of these acids in energy processes for the body's cells, and then the so-called active rest that can be used in microbial control processes (in synergy with or without SCFA). It is assumed based on our own experience that, referring to the pure forms of MCFA, the metabolized part is 35–40% per unit of weight, depending on the length of the carbon skeleton, since in the case of C_6 (caproic acid) and the age of the animals – piglets from 21 days of age, the metabolic use can be as high as 65%. On the other hand, for example the glycerol esters already cited in the content of this article, due to their unique structure, despite the fact that they contain an acidic chain, e.g. 6-carbon one, in combination with glycerol, e.g. at the 1-carbon position of glycerol, are more rapidly assimilated by the bacteria residing on the wall of the gastrointestinal tract as a source of potential energy, rather than absorbed by the body. This also means that esters can be administered in slightly smaller quantities, since 1 unit of this substance shows greater inhibitory activity than the same unesterified fatty acid. An example of this is the valeric acid ester (described below), which has a bond structure with covalent forces, and therefore the highest chemical stability (in the pH range of 2.3–6.8), which means high catalytic resistance against hydrolases (α,β lipases).

	Streptococc. Beta	*Corynebacteria Hemolit*
C12 acid	249	124
C12 mono-glyceride ester	9	45

Table 4. The MIC value for lauric acid (C12) vs. its monoglyceride ester (Kabara et al. 2005) mmol/ml

	Clostriudium perf.	*Streptococcus suis*
C5 mono-glyceride ester	3 100	2 000

Table 5. The MIC value for the valerian acid ester (C5) umol/ml

An effective formulation based on acids and their derivatives is a multicomponent bulk blend on a carrier such as high-absorption silica or surrounded by palm oil acids and palm sterol, or liquid on a water-glycol carrier. It contains active substances at the highest chemical concentration, which allows to use a wide range of dosage of the product, depending on the actual needs on the farm (condition of piglets, alignment, epizootic status, quality of feeds – input materials in terms of microbiological purity, buffer capacity, etc.).

The general properties of organic acids described in the above section of the paper and the connection between them and the specific characteristics of the physiology of the peri-weaning period are a brief summary of the issue. In the second part of the article (to be published in the next issue of our Safety Food magazine), the individual acids and their derivatives will be presented in detail, along with an extensive meta-analysis of practical results.

Heat stress in pigs: causes, symptoms, and management

Artur Maciejewski – Pig Nutrition Advisor Wipasz S.A.

Heat stress in pigs is a serious problem in farming, especially in hot climates. Pigs are particularly sensitive to heat stress due to their limited thermoregulation ability. The effects of heat stress can lead to impaired health, decreased productivity, and increased mortality. The causes, symptoms, and strategies for managing heat stress in pigs are described below.

Causes of heat stress:

- ☑ **High ambient temperature** – when the air temperature exceeds 25–30°C, pigs begin to experience thermal discomfort, and above 35°C serious health problems can occur.
- ☑ **High humidity** – humidity above 70% increases the risk of heat stress because it hinders heat transfer through evaporation.
- ☑ **Poor ventilation** – the lack of adequate airflow in pig houses leads to heat and moisture accumulation, which exacerbates the problem of heat stress.
- ☑ **Excessive stocking density** – the presence of too many pigs in a small area makes it difficult to maintain optimal thermal and ventilation conditions.

Symptoms of heat stress in pigs

☑ Behavior:

- frequent panting;
- lying in a stretched position with legs extended to the sides;
- reduced physical activity;
- increased search for places with cooler ground.

☑ Physiology:

- increased respiration;
- increased body temperature;
- increased water consumption, but decreased feed intake;
- body weight loss.

☑ Reproduction and production:

- reduced fertility;
- reduced milk production in sows;
- decreased weight gain in fattening pigs;
- increased number of miscarriages and stillbirths.

Heat stress management strategies

1. Environmental control:

- ☑ **Ventilation** – ensuring an adequate ventilation system that maintains air flow and removes excess heat and moisture. Mechanical fans, air exhaust systems, and ventilation openings can be used.
- ☑ **Air cooling** – the installation of cooling systems such as sprinklers, water mists, or air conditioners can effectively reduce the ambient temperature.
- ☑ **Insulation of buildings** – proper insulation of the pig house helps maintain a constant temperature inside the building and protect it against excessive heat.

2. Feed and water management:

- ☑ **Access to water** – pigs should have constant access to fresh and cool water. It is of key importance to increase the number of drinkers and regularly inspect their operation.
- ☑ **Adjusting the diet** – reducing the proportion of fiber in the diet and introducing feeds with higher energy concentration can help reduce metabolic heat production.
- ☑ **Electrolytes in the ration** – electrolyte supplementation helps maintain electrolyte balance and prevents dehydration.

3. Space organization:

- ☑ **Shade** – provision of shaded areas in the pig house, especially in outdoor enclosures.
- ☑ **Optimum stocking density** – maintaining an adequate pig stocking density to provide each animal with adequate space for rest and ventilation.

4. Monitoring and interventions:

- ☑ **Regular measurements** – continuous monitoring of temperature and humidity in pig houses to quickly respond to changing conditions.
- ☑ **Early recognition of symptoms** – rapid detection of heat stress symptoms and immediate remedial actions.
- ☑ **Veterinary support** – consultation with a veterinarian to implement additional countermeasures, such as the administration of drugs to promote thermoregulation.

Heat stress is a serious threat to the health and performance of pigs. Proper management of the environment, feed, and water, and monitoring of pig house conditions are key to minimizing the effects of heat stress. Appropriate management strategies help maintain the health and welfare of pigs, resulting in better production efficiency and reduced losses due to health problems. With these measures, farmers can ensure that their animals are comfortable and protected from the negative effects of high temperatures.

In this section you will read:

- The importance of dairy products in the human diet – facts and myths
- WIMILK 44 – savings and convenience
- Ways to increase feed intake in cows

The importance of dairy products in the human diet – facts and myths

Małgorzata Chrostowska – Director, Cattle Sales Department Wipasz S.A.

Dairy products have been present in the human diet for more than 6,000 years and are included in dietary recommendations in many countries around the world. They are an important component of the diet of a large part of the population. They are used as an excellent source of protein, amino acids, energy, vitamins, and minerals that are needed for growth and proper development of the human body.

Some claims that dairy products have a negative impact on human health have appeared. Information is spread about an increased risk of certain diseases, including diabetes and cancer. In the modern world, consumers are bombarded with lots of data that is hard to verify. Thus, they gain their knowledge not only from reliable scientific sources, but also from social media, influencers, or other sources that do not always offer information based on true data

What do we know for sure today? Is it a good idea to include dairy products in our daily diet?

Virtually all healthy eating models include the presence of dairy in the daily diet. The Food and Nutrition Institute, in its Pyramid of Healthy Nutrition and Lifestyle for Children and Adolescents, recommends that children aged 4–18 consume 3–4 servings of dairy products per day. Adults and the elderly are recommended to consume 2–3 servings of milk and milk products, primarily in the form of fermented products.

Cow milk contains about 88% of water, 4.6% of lactose, 3.3% of protein, 3.1% of fat and 1% of minerals and vitamins. Milk protein has high biological value because it contains all the essential amino acids. 80% of milk protein is casein. Lactose is actually the only carbohydrate in milk. One must bear in mind that it is beneficial for the absorption of calcium, phosphorus, and magnesium. Milk is also rich in macro- and micronutrients, as well as vitamins B, A, D and E. Dairy products provide more protein, calcium, magnesium, potassium, zinc, and phosphorus than other products typical of an adult's diet.

The importance of calcium from milk

The World Health Organization (WHO) recommends a daily calcium intake of 1,000 mg for adults. Such a dose is contained in 3–4 servings of dairy products, such as a glass of milk, 35 grams of cheese, or 125 grams of yogurt. Dairy products are an excellent source of calcium characterized by high absorption and bioavailability, and at a relatively low cost per dietary ration. As much as 2/3rds of the calcium intake of the population of highly developed countries come from dairy products, which also provide 10–28% of the protein needed. At the same time, dairy products account for only 9–12% of the total energy intake. By excluding milk and its products from the diet, we put ourselves at risk of calcium, potassium, and magnesium deficiencies.

Calcium is also found in significant amounts in green leafy vegetables, but much of it is in insoluble form, which significantly reduces bioavailability. For example, a serving of cooked spinach contains 115 mg of calcium, but only 5% of it is bioavailable.

The public's growing awareness of healthy living is causing many people to use calcium in the form of various supplements. Although no studies have shown much better absorption of calcium from

milk compared to that from dietary supplements, it has been observed that bone mineralization was higher and more durable in those who consumed their calcium with dairy products. Postmenopausal women consuming calcium in low-fat milk saw a significant improvement in bone mineral density, compared to women consuming calcium with dietary supplements. Similar results were obtained for children consuming cheese instead of supplements with calcium.

Adequate dietary intake of protein and calcium is essential to normal bone mass during skeletal growth and to the prevention bone loss in old age. The beneficial effects of dairy consumption by pregnant women on the baby's bone health have also been demonstrated. The elimination of dairy products in growing children results in lower growth, lower bone mineral mass, and a risk of fractures increased by up to 2.7%. In Sweden, a study was conducted for 20 years on a large group of women aged 39–74, which confirmed

Dairy products have also been proven not to increase the risk of cardiovascular disease. On the contrary, it has been shown that limiting the consumption of dairy products can contribute to cardiovascular disease and type II diabetes. Fermented dairy products containing live bacterial cultures support beneficial microflora in the intestines. These 'good bacteria' help manage cardiovascular risk factors, lower glucose levels, and regulate insulin levels.

Health effects of dairy products

It turns out that the body's cognitive functions can be modulated to some extent by food, and their decline can be slowed down by adopting a proper diet and lifestyle. Studies conducted between 1975 and 2000 using neuropsychological tests confirmed that milk consumption (at least 200 ml per day) resulted in better memory and slower decline of cognitive functions. Similar effects were observed in school-aged children.

Dairy products have also been proven not to increase the risk of cardiovascular disease. On the contrary, it has been shown that limiting the consumption of dairy products can contribute to cardiovascular disease and type II diabetes. Fermented dairy products containing live bacterial cultures support beneficial microflora in the intestines. These 'good bacteria' help manage cardiovascular risk factors, lower glucose levels, and regulate insulin levels.

Some dairy products also contain saturated fat, which can affect cholesterol levels. However, recent studies suggest that the consumption of dairy products, regardless of their fat content, is not directly linked to a higher risk of heart disease or stroke. Neutral or positive effects of milk fat consumption on health are indicated. This does not mean, of course, that full-fat products can be consumed without any restrictions. After years of controversy and many guidelines recommending limiting the consumption of milk and milk products, current knowledge indicates that it is more appropriate to recommend moderate consumption of full-fat dairy as part of a healthy lifestyle. Fermented dairy products seem to be the best option as a source of nutrients beneficial to the cardiovascular system that reduce the risk of diabetes or elevated cholesterol levels.

There is no evidence to support the claim that people with rheumatoid arthritis or osteoarthritis need to eliminate dairy from their diets. Earlier suggestions of pro-inflammatory effects of dairy products have been dispelled by the latest research, which has confirmed that full-fat dairy products and milk fat actually have a neutral or positive effect on levels of inflammatory markers circulating in the blood. There are even some publications about the inhibition of osteoarthritis progression associated with frequent milk consumption.

The digestibility of milk proteins reaches 95% and is higher than that of soybean, pea, wheat, lupin, and rapeseed proteins. They are very important for building and maintaining muscle mass because of their amino acid content. Casein facilitates calcium and phosphorus absorption in the small intestine and is a major substrate for the production of bioactive peptides with cardioprotective effects. Lactoferrin, on the other hand, supports the immune system and has anti-cancer effects. Milk proteins, especially whey proteins, significantly support weight loss processes. They increase the feeling of satiety after a meal and reduce appetite. A 2019 study found that fermented dairy products help reduce the fatty tissue and the body weight.

It has also been shown that dairy consumption can significantly reduce the incidence of certain types of cancer. The risk of gastrointestinal cancer was 16% lower in men and 23% lower in women consuming dairy products. A similar effect has been determined for bladder cancer. This protective effect of the consumption of dairy products has been attributed to the high content of potentially chemopreventive compounds in milk, such as calcium, vitamin D3, and linoleic acid.

What about lactose?

Consumption of milk causes bloating, abdominal pain, or diarrhea in some people. As a result, they often avoid dairy in their diets. These symptoms are most often caused by a deficiency of lactase, an enzyme responsible for breaking down lactose into glucose and galactose, which are absorbed in the intestines. Undigested lactose enters the colon, where it is fermented by intestinal microflora, leading to gastrointestinal disorders. Lactose intolerance is one of the most common food intolerances in humans. In Poland, it occurs in 20–37% of adults and 1.5% of infants and children. The highest content of lactose can be found in milk and whey. Dairy drinks, cottage cheese, and

butter contain smaller qualities of this sugar. Hard matured cheeses are virtually lactose-free. Adults with lactose intolerance usually do not experience discomfort after consuming products containing 5–10 g of lactose in a single dose. This is equivalent to 100–200 ml of milk, yogurt, kefir, or buttermilk. Also keep in mind that fermented products contain more lactose pre-digested by bacteria and are better tolerated than milk. In people with lactose intolerance, the aim is to eliminate symptoms, while ensuring a properly balanced diet that provides adequate levels of calcium, vitamin D, and protein. It should be emphasized that the occurrence of gastrointestinal disorders associated with lactase intolerance is conditioned by the intake of dairy products, so one should aim to reduce or eliminate lactose from foods, without giving up dairy altogether. Nowadays, a whole range of lactose-free products are available that can be used in a properly balanced diet.

What is the conclusion?

Milk and its products should be an important component of our diet throughout our lives, especially during childhood and adolescence. Consuming dairy products in the recommended amounts is safe and healthy. Dairy products provide many nutrients that are difficult to find in low-dairy or dairy-free diets, and the benefits of their consumption definitely outweigh any (in many cases contrived) harm.

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WIMILK 44 – savings and convenience

Przemysław Bartosiewicz – Product Development and Technical Support Manager, Wipasz S.A.

The Wipasz product line includes a new protein concentrate called **WIMILK 44.** It was developed with the economic aspect in cattle feeding in mind, and it is easy for farmers to use.

Product use:

- ☑ a protein supplement in complete feeds based on own grain;
- ☑ in TMR and PMR rations, as a protein supplement in cattle feed ration.

Composition:

- ☑ corn DDGS;
- ☑ post-extraction rapeseed meal;
- ☑ post-extraction soybean meal;

The formulation of **WIMILK 44** was developed taking into account the need for and the proper balance of the PDIN – the amount of protein digested in the small intestine resulting from the nitrogen available in the rumen, as well as the PDIE – the amount of protein digested in the small intestine resulting from the energy available in the rumen.

Feed urea as an ingredient of WIMILK 44

Definition of urea

In chemical terms, urea is a diamide of carbonic acid. It is an odorless organic compound that is easily soluble in water. It comes in the form of white granules. It forms biuret as a result of condensation during heating. In agriculture, it is most commonly used as a nitrogen fertilizer. One kilogram of urea contains 2,800–2,900 g of total protein.

- ☑ Legal considerations for the use of urea in cattle nutrition

In accordance with Commission Implementing Regulation (EU) No 839/2012 of 18 September 2012 concerning the authorization of urea as a feed additive for ruminants, it should be mentioned that a urease inhibitor has been added to fertilizer urea for some time, making it unsuitable for cattle feeding. The only safe form is feed urea.

Advantages of using urea

The main advantage is a reduction of the cost of dairy cow feeding. The addition of urea makes it possible to reduce the proportion of post-extraction soybean meal in the ration. Another important point is better digestion of other feed ingredients, thanks to the supply of readily available ammonia to bacteria in the cow's rumen. Ammonia is used by bacteria to build the body's own proteins. Some of it goes to the intestines where the digestion process takes place. Ultimately, it is a source of protein that meets up to 80% of the cow's needs for this compound.

The economic aspect in the use of WIMILK 44

According to the calculations made using the INRA ration development software, the example feeding (2 kg of post-extraction rapeseed meal and 1 kg of soybean meal in the ration) can be replaced with 2.4 kg of **WIMILK 44**. Assuming the meal prices in place in July 2024, the total cost of feeding is PLN 5.00 net per head. At the same time, the cost of feeding with **WIMILK 44** is PLN 4.56 net per head, which results in PLN 0.44 savings per head. For a herd of 100 dairy cows, the net savings amount to PLN 1,320 per month.

The 29 g/kg of feed urea content at a dosage of 2.4 kg of **WIMILK 44** results in 0.69 g of feed urea per head, which is a very safe dosage.

Convenience and accuracy in the use of WIMILK 44

When working with breeders, it is hard not to notice that the biggest role in today's agriculture and breeding is played by time, or more likely, the lack of it. Our product has been developed to reduce the cost of cattle feeding and milk production, as well as to facilitate work and reduce the time needed to prepare feed trucks with TMR and PMR rations. Mixing and milling 4 ingredients (post-extraction rapeseed meal, post-extraction soybean meal, corn DDGS, feed urea at 29 g/kg) into a single product in an appropriate formulation allows better accuracy, homogeneity in feeding, and convenience for the breeder.

As part of a longer cooperation, we offer the possibility of equipping the breeders with a feed silo together with a screw conveyor, which will further facilitate the work and dumping of the **WIMILK 44** product into feed trucks in TMR rations. **WIMILK 44** is available in loose and crumble form. It is delivered in bulk, 1,000 kg big bags, and 25 kg bags.

Ways to increase feed intake in cows

Dariusz Bujko – Product Development and Technical Support Manager, Wipasz S.A.

A dairy cow produces 35–40 liters of milk and consumes 22–25 kg of dry matter of roughage and concentrate feed per day. Providing cows with a well-balanced feed ration does not always result in a sufficiently high intake. There are many factors affecting feed intake, including:

Ration repeatability

The basic principle that governs the feeding of a modern cow is taking care of ration repeatability. The rumen does not like frequent ration changes, as its microflora needs up to 3 weeks to adapt to the new composition. One must keep in mind that it is not enough to take care of the right content of protein, starch, and fiber in the ration. In particular, care should be taken to ensure its repeatability, since frequent changes in the ration lower digestibility, which consequently reduces the appetite and the performance of cows. Also, when changing silage heaps, a transition period should be provided when the new feed is mixed with the old one for some time to ensure faster rumen adaptation. Also, the change of two silages at the same time should be avoided.

TMR feeding

Using a feeding system based on a TMR or PMR ration increases dry matter intake by mixing less palatable feeds with more palatable ingredients. The feed truck mixes the concentrate feed with the roughage, which results in homogeneity of the ration while maintaining the palatability of the feed. It is important to remember that the amount of TMR should be slightly higher than the intake capacity of the cows. If the cows eat the entire ration, they do not take the feed in the proper way for about 2 hours a day. The amount of TMR should be about 5–10% larger than the intake capacity of the cows and the uneaten ration should be left on the feed table. Dry matter is very important for the intake of the finished TMR. A proper TMR should contain about 40% of dry matter. If the dry matter content is higher, it is a good idea to wet it by adding water to increase the intake and reduce sorting by cows. However, a TMR that is too wet often reduces the frequency of chewing, which can lead to metabolic disorders. To avoid this, it is necessary to either increase the quantity of added straw or add dry beet pulp to the TMR, which draws out moisture and aids chewing.

Cold and fresh TMR

The TMR should always be given on a clean feed table. This is especially important in summer, when air temperatures are higher and the TMR spoils faster. Feed intake is also affected by the frequency of TMR feeding. During summer periods, increasing the frequency of TMR feeding to twice a day should be considered. One-time feeding is certainly convenient, but does not fully utilize the productive potential of the herd. Feeding a single ration of TMR during hot weather causes rapid heating of the feed and reduced feed intake, and in extreme cases, leads to health problems in cows. High temperatures result in increased fermentation processes and faster growth of fungi, molds, and yeast. In situations where heating cannot be prevented, mixtures of organic acids (such as sorbic acid, benzoic acid, or propionic acid) or their salts can be used. They act against fungi and molds, have no toxic or corrosive effects, are biodegradable, and mix well with feeds. They can be used in a loose or liquid form. Cows have a natural tendency to spread the TMR, which promotes sorting. The TMR should be swept together frequently on the feed table, preferably every 60 minutes (by an automatic robot). It turns out that frequent sweeping never results in as much feed intake as feeding two or more TMRs.

Silage quality

Silage quality is very important, if not crucial, to the feed intake of cows. Cows have about 25,000 taste buds, which is 2–3 times more than humans, so they sense the taste of feed, e.g. silage, much more intensively. Silage should be similar in color to the ensiled material, and should be free of mold and have an aromatic smell and a slightly sour taste. The pH of silage should not fall below 3.8. One must bear in mind that even the best silage can be subject to secondary heating when it is picked. Once oxygen enters the silage, very rapid microbial processes occur, causing spoilage and heating of the ensiled material. It is very important to ensure:

- ☑ the right size of the pile according to the size of the herd (the entire wall should be picked in no more than 7 days);
- ☑ a sharp, strong cutter that will cut the material in the pile and not cause it to be torn out; and
- ☑ not uncovering the pile in advance.

The optimal time for harvesting grasses is the beginning of ear formation, for clover it is flowering, and for alfalfa it is the beginning of budding. Material that is harvested too late does not become ensiled as well and contains too much fiber, resulting in poor intake. It is also important not to over-dry the green fodder, because such material is harder to compact and is less valuable.

Corn should be harvested for silage when the milk line on the cob cross-section is visible at least in a half of the height of the grain from the base. If corn is harvested too late, problems arise with the shredding of the plants, including the valuable grains, as well as a reduced intake of such feed by cows.

Feed intake by cows is also affected by the repeatability of the ration. Cows like to consume the same kind of feed every day.

Until a few years ago, silage was treated as a fiber carrier necessary to maintain rumen motility. Today we know that very good silage with 70–80% digestibility can yield up to 20 liters of milk per day. So it is worth ensuring that cows take in as much of this feed as possible.

Access to water

Another factor that results in better feed intake is providing the cow with an adequate quantity of water. To produce 1 liter of milk, a cow uses 2–4 liters of water, which results in daily values of up to about 160 liters. The demand for water is even greater at higher ambient temperatures. Reducing a cow's access to water by as little as 10% causes a decrease in feed intake, and the cow begins to show anxiety and aggression. It is assumed that a dairy cow drinks 4–6 liters of water for every kilogram of dry matter intake. It is also important to remember about cows in the dry period, which consume 30–50 liters of water per day. Cows prefer to drink water from tub drinkers in the company of other cows. In barns with bowl drinkers, care should be taken to ensure an adequate number of drinkers (1 drinker per 2 head of cattle in a stanchion barn and about 15 head in a free-stall barn). The appropriate water flow in drinkers should be between 10–20 liters per minute.

Beds and conditions in the building.

Cows should be provided with an adequate number of beds so that they can rest for 10–14 hours a day and ruminate properly. Each additional hour of rest in the beds (over 9 hours) results in 1 additional liter of milk produced. In order for cows to rest properly, the beds should be of adequate length. With the current size of cows, the bed length usually reaches up to 3 meters. In such beds, the animals lie down and get up properly, and while lying down the animals' rumps does not extend outside the bed. The substrate is also an important element. Cows prefer to lie on sand, sawdust, or, as recent studies show, on recycled dry manure. Rubber or water mattresses are a kind of compromise between cows' comfort and organization in the barn. The mats should be laid on a layer sawdust or straw to improve the comfort of the animals. A very important issue is the moisture content of the bedding or mat in the beds. In wet beds, the cows' lying time can then be reduced by up to 30%, resulting in lower feed intake at the feed table. Increased standing time for cows contributes to higher frequency of lameness, increases the risk of rumen acidosis, and reduces blood flow to the mammary gland, resulting in a decrease in milk yield.

The temperature in the building is also an important factor affecting cows' appetite. Both too low and too high temperatures result in a higher energy demand of the cows, but they prefer lower temperatures. The situation is particularly dangerous when the temperature rises. Event at ambient temperatures above 25°C, feed intake and appetite clearly decrease. This is caused, on the one hand, by the heat stress experienced by the cows, and on the other, by changes in the feed caused by higher temperatures, which influence its palatability. During such periods, ventilation in the barn is especially important. A good solution is to use open walls and install fans also at the feed table. The proper air movement speed in the barn during hot weather is 1 m/s.

Access to the feed table

Lack of access or limited access to the feed table results in longer time needed for eating and reduces the time for resting and ruminating for the cows. This further contributes to greater aggression in the animals. In addition, primiparas, freshly calved cows, and those lower in the hierarchy wait a long time for access to the feed table, which makes them more prone to ketosis, acidosis, and hoof disease. Cows should come to the feed table about 12 times a day. Studies show (De Vries et al.2024) that increasing the width of the feed table from 0.5 to 1 m/head significantly increases the time cows spend eating. It turns out that access to the feed table is much more important than the exact concentration of nutrients in the ration (Grant and Albright 2021). With a larger feed table, the aggression of cows while eating in the first 90 minutes after the feed is provided is noticeably lower. Animals lower in the hierarchy spend more time eating. One must be sure to provide a feed table with a minimum width equal to 60–70 cm per cow to achieve high feed intake and thus high milk production.

Hoof condition

Animal health also has a significant impact on animal movement and feed intake. Special attention should be paid to the condition of the hooves, which is an often overlooked issue. Cows with leg conditions lie down most of the day and show no interest in the feed table. Many hoof problems result from errors in the various areas discussed in the previous sections. The key preventive treatments affecting hoof health include:

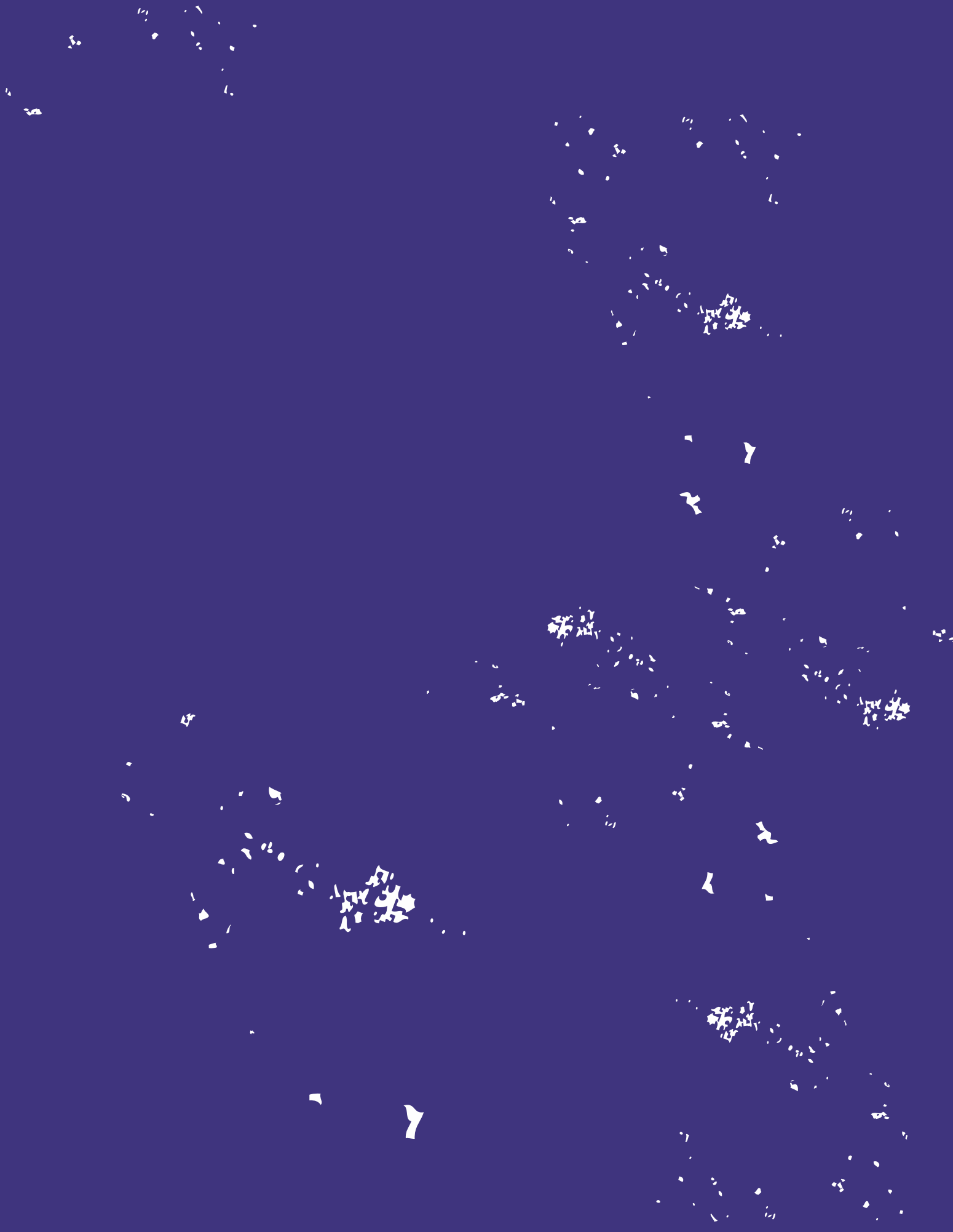
- ☑ dry and clean floors;
- ☑ weekly hoof washing program;
- ☑ prophylactic hoof correction 3 times a year;
- ☑ consideration of hooves in mating selection;
- ☑ lameness monitoring and immediate treatment of each cow; and
- ☑ providing adequate living conditions (beds, access to the feed table, access to water, etc.).

Improved rumen function

It is also a good idea to ensure proper rumen function and thus higher feed intake. High milk production requires providing the cows with large amounts of concentrated feed. Therefore, we recommend the use of our products **Buformix** and **Buformix sac**, which neutralize excessive fatty acids (FFAs) and stabilize the acidity of the rumen contents. Our offer also includes supplements containing live cultures of the yeast species saccharomyces cerevisiae – **Sac rum**. They reduce oxygen in the rumen environment, thereby improving the utilization of structural carbohydrates (NDF) from the feed. To increase the nutritional value of corn silage while reducing oxygen in the rumen, it is a good idea to use the **Combo Booster**. It is a mixture of metabolites of the fungus Aspergillus with live yeast cultures. The mixture improves starch digestibility in the ration while supporting NDF digestibility.

Even the best balanced ration will not translate into higher milk production if the ration is not taken in properly. There are many important environmental factors that affect feed intake and milk production.

Particular attention should be paid to free access to the feed table and water throughout the day. Cows should be provided with the right number and size of lying places, as they should lie down 10–14 hours a day, which breeders very often forget. The feed given to the animals should not contain more than 40–45% of dry matter. Omitting any of those factors will certainly reduce the cows' feed intake and prevent them from developing their full milk production potential.



In this section you will read:

- Local zoning plan (part II)

Local zoning plan (part II)

Advocate Katarzyna Romaniuk-Grzęda

In principle, the local zoning plan is a resolution that initiates the intentional shaping of space with due care for spatial order and sustainable development of the area covered by the plan.

The adoption by a commune or municipality of a new local zoning plan or an amendment to an existing plan can have various consequences for the properties covered by the plan. In particular, a change in the use of a property can increase or decrease its value. Changes resulting, for example, from the process of merging or division of real estate, or construction of technical infrastructure facilities can have similar consequences.

Importantly, all such changes result in financial implications for real estate owners, despite the fact that these circumstances (changes) are beyond the control of the local residents.

Betterment tax

This is a cost that one should prepare for if the value of a property increases due to the occurrence of one of the following circumstances:

- ☑ division of a property;
- ☑ merging and division of a property;
- ☑ construction of technical infrastructure facilities with the participation of funds from the State Treasury, EU funds, funds from local government units, or funds from foreign sources.

The betterment tax rates are set by the municipal council through resolutions. According to the Act on real estate management, the maximum rate for:

- ☑ the division of a property is no more than 30% of the difference between the value of the property before the division and the value of the property after the division;
- ☑ the construction of infrastructure is no more than 50% of the difference between the value that the property before the construction of technical infrastructure facilities and the value of the property after the construction;
- ☑ the merging and division of a property is no more than 50% of the increase in the value of new real estate formed as a result of the merging and division of such real estate compared to the value of the previous property.

The betterment tax is set by the commune head/mayor/city president. The proceedings for the determination of the betterment tax may start within 3 years in the case of a division of a property, starting from the date on which the decision approving the division became final or the ruling on the division became final, or, in the case of construction of technical infrastructure, starting from the date on which the conditions were created for the connection of the real estate to the individual technical infrastructure facilities or from the date on which the conditions were created for the use of a constructed road. It should be emphasized that a resolution of the commune/municipal council on the rate of the betterment tax must be in effect at that time. This is one of the prerequisites. A real estate appraiser is appointed as an expert with specialized knowledge to determine the value of the property and prepare an appraisal report. The report is subject to formal and legal evaluation by the competent authority.

The cost of the preparation of the appraisal report is borne by the authority. One should also bear in mind that the opinion of an appraiser determining the value of a property cannot be uncritically accepted by the authority and should be properly evaluated in each case, preferably with the participation of a lawyer. The authority is not bound by the appraisal report and conducts an assessment of its credibility and value in the context of other evidence submitted in the case. A lawyer can assist in evaluating this evidence from a formal point of view, i.e., he or she can examine whether this evidence was issued by an authorized person in the form prescribed by the relevant regulations, whether it contains all the elements required by law, whether it is justified, and whether the conclusion of the report does not contradict its

decision can be appealed against. However, the expenditures that the property owner has incurred cannot affect the determination of the fee.

The zoning change fee is not charged in the case of gratuitous transfer of the ownership of a property forming part of an agricultural holding by a farmer to his or her successor within the meaning of the provisions of the Act of December 20, 1990 on the social insurance of farmers or the legislation on the detailed conditions and procedures for granting financial assistance under reasoning, etc.

The Act on real estate management does not provide for exemptions from the betterment tax. However, relief and remission of the tax are possible in cases provided for in the Act on public finance. The tax can be remitted in full, for example, upon the death of a taxpayer who left no assets, the deletion of a legal entity from the register in the absence of assets, or when there is a public interest in doing so.

At the request of the taxpayer, the tax may be remitted in full in cases justified by the important interests of the taxpayer or the public interest. The tax may also be remitted in part in cases justified by social or economic reasons, in particular the taxpayers' inability to pay the tax. It is also possible to divide the amount into annual installments to be paid over a period of up to ten years.

The obligation to pay the betterment fee is incumbent on the person who owned the property on the date when the conditions for connecting the property to the various technical infrastructure facilities were created or when the conditions for the use of the built road were created, who thus benefited from the increase in the value of the property.

In the case of inheritance, all the rights and obligations of the transferor are transferred to the heir, which includes the obligation to pay the betterment tax. In contrast, the transfer of ownership rights as a result of a transfer of the real estate by way of a contract, a sale, or a donation does not have such an effect. The decision to impose this tax can be appealed against.

Zoning change fee

A zoning change fee is a fee paid for an increase in the value of real estate caused by the enactment or amendment of a local zoning plan. Its value is determined in accordance with the provisions of the Act on spatial planning and development.

If the value of a property has increased, in connection with the adoption of the local zoning plan or its amendment, and the owner or perpetual usufructuary disposes of the property, then the commune head, mayor, or city president charges a one-time fee specified in that plan, determined as a percentage of the increase in the value of the property. This fee is the commune or municipality's own revenue. The amount of the fee may not exceed 30% of the increase in the value of the property.

Thus, in order to determine the fee for the increase in the value of a property caused by the adoption or amendment of a local zoning plan (the so-called zoning change fee), the **combined occurrence of the following three prerequisites is required:**

- ☑ an increase in the value of a property as a result of the adoption of a local zoning plan or its amendment;
- ☑ determination in the local zoning plan or in its amendment of the percentage rate of increase in the value of the property, which is the basis for determining the amount of the zoning change fee;
- ☑ disposal of the property by the current owner before the expiration of 5 years from the date of entry into force of the adopted local zoning plan or an amendment thereto (whereby the term 'disposal of the property' should be understood as the disposal of either the entire property or a part thereof, as well as the disposal of a share in the ownership of the property).

Proceedings to determine the fee for the increase in the value of the property caused by the enactment or amendment of the local zoning plan are initiated ex officio after the notary sends an excerpt from the relevant notarial deed. The increase in the value of the property can be determined only after an appraisal of the property commissioned to an appraiser in the course of the proceedings. Based on the evidence gathered, a decision is issued to set a fee for the increase in the value of the property resulting from the enactment or amendment of a local zoning plan in a specific amount.

Some of the factors affecting the increase in the value of a property are not solely due to the change in the land use identified in the local zoning plan. Like a decision on the betterment tax, this the 'Structural pensions' measure covered by the Rural Development Program for 2007–2013, issued on the basis of Article 29(1)(1) of the Act of March 7, 2007 on the support for rural development with the participation of the European Agricultural Fund for Rural Development.

A zoning change fee may not be charged if 5 years have elapsed between the entry into force of the local zoning plan or an amendment thereto and the date of disposal of the property. However, the date of entry into force of a local zoning plan is not the date of adoption of a resolution on a local zoning, but the date counted as the expiration of the so-called vacatio legis from the date of publication of the resolution in the official gazette of the province.

The term 'dispose' means only the transfer of ownership or perpetual usufruct by means of a legal transaction against payment. As it is pointed out, there is no reasonable basis for this term to include cases of gratuitous transfer of ownership or perpetual usufruct of real estate – as in the case of a donation.

Thus, at the request of the prospective seller, the competent authority determines the amount of the zoning change fee that the seller will have to pay after the property is sold, which allows the seller to include this cost in the transaction, i.e. the sales price.

Another issue is the application of the provisions on the zoning change fee in the event of an increase in the value of a property as a result of the issuance of a decision on the building and land development conditions. In the absence of a local zoning plan, neither the commune or municipal council in a separate resolution, nor the commune or municipal executive body in a decision on the building and land development conditions is authorized to set the percentage rates of the fee charged for the increase in the value of real estate in connection with the issuance of a decision on the building and land development conditions.

The adoption of a local zoning plan is not always associated with an increase in the value of properties. Sometimes the adoption or amendment of a local zoning plan results in a reduction in the value of a properties. **In such a situation it is the owner (perpetual usufructuary) of a property who can claim compensation from the competent authority.**

Compensation

If the use of a property or a part thereof in the previous manner or in accordance with its previous purpose has become impossible or significantly restricted due to the enactment amendment of a local zoning plan, if the enactment or amendment of the local zoning plan was due to the needs of national defense and security, the owner or perpetual usufructuary of the property may demand from the commune or municipality, or from the entity in possession of a closed area, to pay compensation for the actual damage suffered or to buy the affected property or a part thereof. The legislature has also allowed the above claims to be satisfied by the municipality by offering the owner or perpetual usufructuary a substitute property.

The most common cause of damage resulting from the adoption of or amendment to a local zoning plan is a change in the existing use of land, which hinders the operation of businesses or prevents the construction of buildings. Reduction in property value can also occur as a result of allowing a nuisance in the neighborhood in the local zoning plan.

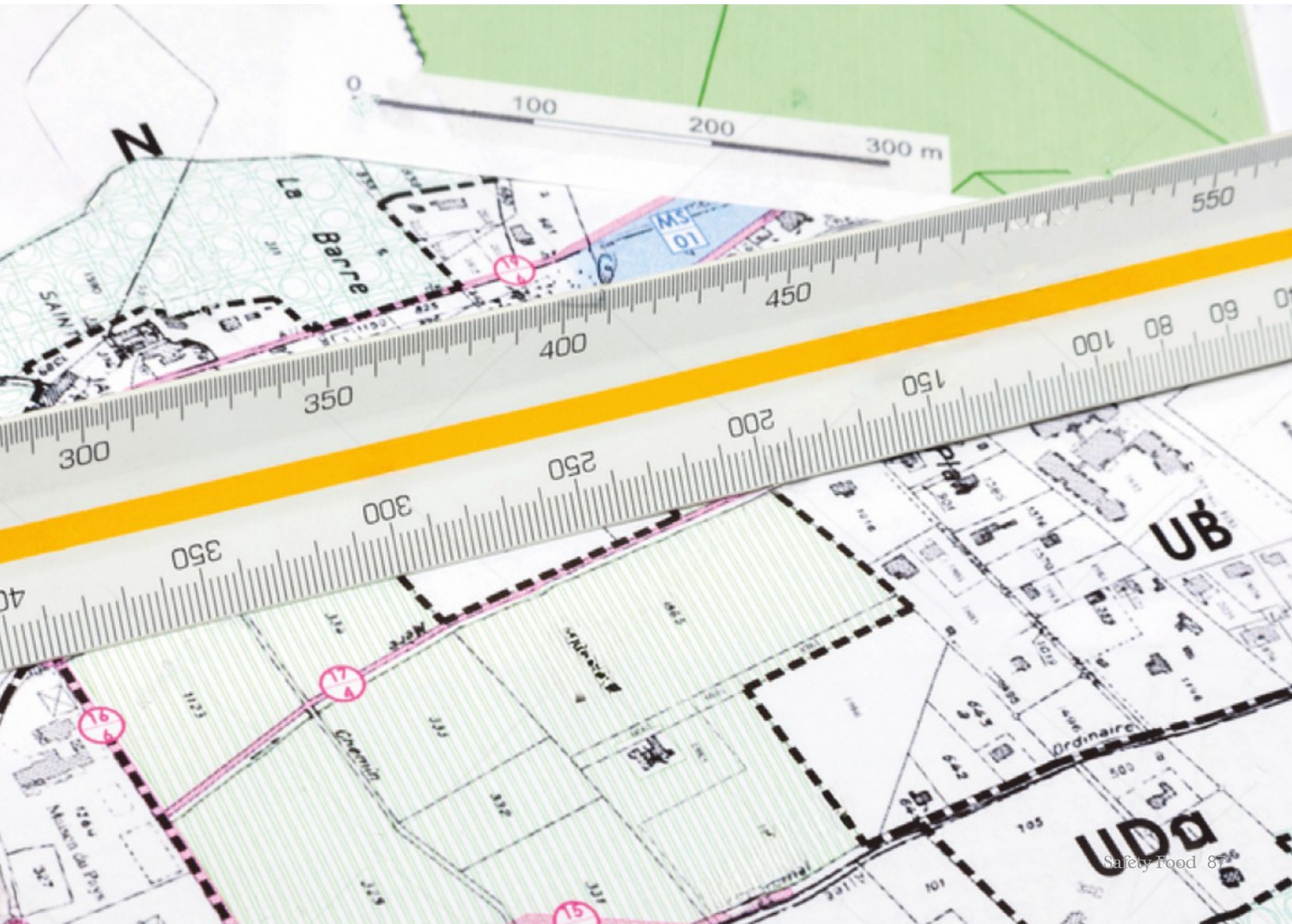
The amount of compensation for the reduction in the value of the property is determined as of the date of its sale. The reduction in the value of a property is the difference between the value of the property determined taking into account the land use in effect after the adoption or amendment of the local zoning plan and its value determined taking into account the land use in effect before the amendment of the plan, or the actual use of the property before the adoption.

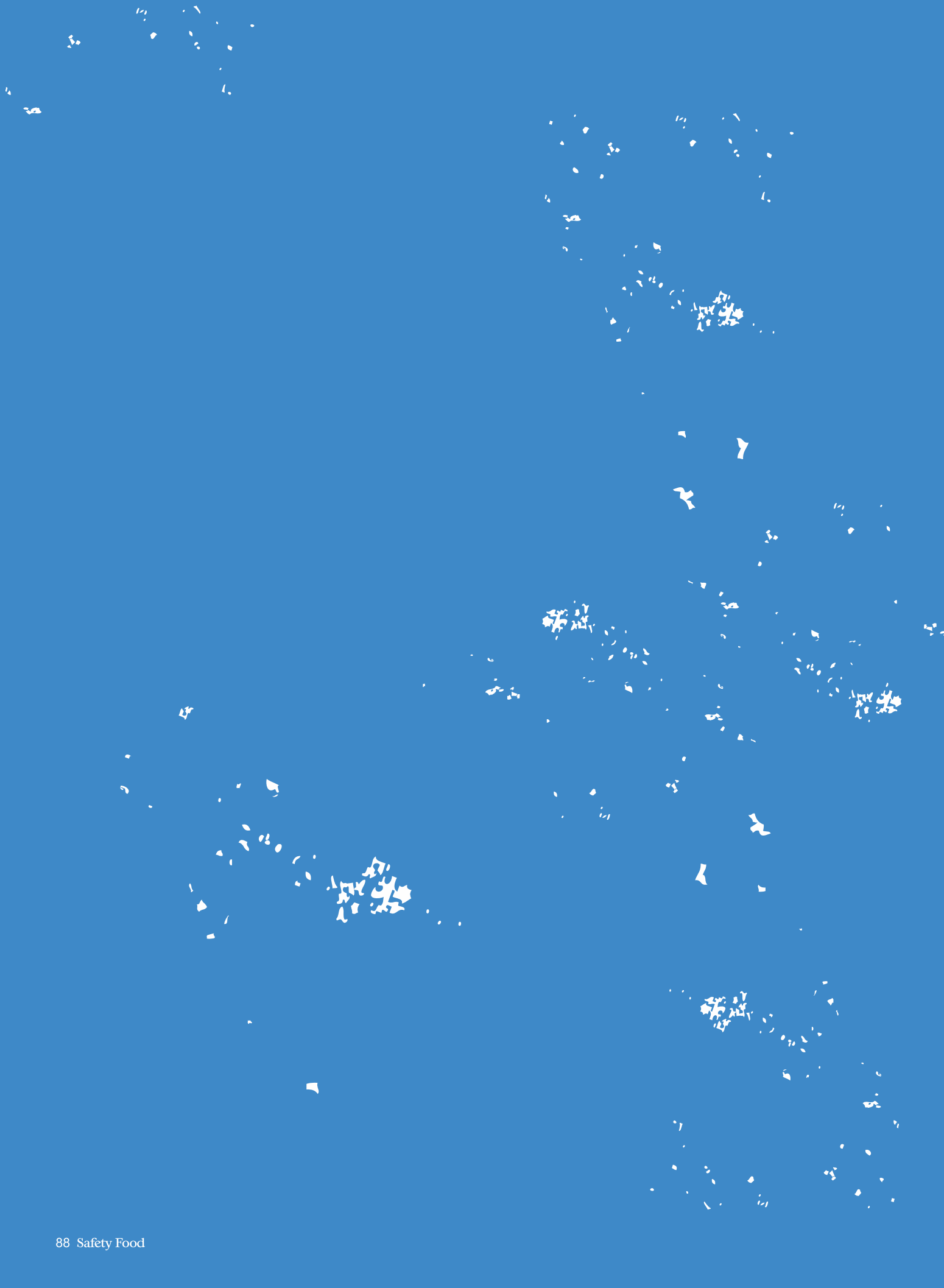
People living in the area covered by an amendment to a local zoning plan are not informed of

the procedure directly; the local government units fulfill their obligation of notifying local communities through an announcement in the local press, by a public notice, and by making the information available in the Public Information

Bulletin on their websites, as well as in the manner customary in specific communes or municipalities. Most property owners may therefore be unaware of the decrease in the values of their properties. This is important because a claim related to compensation for the decrease in the value of a property in the situation of its disposal can be made within 5 years from the date on which the resolution on the local zoning plan became effective.

A party asserts a claim by filing an application with the commune or municipal office, in person, by letter, or electronically, i.e. through the party's account in the ePUAP system or by signing the claim with a qualified electronic signature. The claim must be accompanied by documents confirming the legal title to the property (e.g., a copy of the notarial deed). It must also be shown that the damage occurred, for example, by submitting an appraisal report prepared by a real estate appraiser. The competent authority must pay the compensation within 6 months from the date of the claim, unless otherwise agreed by the parties. In case of a delay, the property owner or perpetual usufructuary is entitled to statutory interest for a late payment.





Our experts

answer your questions

Breeder, if you have any questions, send them to the editorial

What trends and challenges shape sustainable finance?

Europe is planning to become the first continent to achieve zero net greenhouse gas emissions by 2050. This goal will require a huge amount of spending. The European Commission has estimated that achieving the climate goals will require an investment of 260 billion euros every year. The European Union sees green technologies not only as a means of protecting the planet and the health of citizens, but also as a source of economic development and improved competitiveness. The introduction of the Green Deal and the transformation of the entire economy into an environmentally friendly one requires significant changes in the way all participants in economic life operate, including financial market entities and regulators. The future of sustainable finance must be characterized by increasing alignment between the financial goals and the Sustainable Development Goals. As stakeholders from various sectors collaborate and innovate, sustainable finance has the potential to drive significant positive change and contribute to a more equitable and environmentally sustainable global economy. Sustainable finance evolves to meet the increasingly strict requirements associated with environmental, social, and corporate governance (ESG) issues. The landscape of sustainable finance is currently shaped by more than a dozen key trends and developments. The most important of these are:

☑ Commitment of financial institutions and corporations to sustainability – driven by investor pressure, consumer demand, and the recognition that sustainable practices can lead to long-term value creation, financial institutions are increasingly committed to sustainability goals and integrate ESG considerations into their business strategies; investing that focuses on creating positive social and environmental outcomes along with financial returns (impact investing) is gaining popularity. Social financing initiatives, such as microfinance and social bonds, address pressing social challenges and provide capital to insufficiently developed communities;

☑ Increased regulatory support and standardization – policies and frameworks are being put in place worldwide to promote sustainable financing through dedicated entities. The work of the Task Force on Climate-related Financial Disclosure (TCFD) and the European Union's Sustainable Finance Disclosure Regulation (SFDR) are examples of efforts aimed to spread ESG reporting and disclosure to facilitate stakeholders' assessment and comparison of sustainable investments;

☑ Investor and corporate activism – shareholder actions lead to the use of more sustainable practices by companies. Investors increasingly use their voting power to influence corporate behavior and advocate for greater transparency and accountability on ESG issues;

☑ Development of green and sustainable bonds and other financial instruments – the market for green, social, and sustainable bonds is growing rapidly. They finance investments with a positive environmental and social impact, such as affordable housing, zero-emission transportation, and renewable energy. With investors seeking to align their portfolios with sustainability goals, the demand for these instruments will continue to grow;

☑ Climate change resilience and climate risk financing – because of climate change, which poses significant risks to economies and financial systems, there is an increasing emphasis on the financing of climate change resilience and adaptation projects. These include investments in infrastructure that can withstand extreme weather events and initiatives to increase the resilience of vulnerable communities;

☑ Awareness and education – thanks to the increasing level of education, the body of knowledge and awareness of the importance of sustainable finance is increasing. Programs and certificates in sustainable finance offered by professional organizations, business schools, and universities are equipping the next generation of financiers with the necessary knowledge and skills.

[1] *Club for Responsible Finance at the European Financial Congress, "Green Finance" - A new look at finance, Sopot 2020.*

☑ Greenwashing – an important problem and obstacle to the efforts to achieve more responsible production and more informed consumer choices. For this reason, many programs and regulations are being developed to eliminate it. The need to strengthen oversight and increase resources and competencies in sustainable financing to effectively counter greenwashing is also increasingly acknowledged.

☑ Progress of integration of ESG factors into mainstream investing – ESG factors are increasingly integrated into mainstream investment strategies. In an effort to achieve competitive returns and consequently mitigate the risks associated with environmental and social issues, asset managers and institutional investors incorporate ESG criteria into their investment decision-making processes.

☑ Technological transformation – technological innovations, such as artificial intelligence and blockchain, are contributing to increased efficiency, transparency, and measurement of the impact of sustainable financing. Blockchain can be used to improve traceability and accountability in supply chains. Artificial intelligence, on the other hand, can be used to analyze large amounts of data to identify ESG risks and opportunities.

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

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[2] *Club for Responsible Finance at the European Financial Congress, "Green Finance" - A new look at finance, Sopot 2020.*

What is the Task Force on Climate-related Financial Disclosures (TCFD)?

At a time when care for the environment is very important, one finds more and more ways to support nature. From the point of view of companies, one of them is the reporting recommendations of published by the Task Force on Climate-related Financial Disclosures (TCFD). These recommendations were drafted in 2015 and published in 2017. They are based on a set of guidelines that ensure transparency of the financial risks associated with environmental impacts for market participants and investors. Created by former New York City Mayor Michael Bloomberg, at first they were only voluntary recommendations. Today, they are a priority in many countries and are gaining popularity all the time. This indicates the increasing sensitivity of business, organizations, and citizens to the state of the environment.

The TCFD guidelines have been introduced so that companies report their environmental impacts in a manner that is as comparable as possible. This will make it easier for companies to include environmental risks in their operations and strategies. The TCFD report includes 11 recommendations on strategy, indicators, targets, and risk management. These recommendations allow companies to understand the long-term environmental impact of their operations, as well as to know their position among other players in the market in terms of their environmental performance. In recent years, governments, investors, and consumers have exerted an increasing pressure to respect these recommendations.

It should be noted that more and more of the world's largest companies are supporting or reporting in accordance with the TCFD re-commendations. Many aspects of these guidelines are being incorporated into the plans of government entities, so that in the future they will not just be an option, but instead will become a top-down imposed obligation; therefore, it is a good idea to prepare now for reporting according to these standards. This should not be difficult, as they were intentionally drafted in a way that all organizations can understand. In addition, their layout makes it possible to notice any financial and environmental risks.

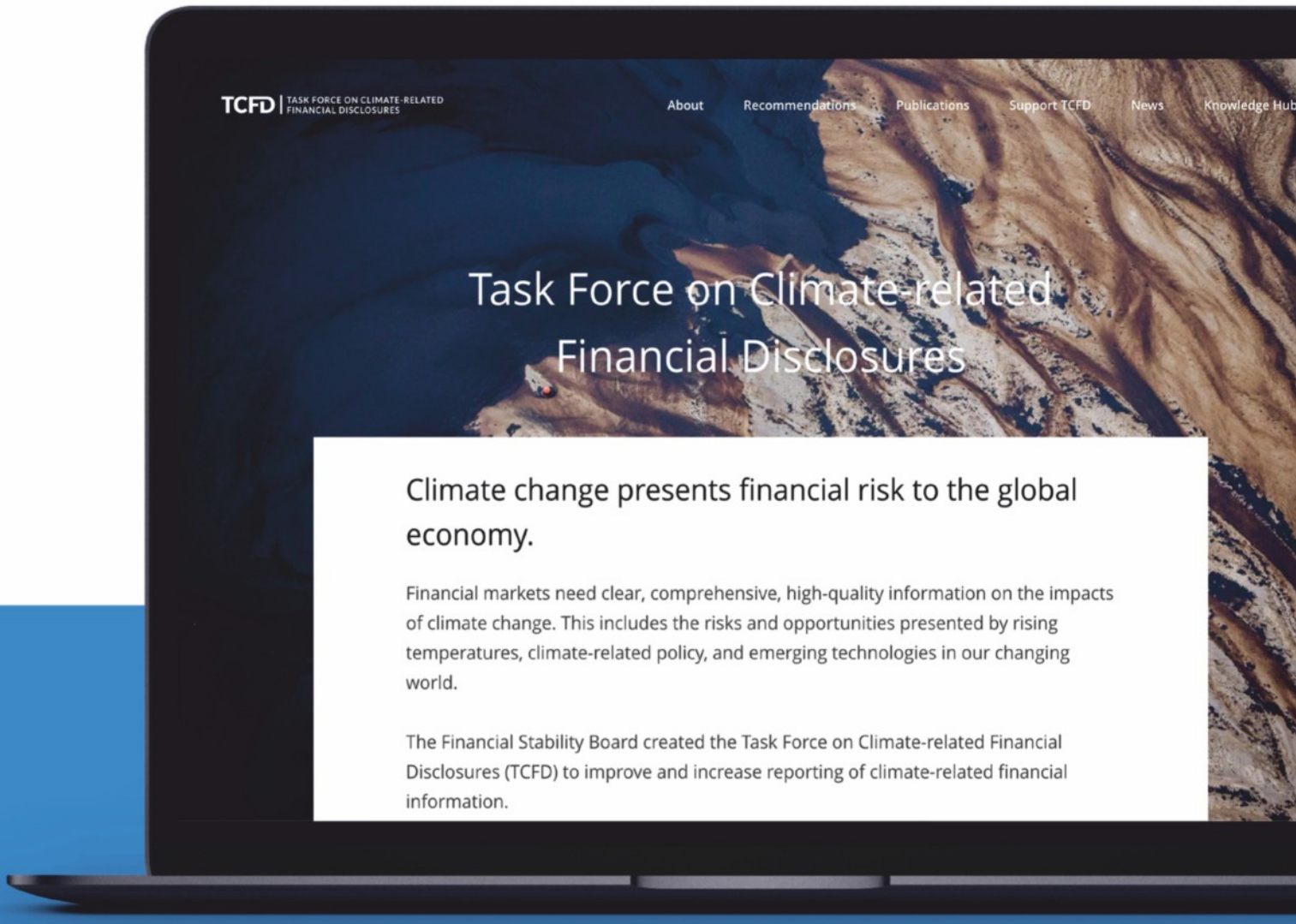
The TCFD recommendations can be divided into 4 pillars:

GOVERNANCE	STRATEGY	RISK MANAGEMENT	METRICS GOALS
Disclose the governance principles in place in the organization regarding the climate-related risks and opportunities.	Disclose the real and potential impact of climate-related risks and opportunities on the operations, strategy, and financial planning of the organization, if such information is relevant.	Disclose how the organization identifies, assesses, and manages climate-related risks	Disclose the measures and goals used to assess and manage relevant climate-related risks and opportunities, if such information is relevant.
Recommended disclosures Describe the management board's supervision in the assessment and management of the climate-related risks and opportunities. Describe the managers' role in the assessment and management of the climate-related risks and opportunities.	Describe the climate-related risks and opportunities that the organization has identified in the short-, medium- and long-term. Describe the impact of the climate-related risks and opportunities on the strategy and financial planning of the organization. Describe the resilience of the organization's strategy considering various climate-related scenarios, including the 2°C or lower scenario.	Describe the organization's climate-related risk identification and assessment processes. Describe the impact of the climate-related risks and opportunities on the strategy and financial planning of the organization. Describe the resilience of the organization's strategy considering various climate-related scenarios, including the 2°C or lower scenario.	Disclose the indicators used by the organization to assess the climate-related risks and opportunities in accordance with the strategy and the risk management process. Disclose the scope of greenhouse gas emissions and the associated risk. Describe the goals used by the organization to manage the climate-related risks and opportunities and the results in relation to the goals.

Source: https://www2.deloitte.com/pl/pl/pages/risk/articles/ujawnienia-ryzyk-i-szans-zwiazanych-z-klimatem.html

According to a report by the Financial Stability Board (FSB), it is the member countries of the European Union that report most frequently in accordance with the TCFD standards. This is because many of these recommendations are also recommended by the European Commission. In Poland, this type of reporting is not common. Publicly traded companies in Poland are required to report on ESG (environment, social, and governance) matters; this requirement came into force with the amendment of the Accounting Act in accordance with the relevant EU directive. It is common in Europe, but unlike the TCFD, ESG reporting does not provide a way to easily compare different companies' climate risks.

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



[1] *ConQuest Consulting, 'Dlaczego ekologia dyktuje warunki działania dużych firm?', Warszawa 2022 r.*

Why is betaine used in Wipasz premixes instead of choline chloride?

Choline is a provitamin essential in animal nutrition, supplied in feed along with plant ingredients and in the form of choline chloride. It plays a key role in many physiological processes, such as acetylcholine formation, neurotransmitter synthesis, cell membrane structuring, and transport of lipids. Choline is a donor of methyl groups, which are crucial in metabolism, functioning of the immune system, and DNA/RNA and protein synthesis. Animals cannot synthesize methyl groups on their own, so their rations must be rich in substances that contain these groups.

If we trace the metabolic process of methylation, we notice that choline – in order to be a donor of methyl groups – has to be converted to betaine by oxidation. Adding betaine directly to the feed results in faster donation of methyl groups without additional energy costs to the animal's body. In addition, the use of betaine as a substrate for the methylation process increases the availability of methionine in the animal's body, which allows saving the synthetic amino acids added to feed. After donating the methyl groups, betaine turns into glycine, a valuable amino acid that, when carefully balanced, is the limiting ingredient. Its absence limits the utilization of other nutrients from the feed. In addition, the use of betaine, especially in its anhydrous form, reduces the amount of chlorine ions introduced into the ration, thus reducing expensive sources of sodium in the formulation.

One should bear in mind that choline is a compound that occurs naturally in large quantities in ingredients that make up the largest share of poultry feed, such as corn, wheat, and postextraction soybean meal. As a result, the content of choline in a ration never falls below 1,200 mg/kg, the minimum amount necessary for processes in which it cannot be replaced by betaine. This means that synthetic choline chloride can be completely eliminated from the premix.

The use of betaine in compound feeds brings a number of significant technological advantages. First of all, betaine is characterized by lower reactivity compared to choline chloride. This minimizes the risk of undesirable chemical reactions with other ingredients in the premix, which in turn ensures that its high activity and effectiveness are maintained.

In addition, betaine is much less hygroscopic. It absorbs less moisture from the environment, which results in improved flowability of the premix. Improved flowability is a key aspect that facilitates both storage and application of the premix, thus preventing clumping and ensuring even dosing, which improves the homogeneity of the final product.

Due to its chemical and physical stability, betaine contributes to the creation of more effective and durable end products. This ingredient is an excellent substitute for choline chloride. Thanks to its properties, it is becoming an indispensable component of feed premixes that increases their functional value and contributes to better health and performance of livestock.

Bartłomiej Radzikowski
– Feed Formulation Specialist Wipasz S.A.

Why do my pigs bite each other?

The aggressive behaviors that occur in pig herds can be divided into different types: those related to the formation of a hierarchy and those caused by psychological, behavioral, welfare, or nutritional disorders. Fights between dominant individuals in the pen for a place in the hierarchy can be observed already in groups of piglets, and this is especially evident after weaning and the formation of new technology groups. These are usually just 'scuffles' that do not cause any serious injury besides scratches. This is natural behavior for pigs or wild boars, which are herd animals. Chronic aggression in pig herds that leads to significant damage to health, such as bitten tails or ears, and this is a much more complex topic.

Tail biting (caudophagia) is a phenomenon where one animal chews the tail of another, often causing bleeding wounds. Tail manipulation itself can proceed in two stages. In the first stage, the animal gently holds the tail of the other animal in its mouth and manipulates it without damaging it.

This is associated with a cognitive habit (which should be a warning sign for the breeder). The second stage is the phase of destruction, skin damage, and bleeding. When the tail is bitten, the pig with the injury becomes more active and lively due to pain and feeling unwell. The increase in activity and the taste of blood become the cause of further aggression and biting and the emergence of more and more animals prone to aggression and cannibalistic behavior. Pigs with bitten tails may lose their appetite or eat less, avoiding staying at the manger for longer periods to reduce the risk of exposing the tail to further bites. In addition, open wounds can lead to general infections and inflammation and, in extreme cases, death.

What is the reason for such behavior and how should it be dealt with?

The issue of pigs biting each other's tails has been known throughout Europe for years. Many scientific publications have been written on the subject, both in Poland and abroad. The problem is so widespread that the European Commission has requested experts from the European Food Safety Authority (EFSA) to prepare an opinion. The opinion they prepared (more than 100 pages long) is an extensive analysis of previous scientific studies related to animal welfare. This opinion mentions, among other things, the risk factors that can lead to cannibalistic behavior, but also things that can be done to minimize this behavior. The opinion can be found on EFSA's website: www.efsa.europa.eu/en/efsajournal/pub/3702 or by searching using the following phrase: 'Scientific Opinion concerning a Multifactorial approach on the use of animal and non-animal-based measures to assess the welfare of pigs.'

Tail biting is a behavioral pathology triggered by widespread stress, which is related to the level of animal welfare. The risk factors that can cause tail biting are listed below, ranked from most to least important (according to the EFSA opinion).

RISK FACTORS
lack of manipulable material (quantity or quality, withdrawal, or absence in early life)
poor climate (too hot/cold, draughts)
poor air quality
poor health
nutritional deficiency (minerals, amino acids)
competition for resources (feeding, drinking, lying)
social instability (mixing, moving)
high stocking density
poor pen layout (disturbed resting; poor pen hygiene)
high genetic potential for lean tissue growth

WELFARE CONSEQUENCE
tail-biting associated detrimental welfare consequences:
pain
fear
infection
disturbed feeding
altered behaviour

ANIMAL-BASED INDICATORS
occurence of bitten tails
tail manipulation behaviour increased
tail lenght shortened
increased presence of abscess at abattoir level
tail posture lowered

In a situation where tail biting has occurred and there is evidence that one of the above-mentioned risk factors occurred at a certain time, it can be presumed that this factor is the main cause. In reality, however, it can only be a trigger, a fuse of a kind. The lack of elements enriching the environment is indicated as the most important risk factor, although the problem of tail biting is phenomenon dependent of multiple factors. The other factors should not be underestimated, as a different set of such factors is present in each production facility. It is still very common to find buildings where ventilation is inefficient, no attention is paid to drafts, or the design of the pen does not allow the designation of a clean and dirty zone. The aforementioned factors, as well as proper stocking density and sufficient feeders/drinkers, are the foundation of pigs' welfare.

Pigs have a very strong need to explore their surroundings and search for food, and that is why they have snout discs for rootling, which forms the basis of their behavior. Individuals that cannot exhibit the proper activity of exploring and manipulating elements that enrich their environment become frustrated and direct their attention to other objects within the pen.

Directive 2008/120/EC specifies that pigs must have permanent access to sufficient materials to explore and perform manipulative behaviors, such as rootling in straw, hay, wood, sawdust, or pigweed, or in a mixture of these materials, which at the same time may not adversely affect the health of the animals. Material enriching the breeding environment should enable pigs to express natural foraging behavior.

Enrichment of the pig breeding environment must meet several requirements to be effective. It should sustain the interest of pigs through the value of novelty, so that the examination of objects in the environment and manipulation of them is strongly expressed. In addition, it is essential that the enriching elements are clean, without any fecal contamination. It is also important that the additional element in the pen has features that make it interesting for this species. Pigs are eager to explore and familiarize themselves with every new object and element of the environment, but they quickly get used to and are bored with those elements that do not have the right characteristics, making them ineffective. The environmental enrichment material should be edible, chewable and suitable for rootling, and should be destructible. Plastic tubes, chains, balls, bottles, and tires do not have all these characteristics. Within 5 days of placing new elements in the pen, a decrease in interest in the pigs is noted if the elements do not meet the requirements of the animals.

Clean and dry straw that is regularly replaced has all the qualities that pigs find interesting and attractive, i.e. it can be eaten, is suitable for chewing and rootling, and can be destroyed. Environmental enrichment with straw can be a problem if it gets into the fecal matter removal system. Straw can always be placed in bins over the troughs or clean mats, which should reduce the material dropping directly onto the grate floor. If the use of straw is an insurmountable problem, the other materials listed in Directive 2008/120/EC can be used, such as nut shells, shredded wood, shredded corn cobs, and even birch pegs suspended from the pen walls. As important as the type and quality of the enrichment material is its quantity, which must be sufficient so that each pig can have free access to it. Providing adequate enriching material, but in limited quantities, creates a competitive phenomenon, which can bring a result that is opposite to the desired one.

Due to the multi-factor nature of the problem of tail biting, there are no simple and fully effective solutions that can be used to solve it. This is because the combination of the risk factors varies in each facility. The reason for the sudden appearance of the problem of aggression also varies. It seems that, with the current state of knowledge, it is not possible to develop clear guidelines that could be universally applied to all, or at least most, large-scale pig farms with positive results. However, it can be assumed that the more knowledge we have about the causes and possibilities of preventing cannibalism, and the more we disseminate it among pig producers, the greater the chance of success in combating this phenomenon.

Bartosz Myśliński
– Animal Nutrition Specialist Wipasz S.A.

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Commission Recommendation (EU) 2016/336 of March 8, 2016 on the application of Council Directive 2008/120/EC laying down minimum standards for the protection of pigs as regards measures to reduce the need for tail-docking.

What can help minimize the environmental impact of chicken broiler farming?

Sustainable broiler farming is becoming increasingly important amid growing concerns about the environmental impact of the poultry industry. Traditional farming methods often lead to high consumption of natural resources and greenhouse gas emissions. Therefore, practices are being introduced to reduce this impact while maintaining high production efficiency. One of the key aspects of sustainable farming is the optimization of the production results. This helps reduce the amount of organic waste and, consequently, minimize the environmental pollution.

In terms of environmental protection, the research conducted is aimed at reducing the emissions of substances generated during animal production (ammonia and carbon dioxide). This is achieved, among other things, through nutritional solutions aimed to improve the digestibility of feed materials (enzymes, proper heat treatment of feed materials, essential oils of natural origin).

Waste management is another area where innovations are implemented. Farms are more likely to invest in technologies for converting waste into biogas or organic fertilizer. Such solutions not only reduce methane emissions, but also create additional sources of income.

The use of renewable energy on broiler farms is also gaining popularity. Photovoltaic systems, heat pumps, and heat recovery systems reduce the consumption of fossil fuels, which directly contributes to a reduction of carbon dioxide emissions.

Water management is another important component of sustainable farming. Water recirculation systems, monitoring of water quality, and optimization of water use in production processes contribute to a reduction in the consumption of this precious resource.

Introducing animal welfare as a key element of sustainable farming also brings environmental benefits. Healthier birds, raised in better conditions, require fewer drugs and antibiotics, thus reducing water and soil pollution.

All of these practices are an integral part of modern broiler farming, which aims to minimize the environmental impact while maintaining efficient and profitable production.

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

Can rapeseed meal replace soybean meal in the feeding of commercial laying hens?

Rapeseed meal is one of the cheaper ingredients with high protein content that can be used in a feed mix. It contains 34 to 38% of protein and about 2.5% of fat. Rapeseed meal protein contains less lysine than soybean meal protein, but is richer in sulfur amino acids, and also contains more minerals, especially calcium, iron, manganese, phosphorus, magnesium, and selenium. However, it is important to remember not to use it in excess amounts, as feed components can penetrate into the eggs.

The limiting factors for rapeseed meal in feed are synapine and choline, which can cause an unpleasant fishy taste and smell of eggs. Hens of the Rhode Island breed that lay brown-shelled eggs may receive feed containing 3–5% of rapeseed meal. Hybrids of this breed have a genetically determined inability to completely decompose synapine and choline into trimethylamine (TMA). The latter compound makes its way into egg yolks without reducing their nutritional value or posing a risk to consumers. However, it may exclude eggs from the market due to the 'fishy' smell. In the case of hens of breeds laying white-shelled eggs, such as White Leghorn, the permissible proportion of rapeseed meal in the feed should not exceed 10%.

While rapeseed meal cannot completely replace soybean meal in the feed, reducing the proportion of soybean meal in favor of rapeseed meal can significantly reduce the cost of the mixture, and also diversifies the feed and enriches it with valuable minerals. However, one must bear in mind that the rapeseed meal used in poultry nutrition must be of good quality and must come from reliable sources. Use of rapeseed meal in the feeding of laying hens at higher proportions needs more research to rule out its negative effects on the taste and smell of eggs.

Adherence to the basic recommendations allows taking full advantage of the potential of rapeseed meal and obtaining products of full value.

Katarzyna Włodarska
– Sales Specialist, Premixes for Poultry Wipasz S.A.

Advantages and disadvantages of the use of soybean and rapeseed meal in pig nutrition

The use of soybean and rapeseed meal in the feeding of pigs is a very important part of feed production, which has a direct impact on the efficiency of animal production.

Soybean meal is one of the most popular and widely used feed ingredients. Its main advantage is its high protein content of about 44–48%, which makes it an excellent source of exogenous amino acids essential to proper growth and development of animals, such as lysine, methionine, and threonine. Soybean meal is also easily digestible, which means it is efficiently utilized by the animals, which in turn leads to better weight gain and improved health of the pigs.

The disadvantage of soybean meal is its high price, mainly due to the heavy reliance on soybean imports from outside Europe, which can affect the economic viability of pig production.

Rapeseed meal, on the other hand, is regarded as an alternative to soybean meal, especially in European countries, including Poland, where rapeseed is a popular crop. The main advantage of rapeseed meal is its local availability, which reduces dependence on imports and lowers the transportation costs. Rapeseed meal contains less protein than soybean meal (about 34–38%), but is still a valuable source of amino acids.

Rapeseed meal has several important advantages in terms of nutritional value. It is rich in polyphenols and biologically active compounds that can benefit the health of animals, increasing their resistance to diseases. Compared to soybean meal, rapeseed means has a higher content of calcium, phosphorus, and magnesium, as well as cystine and methionine. Rapeseed meal also contains beneficial fatty acids that can improve meat quality by increasing the content of beneficial omega-3 fatty acids.

Despite these advantages, rapeseed meal has some limitations. Its high fiber content can reduce the digestibility and assimilability of protein, which affects its utilization in feed. In addition, rapeseed meal contains, among other things, erucic acid and glucosinolates, which in excess quantities can have negative effects on animal health by causing metabolic disorders. Therefore, its use requires a proper balance of the ration and often technological treatment to reduce the content of harmful compounds.

In conclusion, both soybean meal and rapeseed meal occupy a significant place in pig nutrition. They provide not only protein, but also valuable amino acids, fatty acids, and fiber that any feed must contain. Soybean meal, despite its higher price and environmental concerns, offers excellent protein quality and high digestibility, which has a positive effect on weight gains and pig health. Rapeseed meal, on the other hand, being a more sustainable and economically efficient choice, provides important nutrients and contributes to the sustainability of agricultural systems, although its use requires a careful approach due to potential health problems.

Anna Mikołajczyk
– Pig Nutrition Advisor Wipasz S.A.

Ways to effectively reduce the problem with anaerobic bacteria

The pathogenic strains of anaerobic bacteria of the Clostridium Novyi species can cause infections and toxicoses. These bacteria are a natural component of the gastrointestinal microflora and, with the right microbial balance, are completely harmless to animals. However, with inadequate zoohygienic conditions, sudden changes in temperature, high stocking density, and poor ventilation, they can cause problems.

In order to minimize the occurrence of these anaerobic bacteria several rules must be followed:

- ☑ Ensure adequate air circulation;
- ☑ Clean and disinfect premises, water systems;
- ☑ and feed tanks on a regular basis;
- ☑ Control the stocking density in pens;
  Monitor feed quality.

In addition, it is a good idea to use feed additives that exhibit antiviral and antibacterial properties and are designed to maintain the right balance of the intestinal microflora.

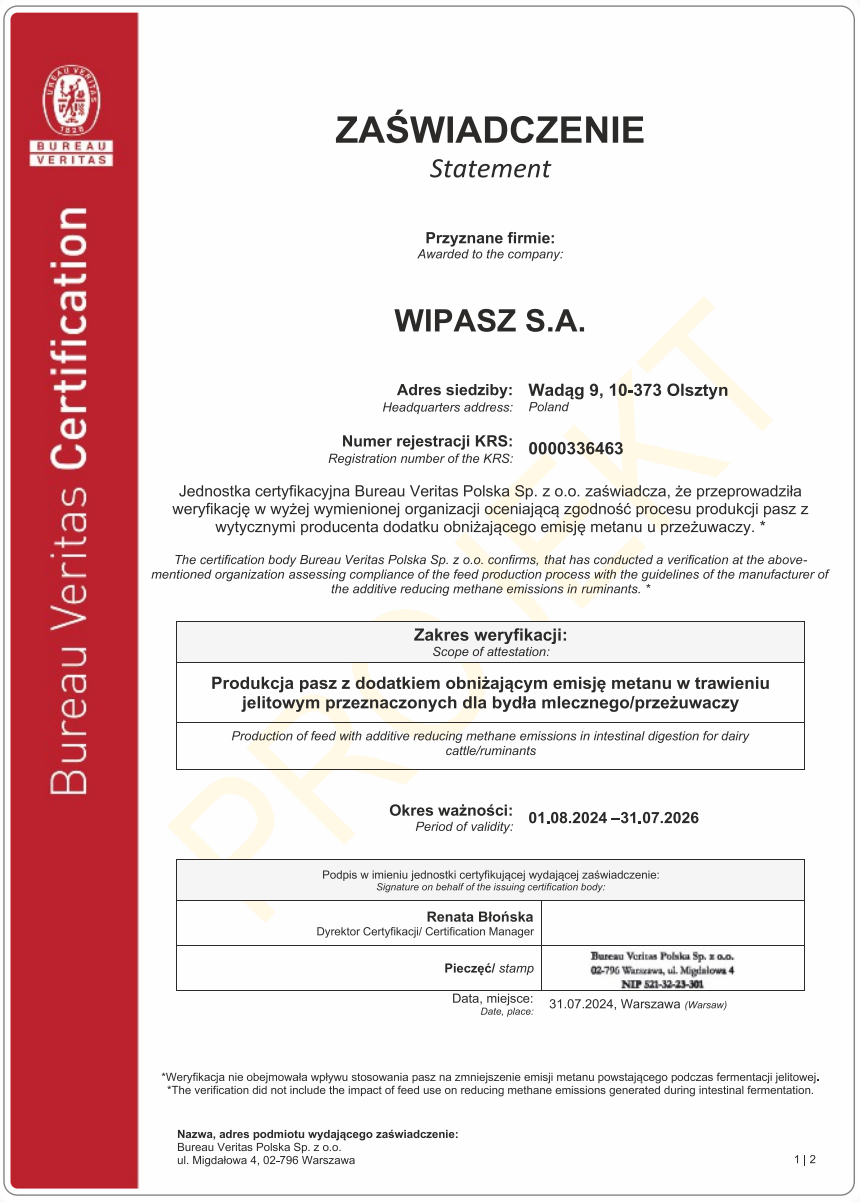
In its product portfolio, Wipasz has **VIACID BT** – a liquid feed mix that improves and regulates intestinal health and ensures high efficiency of feed and drinking water preservation.

Patrycja Marchelewska
– Pig Nutrition Advisor Wipasz S.A.

How do I know if the cow feed I use reduces methane production?

There are few products on the European feed additive market that have methane-reducing effects verified and confirmed by specialized certifiers. If any manufacturer of compound feeds claims that its products have this effect, it should document it with the appropriate certification. Our company was the first in Poland to certify feeds that have the additional function of reducing methane emissions. All feeds manufactured by Wipasz S.A. enriched with the Bioltan formula carry a certificate confirming compliance of the feed production process with the guidelines of the manufacturer of the methane-reducing additive for ruminants. This information is also included on approvals and labels.

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



Bureau Veritas Certification

BUREAU VERITAS

ZAŚWIADCZENIE
Statement

Przyznane firmie:
Awarded to the company:

WIPASZ S.A.

Adres siedziby: **Wadąg 9, 10-373 Olsztyn**
Headquarters address: *Poland*

Numer rejestracji KRS: **0000336463**
Registration number of the KRS:

Jednostka certyfikacyjna Bureau Veritas Polska Sp. z o.o. zaświadcza, że przeprowadziła weryfikację w wyżej wymienionej organizacji oceniającą zgodność procesu produkcji pasz z wytycznymi producenta dodatku obniżającego emisję metanu u przeżuwaczy. *

*The certification body Bureau Veritas Polska Sp. z o.o. confirms, that has conducted a verification at the above-mentioned organization assessing compliance of the feed production process with the guidelines of the manufacturer of the additive reducing methane emissions in ruminants. **

Zakres weryfikacji: *Scope of attestation:*
Produkcja pasz z dodatkiem obniżającym emisję metanu w trawieniu jelitowym przeznaczonych dla bydła mlecznego/przeżuwaczy
Production of feed with additive reducing methane emissions in intestinal digestion for dairy cattle/ruminants

Okres ważności: **01.08.2024 –31.07.2026**
Period of validity:

Podpis w imieniu jednostki certyfikującej wydającej zaświadczenie: *Signature on behalf of the issuing certification body:*	
Renata Błońska Dyrektor Certyfikacji/ Certification Manager	
Pieczęć/ *stamp*	Bureau Veritas Polska Sp. z o.o. 02-796 Warszawa, ul. Migdałowa 4 NIP 521-32-23-301

Data, miejsce: *Date, place:* 31.07.2024, Warszawa *(Warsaw)*

*Weryfikacja nie obejmowała wpływu stosowania pasz na zmniejszenie emisji metanu powstającego podczas fermentacji jelitowej.
*The verification did not include the impact of feed use on reducing methane emissions generated during intestinal fermentation.

Nazwa, adres podmiotu wydającego zaświadczenie:
Bureau Veritas Polska Sp. z o.o.
ul. Migdałowa 4, 02-796 Warszawa

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Does it pay off to use additives that reduce the carbon footprint of milk production?

"There are things in life that are worthwhile, there are things that pay off, and what is worthwhile does not always pay off and what pays off is not always worthwhile."

This sentence, uttered by Polish politician Władysław Bartoszewski, draws attention to the dilemma between doing the right things, things that are good for the environment, things that make us feel better, and doing things that pay off and bring profits.

Similar dilemmas arise in conversations about lowering the carbon footprint of milk production. Is it worth the extra cost and does it pay off?

A natural phenomenon associated with the physiology of ruminants is that they emit methane gas, which is produced as a result of rumen fermentation. Methane is considered the most harmful of the greenhouse gases, and its environmental impact is nearly 25 times that of carbon dioxide. It has been calculated that all the world's ruminants are responsible for 22% of the emissions of this gas.

With the planet's well-being in mind, it is worthwhile to strive to lower the carbon footprint, as this contributes to slowing the greenhouse effect. But does it pay off?

Climate change caused by warming of the atmosphere is having a negative impact on agricultural production, including cattle farming. Increasingly frequent droughts, violent weather events such as hailstorms, flash floods, and strong hurricanes are already having a negative impact on the economics of every farm. Therefore, reducing greenhouse gas emissions pays off for everyone.

We can start taking care of our planet in a simple and cost-effective way. It is enough to use our supplementary feeds with the **Bioltan** formula. Thanks to their effect on the composition of the rumen microflora, cows emit up to 22% less methane, thus making better use of the ingredients of the ration. This translates into an increase in milk production yields of up to 4 kilograms, improved health, and reproduction rates, thereby increasing the profitability of milk production.

With the **Bioltan** formula, it makes economic sense to reduce the carbon footprint and take care of our planet's good climate.

Pear and parsley cream on a Green Farms Chicken broth

Ingredients for the broth:

- 1 package of Green Farms Chicken legs and Green Farms Chicken wings
- vegetables: 1–2 carrots, 1/2 parsley, a piece of leek and celery
- a few sprigs of parsley
- 2 dried caps of bay bolete or boletus
- 3 bay leaves
- 3 kernels of allspice
- 1 onion burnt on a gas burner
- 1 garlic clove

Ingredients for the cream:

- 1/2 kilogram of parsley roots
- 1 pear
- 1 teaspoon of dried thyme
- 1 glass of milk
- 1/2 liter of Green Farms Chicken broth
- 3 tablespoons of olive oil
- salt and freshly ground black pepper
- 3 tablespoons of almonds

Preparation:

Step I

Rinse the chicken and put it in a pot, add the vegetables, all the herbs, the onions, and the mushrooms. Pour cold water over everything to fully cover the ingredients. As it cooks, take the scum off the surface of the broth. Cook under a tilted lid for about 1.5 hours.

Step II

Peel the parsley and cut it into thick slices. Heat the olive oil on the bottom of a large pot, add the parsley, and simmer for about 5 minutes. Then add the pear cut into quarters and simmer for another 5 to 10 minutes, until the pear becomes very soft. Pour the broth into the pot (so that it covers the vegetables) and cook for another 15 minutes.

Step III

In the meantime, roast the almonds in a dry pan. Add milk to the soft vegetables and blend, adding more milk or some broth if necessary. Season with thyme, salt, and pepper; eat sprinkled with the almonds.

Enjoy it!

Baked Green Farms Chicken rolls with prunes and bacon

Ingredients:

- 2 packages of Green Farms Chicken fillet
- 150 ml of 30% cream
- 100 g of prunes
- 100 g of blue cheese (Camembert, Brie)
- 8 slices of smoked raw bacon
- 3 tablespoons of oil

Spices:

- a few leaves of sage
- thyme
- sea salt
- sweet paprika
- black pepper

Preparation:

Step I

Cut the fillets flat in half (without cutting all the way through), spread and gently smash with a tenderizer. Sprinkle them on both sides with salt, pepper, paprika, and thyme. Place a few prunes and a few pieces of cheese on the meat, then wrap it into rolls. Wrap each roll with 2 slices of bacon and fasten with a toothpick.

Step II

Heat the oil in a frying pan, fry the rolls on each side until brown. Move them to an ovenproof dish, place sage leaves on top and pour the cream over them.

Step III

Cover everything with foil, put it in an oven preheated to 180°C. Bake for 20 min. and then remove the foil and bake for another 5 min.

The rolls taste best with boiled or baked new potatoes.

Enjoy it!

Date cake with chocolate glaze

Ingredients for the caramel:

- 1/2 cup of sugar
- 1/4 cup of hot water

Ingredients for the cake:

- 1 cup of tort flour
- 1/2 teaspoon of baking powder
- 1/2 teaspoon of baking soda
- 2 large eggs
- 1/2 cup of sugar
- 1 teaspoon of vanilla extract or essence
- 3/4 cup of oil, e.g. rapeseed oil
- 1 cup of grated carrots
- 1 cup of chopped dates
- 1/2 cup of finely chopped walnuts
- a pinch of salt

Ingredients for the chocolate glaze:

- 25 g of butter
- 25 ml of milk
- 50 g of dark chocolate

Preparation:

Step I

Melt the sugar in a thick-bottomed saucepan. When it turns amber in color and begins to boil gently, slowly pour in the hot water (be careful: once the water is added, the sugar will boil intensively). Remove from the heat and leave to cool down.

Step II

Sift the flour together with the baking powder and baking soda. Roast the finely chopped walnuts in a dry pan. Mix the eggs together with a pinch of salt and sugar until light and fluffy. Then, at the lowest speed of the blender, alternately add the flour, oil, cooled caramel, and vanilla in several portions. Mix the carrots, dates, and nuts with a teaspoon of flour. Pour into the batter and mix gently to combine the ingredients.

Step III

Line a 10×20 cm baking pan with paper and pour the batter into it. Bake at 175°C for about 50 to 55 minutes until the testing stick is dry.

Melt the butter in a saucepan together with the milk. Then add the chocolate pieces and mix until the ingredients are combined. Spread the glazing evenly and leave it to set for 15 minutes.

Enjoy it!

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