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Non-commercial JSC «National Agrarian Science and Educational Centre»**

«S.Seifullin Kazakh Agrotechnical Research University» JSC



Catalog of scientific developments ready for implementation and commercialization

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Commercialization of a technology for producing standardized neuro- and immunoprotective extracts of lion's mane mushroom (*Hericium erinaceus*) for functional nutrition

Parameters	Description
Field of application	Functional nutrition, life and health sciences, biotechnology, and personalized medicine
Brief description of the development	Standardized extract of Lion's Mane mushroom (<i>Hericium erinaceus</i>) for functional nutrition, providing reproducible quality, confirmed biological activity, and supply stability, unlike existing imported and non-standardized analogs
Practical effect / Problem solved	Previous studies have shown that <i>Hericium erinaceus</i> extracts possess pronounced antioxidant and antimicrobial activity, inhibit acetylcholinesterase, and reduce the toxicity of amyloid β -peptides in in vitro experimental models. The project's idea is to create a reproducible biotechnological process for producing standardized Lion's Mane extracts with predictable composition and stable biological activity, targeted at the functional nutrition market
Readiness stage	Ready for implementation
Results of testing / implementation	The research results were published in the international journal <i>Foods</i> (2024), confirming the scientific and applied significance of the work. Mushroom extracts were obtained, their in vitro biological activity was studied, extraction parameters were optimized, and conditions for the pilot application of the technology were determined. Methodological recommendations for mushroom cultivation, production, and application of mushroom extracts and biomass processing products were developed and published.
Target consumers of the development	End B2C consumer: online stores, marketplaces, pharmacies; B2B: private labels, distributors, pharmaceutical companies. Tourists (as a souvenir from Kazakhstan), health food stores (Eco-shops). Export (strategic goal): Uzbekistan, Kyrgyzstan, Turkey, Russia.
Possible areas of cooperation	Technology implementation; production partnership
Availability of security documents (patents)	Patent No. 37662 for the invention obtained: "Method for preparing a feed additive from spent mushroom substrate", TRL 6
Научный руководитель	Khasanov Vadim Tagirovich, Professor, Candidate of Biological Sciences, 8(701) 421 21 34, e-mail: vadim_kazgatu@mail.ru





Zero-waste production of plant oils enriched with micronutrients using ultrasonic extraction methods

Parameters	Description
Field of application	Processing; deep processing; (additionally: production of functional food products)
Brief description of the development	The technology is an innovative method for isolating biologically active substances from wild berries and oilseeds using ultrasonic extraction. The development ensures the enrichment of vegetable oils with vitamins and minerals without losing their beneficial properties, and is characterized by environmental friendliness, zero-waste production, and high extraction speed. The project is the first solution in Kazakhstan in the field of import substitution of functional oils and gluten-free products based on local raw materials
Practical effect / Problem solved	The problem of a shortage of domestic specialized functional food products and gluten-free products in the market of Kazakhstan is being solved. The practical effect consists in minimizing waste (zero-waste production), expanding the range of healthy products on the shelves, as well as the efficient use of local organic raw materials
Readiness stage	Testing completed, implemented at the enterprise (The project is being implemented by "NPP "NutriTech" LLP within the framework of grant funding for the commercialization of R&D results from the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan)
Results of testing / implementation	The technology has been implemented and tested at the production facility of "NPP "NutriTech" LLP in Kazakhstan. Pilot-industrial batches of enriched vegetable oils and gluten-free flour (components for bakery and confectionery products) were obtained. The economic effect is reflected in the creation of a profitable domestic production with a high potential for import substitution
Target consumers of the development	Processing enterprises, bakery and confectionery manufacturers, the specialized and healthy food segment (HoReCa, retail chains), as well as end consumers requiring a gluten-free and functional diet
Possible areas of cooperation	Technology implementation; scaling up; joint project; production partnership
Availability of security documents (patents)	Patent of the RK No. 11598. Method for the production of vegetable oil by ultrasonic extraction and homogenization
Scientific Supervisor	Satayeva Zhuldyz Isakovna — Project Leader and General Director of "NPP "NutriTech" LLP, PhD, +7 (777)313-2050, https://www.nutritech.kz/ , nutritech.kz@mail.ru , Instagram nutritech.kz





Technologies for the restoration and innovative plasma hardening of soil-engaging components

Parameters	Description
Field of application	Agricultural machinery manufacturing
Brief description of the development	An innovative technology has been developed for the restoration and plasma hardening of soil-cutting parts of agricultural machinery, ensuring a 2–3 times increase in their service life without altering their geometry or increasing material consumption. The technology is based on local plasma hardening with controlled plasmatron kinematics and is adapted for use in both manufacturing and service-repair environments. The development is aimed at reducing the costs of agricultural enterprises for replacing working parts and decreasing dependence on imported components
Practical effect / Problem solved	Reducing the costs of agricultural enterprises for replacing soil-cutting parts and increasing the service life of agricultural machinery by 2-3 times
Readiness stage	Testing completed, the technology is ready for pilot-industrial implementation (TRL 7)
Results of testing / implementation	The plasma hardening technology has been tested under real operating conditions at the agricultural enterprises "Belgorodskoye" LLP and "Poltavka-2" LLP. During field trials of plasma-hardened plowshares and cultivator sweeps, a 2–3 times increase in surface hardness and wear resistance of the working parts compared to standard mass-produced samples was confirmed
Target consumers of the development	Agricultural producers, crop production enterprises
Possible areas of cooperation	Co-financing
Availability of security documents (patents)	Patent of the Republic of Kazakhstan No. 35782 "Method for plasma hardening of heavily loaded thin-walled parts of low mass" (2022); certificate of entry into the state register of rights to objects protected by copyright No. 63921 dated November 6, 2025 "Methodology for assessing plowshare wear using 2D scanning"; patent applications submitted: No. 20260067.1 dated January 19, 2026 "Method for determining plowshare wear using 2D scanning" and No. 20260076.1 dated January 20, 2026 "Method for plasma hardening of parts in a magnetic bath with cooling".
Scientific Supervisor	Gulyarenko Aleksandr Aleksandrovich, Associate Professor, 8-701-270-38-77, a.gulyarenko@kazatu.edu.kz





Technology for the artificial reproduction of pike-perch in a recirculating aquaculture system (RAS)

Parameters	Description
Field of application	Fisheries, aquaculture
Brief description of the development	A technology has been developed for the artificial reproduction of zander (pike-perch) in a recirculating aquaculture system (RAS), allowing for incubation under controlled conditions
Practical effect / Problem solved	To increase the export potential of zander fillets; To create conditions for the practical diversification of production by shifting from passive harvesting of zander from natural water bodies in favor of highly promising methods of zander farming in aquaculture; To reduce the anthropogenic footprint by decreasing the pressure on commercial fish stocks in natural bodies of water, which will contribute to preserving the biodiversity of aquatic ecosystems; To increase labor productivity in the fisheries sector and boost the income level of fish farms due to the higher added value of fish products
Readiness stage	Testing completed, ready for implementation
Results of testing / implementation	Testing was conducted at the Kazakhstan-Czech International Scientific Center for Aquaculture (KCISCA)
Target consumers of the development	Fisheries entities, potential fish farmers
Possible areas of cooperation	Technology implementation; scaling up; joint project
Availability of security documents (patents)	Utility model patent No. 9752 «Method for artificial spawning of zander»
Scientific Supervisor	Kuanchaleyev Zhaksygalı Batyrgaleevich, Director of KCISCA, +7 777 333 33 00, e-mail: ihtiojax@gmail.com





Grain-Fertilizer-Grass Seeder for Direct Sowing into Sod Cover

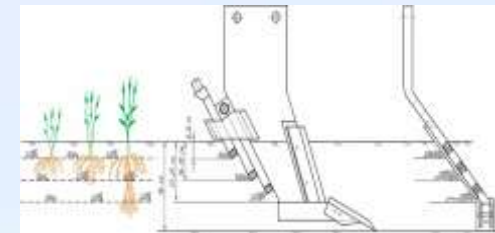
Parameters	Description
Field of application	Crop production; livestock breeding
Brief description of the development	The proposed technology for the restoration and improvement of meadows and pastures includes subsoil loosening with slotting of sod, fallow lands, depleted meadows, hayfields, and pastures, with the simultaneous overseeding of grass seeds, grain-grass mixtures, and the differentiated application of mineral fertilizers
Practical effect / Problem solved	- restoration and improvement of meadows and pastures; - 25-35% increase in yield; - 25-45% savings on mineral fertilizers.
Readiness stage	Prototype / testing completed, ready for implementation
Results of testing / implementation	The actual economic effect from the implementation on 50 hectares at "Akmola-Phoenix" JSC amounted to 11,685 KZT/ha
Target consumers of the development	Agricultural producers; agricultural machinery manufacturing enterprises
Possible areas of cooperation	Pilot testing; technology implementation; scaling up; joint project; production partnership, or other
Availability of security documents (patents)	Patents of the RK No. 34241, 35155, and Eurasian Patent No. 038584
Scientific Supervisor	Nukeshev S.O., Professor, 87015129791, s.nukeshev@kazatu.edu.kz





Chisel-type deep loosener and fertilizer applicator for stratified in-soil differentiated application of mineral fertilizers

Parameters	Description
Field of application	Crop production
Brief description of the development	Designed for primary deep soil tillage up to a depth of 45 cm and tiered differentiated application of primary mineral fertilizer doses (up to 400 kg/ha) using an inclined belt in layers simultaneously at depths of 8-10, 16-18, and 23-25 cm. It is aggregated with the hoppers of seeding complexes
Practical effect / Problem solved	The technology allows eliminating moisture dependence due to the ability of the working parts to form a loose structure and "moisture reservoirs" within the soil, as well as maximizing the accumulation of autumn and spring moisture after autumn tillage. Applying the primary dose of fertilizers in layers at different depths promotes complete plant nutrition for 4-5 years and achieving the maximum potential yield. Deep autumn plowing with this implement eliminates spring floods in the fields
Readiness stage	Implemented into production, small-scale production is carried out by "AGRITECH-KATU" LLP on the basis of "Tselinselmash-Astana" LLP
Results of testing / implementation	Production trials at "Karabalyk Agricultural Experiment Station" LLP showed that autumn plowing (even without fertilizer application) yields an increase of 3 to 7 centners/ha. Applying the primary dose of fertilizers according to the agrochemical map will ensure complete plant nutrition for 4-5 years and provide mineral fertilizer savings of 30-50%.
Target consumers of the development	Agricultural producers; agricultural machinery manufacturing enterprises
Possible areas of cooperation	Pilot testing; technology implementation
Availability of security documents (patents)	Patents of the RK No. 34847, 35686
Scientific Supervisor	Nukeshev S.O., Professor, 87015129791, s.nukeshev@kazatu.edu.kz





Method for forecasting the phenology of non-gregarious locust pests based on spatiotemporal deep learning and climate reanalysis data

Parameters	Description
Field of application	The invention relates to agriculture, specifically to plant protection and phytosanitary
Brief description of the development	A method for predicting the phenology of non-swarming locust pests based on deep learning and climate reanalysis has been developed. The model uses recurrent neural networks to analyze soil temperature and moisture. The technology allows predicting pest development timelines 10–20 days in advance and increases the accuracy of phytosanitary monitoring
Practical effect / Problem solved	The development improves the accuracy of pest development forecasting and ensures timely treatments. The technology contributes to reducing crop losses and automating phytosanitary monitoring
Readiness stage	Prototype. Testing of algorithms and processing of archival climate data have been conducted
Results of testing / implementation	Modeling of phenological stages based on long-term climate data was performed. The model provides forecasting of critical development stages up to 10–20 days in advance
Target consumers of the development	State Inspection Committee in the Agro-Industrial Complex of the Ministry of Agriculture of the Republic of Kazakhstan with its subordinate organizations (RSE "Republican Methodological Center for Phytosanitary Diagnostics and Forecasts", regional and district territorial inspections of the SIC AIC MoA RK, RSE "Phytosanitaria"), research organizations dealing with agriculture and plant protection problems
Possible areas of cooperation	Pilot testing of the technology jointly with territorial branches of the Republican Methodological Center for Phytosanitary Diagnostics and Forecasts; international research projects in the field of agro-climatic modeling and AI in agriculture
Availability of security documents (patents)	
Scientific Supervisor	Baibussenov Kurmet Serikovich – PhD, Associate Professor of the Institute of Agriculture and Forestry, 87754567126, baibussenovks10051987@gmail.com



Efficacy of Phytobiotics Futterzusatzstoffe products in combination with albendazole against helminth infections in horses under conditions of Northern Kazakhstan

Parameters	Description
Field of application	Livestock breeding; veterinary medicine
Brief description of the development	A new effective regimen for treating horses with anthelmintics combined with phytobiotics has been developed. In production conditions, the treatment regimen was implemented through the treatment of 87 heads of horses for preventive treatment against intestinal tract strongylatoses according to the schedule of the farm's plan of activities. The efficacy of the treatment regimen was determined by the extensiveness and intensity of egg excretion (EPG) according to the protocol "EFFICACY OF ANTHELMINTICS: GENERAL REQUIREMENTS", International Cooperation on Harmonization of Technical Requirements for Registration of Veterinary Medical Products, 2022
Practical effect / Problem solved	Increasing the lactation period of milking mares; increasing volumes by 10-15%; saving feed by 8-13%; reducing horse fattening periods
Readiness stage	Prototype / testing completed, ready for implementation
Results of testing / implementation	The proposed treatment regimen for horse strongylatoses was effective in terms of extensiveness (93.3%) and intensity (90.7%). The use of Sangrovit made it possible to maintain a stable level of milk productivity of mares during the period of active exploitation
Target consumers of the development	Agricultural producers; agricultural machinery manufacturing enterprises
Possible areas of cooperation	Pilot testing; technology implementation; scaling up; joint project; production partnership, or other
Availability of security documents (patents)	Certificate of entry of information into the state register No. 53851 dated January 24, 2025. Certificate of entry of information into the state register No. 51416 dated November 13, 2024.
Scientific Supervisor	Zhanabaev A.A., Professor, +77013587574, a.zhanabaev@kazatu.edu.kz, zhanabaev.asylbek@mail.ru



Method for Increasing Fish Production in Lake-Based Aquaculture Farms

Parameters	Description
Field of application	Fisheries, aquaculture
Brief description of the development	A method has been developed to increase fish production in lake-based commercial fisheries using advanced aquaculture techniques, such as the use of recirculating aquaculture systems (RAS) for the reproduction and rearing of juveniles, biological reclamation, and increasing the feeding capacity of natural water bodies
Practical effect / Problem solved	When using intensive aquaculture methods, it allows for obtaining more fish products per unit area compared to traditional methods. To create conditions for the practical diversification of production by shifting from passive fisheries management in small water bodies towards highly promising methods of fish farming in lake-based commercial fisheries
Readiness stage	Prototype
Results of testing / implementation	Research was conducted at the Kazakhstan-Czech International Scientific Center for Aquaculture (KCISCA)
Target consumers of the development	Fisheries entities, potential fish farmers
Possible areas of cooperation	Technology implementation; scaling up; joint project
Availability of security documents (patents)	Utility model application No. 2026/0130.2 dated January 21, 2026 «Method for rearing whitefish larvae using recirculating aquaculture systems (RAS)»
Scientific Supervisor	Kuanchaleyev Zhaksygalı Batırgaleevich, Director of KCISCA, +7 777 333 33 00, e-mail: ihtiojax@gmail.com





Technology for Producing Gerodietetic Meat Products Enriched with Bioactive Ingredients Derived from Secondary Meat Raw Materials

Parameters	Description
Field of application	Processing
Brief description of the development	Production of high-quality sausage products enriched with antioxidant properties using a bioactive additive for sale in domestic and foreign markets
Practical effect / Problem solved	New types of sausage products with the addition of purslane (a bioactive additive enriched with micronutrients based on plant raw materials), satisfying consumer demand for healthy nutrition; Increasing the nutritional value and antioxidant activity of sausage products, extending the shelf life of the finished product; Reducing dependence on imported analogs through the use of local ingredients and reduction of logistical costs, providing a more competitive product price compared to foreign analogs
Readiness stage	Testing completed, ready for implementation
Results of testing / implementation	A technology for preparing the purslane-based bioactive additive BIO AP has been developed; recipes for new types of sausage products with the addition of purslane have been developed; a production technology for sausage products enriched with antioxidant properties based on the use of the bioactive additive has been developed; 3 articles have been published in the Scopus database; there are potential consumers represented by 3 companies that have expressed interest in purchasing products in the volume of 20,060 kg per month
Target consumers of the development	Processing enterprises
Possible areas of cooperation	Joint project
Availability of security documents (patents)	Application submitted
Scientific Supervisor	Makangali K.K., Associate Professor of the Institute of Engineering and Food Technologies, 87079822448, e-mail: k.makangali@kazatu.edu.kz





Technology for the Production and Processing of Sheep Milk

Parameters	Description
Field of application	Livestock breeding; processing.
Brief description of the development	The development is a technology for the production of soft sheep's cheese with increased nutritional and biological value. The main advantages are the preservation of vitamins due to gentle thermal processing, extended shelf life, and enrichment of the product with vitamins, minerals, and antioxidants. Unlike analogs, the technology involves the thermization of sheep's milk, which improves the organoleptic and preventive properties of the cheese
Practical effect / Problem solved	Sheep's milk is hypoallergenic, and its chemical composition is richer and more nutritious than cow's milk, so the proposed products will enjoy stable market demand
Readiness stage	Laboratory sample
Results of testing / implementation	Testing of the cheese products was conducted at the testing laboratory of "Nutritest" LLP (test report No. 1728K dated July 13, 2022)
Target consumers of the development	Agricultural producers; dairy farms; processing enterprises
Possible areas of cooperation	Technology implementation; joint project.
Availability of security documents (patents)	Utility model patent No. 7067 «Method for preparing sheep's cheese with spinach»
Scientific Supervisor	Muldasheva Aknur Khairatovna, Lecturer, PhD, +77778128650, a.muldasheva@kazatu.edu.kz



Organization of Serial Production of a Complex Agent for Stimulating Growth, Development, Yield, and Drought Resistance of Wheat

Parameters	Description
Field of application	Crop production
Brief description of the development	The essence of the development lies in creating and organizing the mass production of a domestic complex agent based on chelated microelements, a polysaccharide, and a phytohormone, designed for treating wheat seeds and crops to enhance drought resistance, stimulate growth, and increase crop productivity. The practical effect of the development is solving the problem of reduced wheat yields in arid conditions by improving field seed germination, increasing plant drought resistance by 1.33-1.56 points, growing yields, reducing grain production costs, and increasing production profitability. The development differs from existing analogs by using an optimized combination of chelated microelements (Zn, Mn, Cu, Fe, Si), sodium alginate, and 24-epibrassinolide, which ensures an increase in seed germination up to 92.67%, a yield increase of 4.82-6.1 c/ha, and an 18.2% reduction in grain production costs at a product cost of 25,893 KZT/l, which is significantly lower than foreign analogs costing 62,996-97,920 KZT/l
Practical effect / Problem solved	The practical effect of the development consists in increasing the field germination of wheat by 6.63-10.94%, increasing drought resistance by 1.33-1.56 points, increasing yield by 4.82-6.1 c/ha, reducing grain production costs by 18.2%, and increasing production profitability up to 32.8-59.54% in the arid regions of Kazakhstan
Readiness stage	The readiness stage of the development corresponds to the technological readiness level TRL-7, which is confirmed by the creation of a fully functional prototype of the complex agent, successful pilot-industrial testing, the availability of a utility model patent, and the implementation of the technology in production conditions
Results of testing / implementation	The developed complex agent underwent full-scale field trials under the conditions of «Naidorovskoye» LLP, Osakarov district of Karaganda region. The production testing results confirmed the high economic efficiency of its application (profitability - 32.8%, with a low grain production cost of up to 45,514 KZT/ha).
Target consumers of the development	Grain-growing agricultural enterprises, agro-holdings, peasant and tenant farms
Possible areas of cooperation	Technology implementation; production partnership; product distribution
Availability of security documents (patents)	Utility model patent «Complex agent and treatment method for stimulating the growth and development of wheat» No. 10033 (authors: Amantayev B.O., Kulzhabayev E.M., Lushchak P.V.; registration date - May 13, 2024)
Scientific Supervisor	Amantayev Bekzak Omirzakovich, Associate Professor. Tel: +7 (701) 380-83-24; E-mail: b.amantayev@kazatu.edu.kz





Efficacy of Phytobiotics Futterzusatzstoffe Preparations in Combination with Albendazole Against Helminth Infections in Cattle Under the Conditions of Northern Kazakhstan

Parameters	Description
Field of application	Veterinary medicine
Brief description of the development	The proposed treatment regimen is an effective means for the prevention of strongylatoses in cattle, and it also contributed to increasing the quantity and fat content of milk, as well as the average daily weight gain of young stock born in the current year.
Practical effect / Problem solved	- Increasing milk fat content by 13%; - increasing young stock weight gain by 25%; - saving feed by 8-10%.
Readiness stage	Prototype / testing completed, ready for implementation
Results of testing / implementation	It is an effective means for the prevention of cattle strongylatoses, and it also contributed to an average increase in the daily weight gain of young stock born in the current year by 166 g. Milk fat content increased by 13%
Target consumers of the development	Agricultural producers; dairy farms, feedlots
Possible areas of cooperation	Pilot testing; technology implementation; scaling up; joint project; production partnership, or other
Availability of security documents (patents)	Certificate of entry of information into the state register No. 53915 dated January 27, 2025
Scientific Supervisor	Zhanabaev A.A., Professor, +77013587574, a.zhanabaev@kazatu.edu.kz, zhanabaev.asylbek@mail.ru





Efficacy of Sangrovit-Extra in Combination with Albendazole Against Helminth Infections in Sheep Under the Conditions of Northern Kazakhstan

Parameters	Description
Field of application	Veterinary medicine
Brief description of the development	A new effective regimen for treating sheep with anthelmintics combined with phytobiotics has been developed and registered as a copyright object. In production conditions, the treatment regimen was implemented through the treatment of 117 heads of sheep for treatment against intestinal tract strongylatoses
Practical effect / Problem solved	- Increasing young stock weight gain by 19%; - saving feed by 13%.
Readiness stage	Prototype / testing completed, ready for implementation
Results of testing / implementation	The proposed regimen prevents reinfection of sheep with strongylates: in the group receiving Sangrovit-Extra, the reinfection rate was 1.5 times lower than in the control group, and the tested regimen of using the anthelmintic drug in combination with Sangrovit-Extra contributes to the normalization of liver enzymatic activity parameters.
Target consumers of the development	Agricultural producers; dairy farms, feedlots
Possible areas of cooperation	Pilot testing; technology implementation; scaling up; joint project; production partnership, or other
Availability of security documents (patents)	Certificate of entry of information into the state register No. 53850 dated January 24, 2025.
Scientific Supervisor	Makangali K.K., Associate Professor of the Institute of Engineering and Food Technologies, 87079822448, e-mail: k.makangali@kazatu.edu.kz





Development of Dry, Water-Resistant Extruded Feeds Based on a Symbiotic Formulation to Enhance Fish Productivity and Evaluation of Fish Product Quality

Parameters	Description
Field of application	Aquaculture; food safety; biotechnology; food production technology; feed production; veterinary medicine; microbiology; other (specify)
Brief description of the development	An extruded water-resistant feed based on a symbiotic formulation for catfish and tilapia has been developed. A method for obtaining a symbiotic for fish has been developed. Currently, there are no analogs of this development in the Republic of Kazakhstan.
Practical effect / Problem solved	Reducing feed costs; increasing fish productivity; improving the quality of fish products; boosting fish immunity.
Readiness stage	Implemented at the Maybalyk fish hatchery
Results of testing / implementation	Where tested; what results; economic effect; quantitative indicators, etc.
Target consumers of the development	Agricultural producers; fisheries; agro-holdings
Possible areas of cooperation	Pilot testing; technology implementation; scaling up (specify)
Availability of security documents (patents)	Patent (No. 37481, Method for obtaining a symbiotic for fish based on isolated lactobacilli strains)
Scientific Supervisor	Paritova Asel Erzhanovna, Associate Professor, 87078065617, paritova87@mail.ru