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B. Iegorov, Dr. of Tech. Sci., Professor, University president¹, E-mail: bogdanegoroff58@gmail.com
 ORCID 0000-0001-7526-0315, ResearcherID Q-1365-2015, Scopus ID 56578802600
A. Makarynska, Dr. of Tech. Sci., Associate Professor, E-mail: allavm2015@gmail.com
 ORCID: <https://orcid.org/0000-0003-1879-8455>, Researcher ID: C-5217-2016, Scopus ID: 57192819060

INTERNATIONAL SCHOOL OF FEED 2025

FEED, QUALITY, TECHNOLOGY AND ANIMAL FEED



The 10th Anniversary Session of the International School of Feed (ISF-2025) "The Art of Design, Operation and Improvement of Technologies, Formulation, Safety and Quality of Compound Feeds" was held on July 3-5, 2025 at the Odessa National Technological University. ISF-2025 was organized with the support of the Livestock farming institute of NAAS of Ukraine, the European Federation of Food Science and Technology, the Association "Union of Feed Producers of Ukraine", Odessa National University of Technology, the Group of Companies "ProAgro Group", the Institute of Animal Husbandry of the NAAS of Ukraine. Speakers and participants from Ukraine, Germany, Scotland, Poland and Moldova took part in the work of ISF-2025.

On the first day, dedicated to "Trends in the design and improvement of the efficiency of the technological processes of compound feed production", the panel meeting of the organizers and participants was opened with a welcoming speech by Bohdan Iegorov, Head of the International School of Feed, Doctor of Technical Sciences, Academician of the NAAS of Ukraine, Honored Worker of Science and Technology of Ukraine, Laureate of the State Prize of Ukraine in the field of science and technology, Professor of the Department of Grain and Compound Feed Technology,

Serhiy Sots, Doctor of Technical Sciences, Associate Professor, Director of the Educational and Scientific Institute of



Grain, Processing and Baking Business named after Prof. K.A. Bogomaz of the Odessa National Technological University, Fedir Marchenkov, Doctor of Biological Sciences, Deputy Director for Scientific Work of LLC "Bio-Contact", PE "Kronos-Agro", Yevhen Baranovsky, Technical Director of LLC "MegaKorm". Diplomas were awarded to regular participants, founders and organizers of "ISF-2025".

The report of Alla Makarynska, Doctor of Technical Sciences, Head of the Department of Grain and Feed Technology of ONTU was devoted to the production of feed in the world and Ukraine, analysis of production directions by regions and directions, problems and prospects, ways to increase the feed, energy and technological potential of the modern feed "world". The report used statistical data for 2024, which are provided annually by the company Alltech (USA). The number of feed mills continued to increase globally, with more than 420 new mills. Increases in Latin America and Asia-Pacific offset the net decrease in feed mills in Europe and North America. China's significant increase in feed mills is particularly noteworthy because the country simultaneously experienced a slight decrease in overall feed production (Tabl 1).

This reflects China's strategic industry restructuring, with major companies investing in high-capacity, technologically advanced facilities, while older, less efficient operations are phasing out. These new mills often focus on higher-quality




Tabl 1 - Volumes of compound feed production in 2024 by region (based on materials from Alltech)

Region	Number of mills, 2024	Number of mills, 2023 (updated)	Difference
Africa	2,228	2,188	40
Asia-Pacific	8,211	7,627	584
Europe	6,252	6,421	-169
Latin America	4,426	4,356	70
Middle East	844	872	-28
North America	6,069	6,143	-74
Oceania	200	195	5
Grand Total	28,230	27,802	428

Tabl 2 - Top 10 Feed-Producing Countries (based on materials from Alltech)

Top countries	2024 feed tonnage (million mt)	2023 feed tonnage (million mt) – updated	Growth (million mt)	Growth %	Rank, 2024	Rank, 2023
China	315.030	321.548	-6.518	-2.03%	1	1
U.S.	269.620	267.787	1.834	0.68%	2	2
Brazil	86.636	84.581	2.055	2.43%	3	3
India	55.243	52.834	2.409	4.56%	4	4
Mexico	41.401	40.837	0.564	1.38%	5	5
Russia	38.481	35.456	3.025	8.53%	6	6
Spain	35.972	35.455	0.517	1.46%	7	7
Vietnam	25.850	24.997	0.853	3.41%	8	8
Türkiye	24.502	23.374	1.128	4.83%	9	10
Japan	24.297	24.264	0.033	0.14%	10	9

specialty feeds, regional distribution optimization and vertical integration strategies, positioning China's feed industry for future growth despite short-term production adjustments in specific livestock sectors.

The top 10 countries in terms of feed tonnage did not change significantly in 2024 (Tabl 2): Türkiye moved up from No. 10 to No. 9, surpassing Japan. Despite significant volume changes, the other top 10 countries remained in the same positions. Altogether, the **top 10 countries account for 65.6% of the world's 2024 feed production** (versus 66.0% in 2023), and they can be viewed as an indicator of the trends in agriculture. About 52% of global feed consumption is concentrated in four countries: China, the U.S., Brazil and India.

No. 1 — China. Despite China's total feed amounting to 315.0 million mt in 2024, its animal feed sector declined by 2.0% year over year (6.5 million mt). This was driven mainly by decreases in pig, beef, dairy and aquaculture feed usage due to oversupply, weak prices and disease challenges. However, broiler feed grew robustly (+2.6%), and pet food grew by 10.3%. Though overall feed production was down slightly, China added 475 new feed mills, strategically restructuring its feed industry through: high-capacity, technologically advanced facilities; regional distribution optimization; and specialty feed production. The country's feed mill expansion reflects its national food security priorities: record grain harvests; supply chain control; and reduced dependence on imports. Many of the new mills focus on higher-quality, premium feed products — and many represent downstream expansion by agricultural conglomerates seeking greater control. Overall, China's feed landscape remains vulnerable to price swings, disease and farm consolidation — but large integrators and high-value segments may see more resilient expansions.

Total feed tonnage: 315.0 million mt. **Feed production growth:** • Broiler — 2.6%, • Pet — 10.3%,

Notable decreases: • Major decreases in beef (-12.2%) and dairy (-13.9%)

• Pig feed production declined (-3.9%) for the first time in three years due to ongoing oversupply and slower sow replenishment in 2024.

Challenges: • Disease management, • Price fluctuations, • Farm consolidation

No. 2 — United States. The U.S. maintained its position as the world's second-largest feed producer, with total animal feed production reaching 269.6 million mt, a 0.7% increase over 2023. This was driven largely by pig and broiler sector growth. Beef feed demand remained strong due to record-high prices and tight cattle supplies, though feed tonnage is expected to decline as herd rebuilding begins. The pork sector showed cautious optimism, with lighter dressed weights and global trade uncertainties impacting production. Poultry faced challenges from HPAI, driving egg prices up over 20%, while broiler feed demand stayed resilient. Dairy feed tonnage remained flat, with steady cow numbers and improved margins supporting production. Other sectors, like sheep and goat feed, grew 2% due to rising demand, while aquaculture faced setbacks with the bankruptcy of a major shrimp producer. Overall, the U.S. feed industry remains robust, navigating challenges like disease outbreaks, trade dynamics, and shifting consumer demands.

Total feed tonnage: 269.6 million mt. **Feed production growth:** • Beef — 1.3%, • Pet — 2.0%, • Broiler — 1.4%, • Equine — 0.8%

No. 3 — Brazil. Brazil kept its position as the world's thirdlargest feed producer, with animal feed production reaching 86.6 million mt there in 2024, a 2.4% increase from 2023. All sectors experienced growth, except equine, which remained steady. The poultry sector expanded due to Brazil's dominance in global chicken exports and rising domestic demand for af



fordable protein. Beef production is expected to contract due to reduced cow inventories, though exports remain strong, particularly to China and the U.S. The dairy industry saw modest growth, with a shift toward more efficient, technology-driven farms, while pork exports hit record highs, supported by declining beef supplies. Brazil's agriculture sector remains resilient, with strong export demand counterbalancing production challenges in beef and dairy.

Total feed tonnage: 86.6 million mt. **Feed production growth:** • Beef — 7.0%, • Pet — 3.4%, • Broiler — 1.6%, • Layer — 6.5%.

No. 4 — India. Total animal feed production increased 4.6%, with poultry and dairy as the primary drivers of this growth. The dairy sector experienced significant growth (+11.1%) because of rising demand, government support and infrastructure investments, and robust exports. The layer sector grew by 4.6% due to high consumer demand for eggs. Pet ownership in India is growing at a rate of 12–15%, driven by rising income levels.

No. 5 — Mexico. Animal feed production totaled 41.4 million mt, an increase of 1.4%. All feed sectors, except pig, grew in 2024. The pig sector decline was due to the import of pork from the U.S. and the impact of local diseases. Mexico's layer sector showed the most growth due to increased domestic consumption of this first-choice protein in the country, especially amid economic pressures.

No. 6 — Russia. Animal feed production increased by 3.0 million mt, an increase of 8.5%. Over 2/3 of the country's feed production growth can be attributed to the pig sector, which grew over 2 million metric tons.

No. 7 — Spain. Total animal feed production increased 1.5%, fueled by steady pork demand, rising poultry consumption and a pet ownership boom. The rise in poultry feed, particularly for broilers (+7.8%) and layers (+5.3%), reflects growing consumer demand for chicken and eggs. Poultry is often a more affordable protein source compared to pork or beef, making it attractive amid economic pressures. Spain is a major pork producer in Europe, and the modest increase (+1.1%) in pig feed production reflects steady domestic and export demand, alongside a slight recovery from porcine reproductive and respiratory syndrome (PRRS). Sustainability efforts in beef and dairy production are also intensifying, with efforts focused on improving farm efficiency, controlling slurry emissions and incorporating methane inhibitors to reduce environmental impact.

No. 8 — Vietnam. Feed production is experiencing a steady upward trend, with total feed tonnage increasing by 3.4%. Media sources in Vietnam report the domestic feed industry's growth will likely continue in future years due to increasing demand as well as supportive government policies. Dairy feed production saw the highest percentage increase (+36%), fueled by rapid expansion in the sector, a growing middle class with higher disposable income and an increasing appetite for dairy products like milk and cheese. There was also steady growth in the aquaculture sector, with an increase of 3.3% in feed production. Aqua accounts for 16.8% of

Vietnam's total feed production.

No. 9 — Türkiye. Feed production saw robust overall growth (+4.8%), driven primarily by the dairy sector, which surged by 21.33%. This growth was attributable to the increase in the number of heifers and their calves brought from abroad. The pressure feed companies put on farmers to buy feed is also a factor. Conversely, the poultry sector faced a significant setback, declining by 7.4%, with the layer subsector dropping sharply by 14.9%, due to HPAI outbreaks, currency volatility, higher input costs, geopolitical tensions and a dependence on imported feed ingredients.

No. 10 — Japan. Feed production was nearly flat, with a 0.1% growth. A decline in the pig sector was offset by growth in the poultry sector, as consumers looked for less expensive animal proteins. Pig slaughter numbers remained flat, caused by the long-term impact of last year's hot summer weather. Some factors causing slight growth in slaughter numbers include the continued high feed costs and disease outbreaks that caused small producers to leave the industry.



The domestic experience of compound feed production in Ukraine and the enterprises that are part of the "YEDNIST' GROUP" (Inter-Yedynstvo Holding), and approaches to effective production were discussed in the report of Serhiy Bakum, General Director of YEDNIST' GROUP. He spoke about the key achievements in the field of animal husbandry over the past 35-40 years and the advantages of using complete feeds for the national economy; technological and technical solutions in the field of feed production are aimed at improving quality and improving digestibility. He noted the main factors of dependence for domestic feed production, characterized the key problems of the modern feed production market of Ukraine and measures of state and market influence to overcome existing problems.



Rodion Rybchinsky, Director of the Flour Mills of Ukraine, President of the Food Industry Producers Union, spoke about the balance of feed crops as the basis of the feed factor of the country's food security. He considered key market factors, the balance and quality of the main grain crops: wheat, barley, corn, the structure of the yields of the main grain crops in Ukraine. He noted the main price trends of the grain market: a stable growing trend has formed in the dynamics of grain prices; interseasonal price declines are short-term and quickly



change to a growing trend; at the start of the 2025/26 MY, against the background of significant external demand and limited supply in Ukraine, domestic prices for the main feed crop - barley - increased the most. He presented the balance of meals and price trends in the meal market: stable sunflower processing and sunflower oil exports ensure a relatively stable price for sunflower meal on the domestic market; The excess supply of soybean meal has formed a long-term downward trend in price dynamics.



Feed hygiene and business profitability: technological foundations, prevention and safety measures were discussed in the report of Bohdan Yegorov, Doctor of Technical Sciences, Academician of the National Academy of Sciences of Ukraine, Honored Worker of Science and Technology of Ukraine, laureate of the State Prize of Ukraine in the field of science and technology, professor of the Department of Grain and Feed Technology, president of the Odessa National Technological University. 5 modern trends in feed production are indicated: supporting immune health, animal welfare, precision technologies and nutrition, emphasis on plant components, ecologization and sustainable practices. The results of a study of microbiological contamination of feed at Ukrainian factories in Odessa, Mykolaiv, and Kharkiv regions are presented. It was found that increased temperature regimes in local volumes of production premises cause condensation, which, in combination with dust, promote the growth of microbiota. A healthy microbiome is an effective business!



Ivan Kun, CEO of Interprojekt GmbH (Germany), spoke about the features of designing and operating feed mills. The company presented MOM systems (Manufacturing Operations Management) - a software package for centralized management of production processes at a feed mill. They act as an intermediate layer between the ERP level (enterprise resource planning) and the automation level (SCADA/PLC), ensuring operational management of production operations.

Yevgeny Derkach, Ph.D., Associate Professor, Head of the Innovation Lab Project Implementation Department, PJSC MHP Eco Energy, Department of Energy Innovation and Energy Efficiency, reported on the new potential of the protein reserve for the production of compound feed for young animals and poultry, namely the use of insects and their processing

products. He described the larvae of the Black Lionfish as an alternative source for balancing the protein composition of feeds and their rational use in circulatory production models, which will significantly increase the sustainability of the agro-food complex and solve the issue of food security.



Fedir Marchenkov, Ph.D., Deputy Director for Scientific Work of LLC "Biokontakt", PE "Kronos-Agro" reported on enzymatic prospects for revealing the nutritional and energy potential of feed raw materials and finished compound feeds based on the study of enzyme characteristics, mechanism of action, compatibility in mixtures, comparison of liquid and dry forms of enzymes, "Over the top" and "Down specifications" application methods.

On the first day of work, active learning was accompanied by professional panel discussions, in which scientists and leading experts in the feed industry participated, where urgent issues on the production of high-quality feed as the basis of effective systems in animal husbandry, the future of feed in Ukraine were discussed: problems, challenges, expansion of production and new domestic and foreign markets. Active participation in such discussions was taken by Oleg Chub, Candidate of Agricultural Sciences, Director of Chub Agroconcept GmbH. Bogdan Yegorov, Doctor of Technical Sciences, Academician of the NAAS of Ukraine, Oleksiy Krasnorutsky, Doctor of Economic Sciences, Professor, Senior Researcher, Director of the Institute of Animal Husbandry of the NAAS of Ukraine, Ivan Kun, General Director of Interprojekt GmbH, Volodymyr Lagodienko, Doctor of Economic Sciences, Professor, Head of the Department of Marketing, Entrepreneurship and Trade of Odessa National Technological University, Serhiy Drozdov, Candidate of Agricultural Sciences, Senior Researcher, Deputy Director of the Institute of Animal Husbandry of the NAAS of Ukraine for Scientific Work.



A separate block of training was a day dedicated to the art of creating and practicing optimization of compound feed recipes. The role of analyzing the quality of feed raw materials and compound feeds and the art of creating highly effective compound feed recipes, the features of selection, percentage ratio, and size of components were discussed in the report of Nina Vorona, Candidate of Technical Sciences, Associate Professor of the Department of Grain and Compound Feed Technology of Odessa National Technological University.



Technical Director Yevgeny Baranovsky spoke about practical approaches to optimizing compound feed recipes, analyzing recipes and their effectiveness, as well as feeding programs of MegaKorm LLC.



The permanent speaker of the International School of Feed Peter SURAI, D.B.Sc., Professor of Evolutionary Biology and Ecology at the University of Glasgow, made a scientific report on increasing the efficiency of the use of compound feeds, the role of vitamins in the regulation of immunocompetence and provided participants with practical approaches to immunomodulation.

The work of the second discussion panel "Quality is not only a requirement of time, but also the basis of a profitable business" was aimed at theoretical and practical mastery of express methods and automated flow analyses for determining the quality of feed raw materials and compound feeds.



Oleksandr Pleve, Director and Oleksiy Stoyko, Equipment Specialist of Sok Trade LLC, introduced the participants to modern laboratory equipment, express analyzers offered by Sok Trade LLC for grain and compound feed production laboratories, and demonstrated the operation of the equipment, which aroused considerable interest from both laboratory workers and management.



Dr. B.Sc., Corresponding Member of the NAAS of Ukraine, Prof. of the Department of Grain and Feed Technology Anatolii Levytskyi, and Alla Lapinska, Ph.D., Assoc. Prof., PhD, Odessa National Technological University held a discussion table on the issues of providing diets with fats and fatty acids, their role in metabolic processes and the functioning of the gastrointestinal tract of animals and poultry.

After two days of work at the International School of Feed, the participants were offered a cultural program in the pearl of Odessa - the Odessa National Academic Theater of Opera and Ballet and a visit to the performance "Natalka Poltavka", which left wonderful memories of the authenticity of the Ukrainian national cultural heritage.



On the last day, a round table was held: "Increasing the profitability of compound feed production and strengthening the food security of Ukraine", a resolution of the International Feed School was adopted and a briefing was held. As one of the participants put it: "ISF is a "closed" club". In fact, we are open to everyone. But to participate, you need to have a certain level of theoretical and practical training. We express our gratitude to our regular partners "Union of Flour Mills of Ukraine", "Association of Food Producers", PrJSC "MHP", Group of Companies "Yednist", LLC "MegaKorm", "Vitagro Nutriton", "SocTrade", "Inerprojekt GmbH", "Kramar", "Bio-kontakt", "Kronos Agro", LLC "Agrarian Company 2004", "Fishery Tech.", LLC "Tekro", LLC "Novatorg", "Lokhvytskyi Compound Feed Plant", PrJSC "MHP Eco Energy", ND Institute of Animal Husbandry of NAAS of Ukraine, as well as the Department of Grain and Compound Feed Technology of Odessa National University! When professionals in their field gather, there is not enough time to talk, even if there were 36 hours in a day. Science and practice do not stand still, so we must constantly improve. And the "International School of Feeds" is just the most effective format for exchanging knowledge and practices. Together we are strong! See you soon!

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