

## Search for a Spanish Partner for a Bilateral R&D Project

Organization	
Date of Request:	16/9/2023
Company name:	
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### SECTION 1: Entity launching the partner search

(Please give brief / to the point explanations. For more explanation on any point below, you may add a short paragraph as an annexure, with this document.)

Sector	Animal Production
Entity mission or core functions	Animal and Fish Dept., Faculty of Agriculture, Alexandria University
Date of establishment	1948
Ownership (if public and traded, add stock exchange and ticker symbol)	Government, educational and research entity
Total number of employees	30
Number of employees in R&D	-
Key products sold or services provided	Research-education- community services
Entity core technical competences	The Animal and Fish Production Department possesses a range of core technical competencies that enable it to effectively carry out its research and educational missions. These competencies include expertise in animal and fish husbandry, breeding, nutrition, health management, and reproductive technologies. The department is equipped with advanced laboratories, breeding facilities, and field stations that support experimental research, data collection, and practical training. Its multidisciplinary team of specialists in microbiology, genetics, veterinary sciences, aquaculture, and engineering collaborates on innovative projects, product development, and sustainable practices. These technical components collectively ensure the

	department can advance scientific knowledge, develop new technologies, train students, and support industry needs in animal and aquatic production.
Key R&D programs and activities	The department has established numerous partnerships with local industry stakeholders in the field of animal production. These collaborations focus on jointly researching and developing innovative solutions to promote sustainable animal production tailored to Egyptian conditions. The efforts aim to address industry challenges through scientific research and practical approaches, supporting the advancement and resilience of the sector. By working closely with industry partners, the department strives to develop effective, science-based strategies that enhance productivity, sustainability, and overall sector development in Egypt.
Examples of accomplishments	-Development of prototypes and pilot units for producing
Company strategic orientation	<p>-Development of Sustainable natural based solutions that improve animal productivity and resilience under local Egyptian conditions, leading to increased herd health and productivity.</p> <p>-Industry Partnerships and Joint Projects: Signing collaborative agreements with local industry partners to implement research findings in real-world settings, resulting in the adoption of new practices and technologies in the field.</p> <p>-Training and Capacity Building: Conducting specialized training programs for farmers and industry professionals, enhancing their skills in modern animal and fish production techniques.</p> <p>-Research Publications and Grants: Publishing impactful research in scientific journals and securing competitive research grants to support ongoing innovation in animal and fish production.</p> <p>-Education: the department grants bachelor degree and post-graduate degrees in the field of animal production, aiming three major fields, physiology, nutrition, and husbandry and breeding.</p> <p>Education: The department offers undergraduate (bachelor's) degrees as well as postgraduate (master's and doctoral) programs in the field of animal production. Its academic focus is centered on three major areas: physiology, nutrition, and husbandry and breeding. These programs are designed to equip students with comprehensive theoretical knowledge and practical skills, preparing them to contribute effectively to the advancement of the animal production sector.</p>

## The summary of the topic

### Smart Microbial Bioprocessing of Agro-Residues for Sustainable and Healthy Livestock Production

This project aims to investigate **microbial fermentation of agro-industrial byproducts** to develop innovative bioproducts, including **probiotics, postbiotics, and fermented feed alternatives** that support sustainable livestock production. By utilizing specific microbial strains, the project seeks to **convert waste materials**—such as crop residues, food processing byproducts, and other agro-industrial residues—into valuable, eco-friendly feed additives and supplements that harness the **nutrients and active components** present in these materials. These bioproducts are designed to enhance livestock health and immunity, find safe antimicrobial agents, improve productivity, and reduce dependence on conventional feed resources, thereby minimizing the environmental footprint associated with livestock production and the degradation of agro-industrial byproducts. Ultimately, this approach promotes environmental sustainability and economic viability within Egyptian livestock systems.

Furthermore, the project will leverage advanced aided technologies such as **Artificial Intelligence (AI)** and **omics** approaches (genomics, proteomics, metabolomics) to optimize fermentation processes, identify beneficial microbial strains, and elucidate the complex interactions within the fermentation ecosystem. AI-driven data analysis, process modeling, and predictive analytics will facilitate the enhancement of product quality and scalability. Meanwhile, omics techniques will provide in-depth insights into microbial functions and metabolic pathways, enabling targeted manipulation for improved bioproduct production.

The collaboration between Egyptian and Spanish partners will foster knowledge exchange, share technical expertise, and support the development of scalable, tailored solutions that address local and regional needs. This integrated approach aims to advance sustainable animal agriculture, contribute to environmental conservation, and promote a circular economy in both countries.

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## SECTION 2: Spanish Company Profile

*(Please provide a brief summary of the prospective partner company or organization. This summary may address some or all of the points below)*

Profile of ideal technology partner	·Microbial Biotechnology & Fermentation Technology and waste Valorization & Bioconversion
Core technological competencies and expertise	<p>-Expertise in designing and optimizing microbial processes for converting agroindustrial waste into valuable bioproducts such as probiotics, postbiotics, or animal feed additives.</p> <p>-Experience in developing scalable processes for transforming agricultural residues, crop waste, or by-products into bio-based products.</p> <p>-Scaling laboratory findings to pilot and industrial levels, with knowledge of bioreactor design, process optimization, and quality control.</p> <p>-Skills in microbiological analysis, chemical characterization, and ensuring compliance with safety and environmental standards.</p>
Other essential qualifications (e.g.: ownership, track records etc.)	-Expertise in developing and commercializing microbial-based bioproducts for waste management, and livestock, supported by a industry experience, and established markets. Equipped with R&D infrastructure and a skilled, multidisciplinary team.
If you have a list of companies with whom you are in contact or interested in contacting, please provide contact details	NO
If you are interested in collaboration: please specify details and other important information you want to share with a potential company	<p>The Principal Investigator (PI) on the Egyptian side possesses extensive expertise in microbial fermentation techniques for the production of probiotics, synbiotics, postbiotics and fermented feeds. Additionally, the PI specializes in utilizing fermented agro-industrial wastes to develop natural, sustainable solutions for livestock production. Having led numerous projects in this field and authored relevant publications, the PI is well-positioned to facilitate innovative collaborations that can translate laboratory research into industrial and commercial applications. This partnership presents a valuable opportunity to leverage cutting-edge scientific insights to advance sustainable livestock practices, promote the development of high-quality probiotic products, and support the commercialization of eco-friendly fermentation processes.</p> <p>PI: <b>Key projects and publications in the field:</b></p>

	<p>Designing an industrial prototype for innovating <b>microbial-based feed additives</b> using nano-encapsulation technology for improving performance and immunity of farm animals. Funded by Academy of Scientific Research and Technology, Science and Technology Center, Grant Type : National Strategy for Genetic Engineering and Biotechnology/ Phase iii: Applications &amp; Products Development 2022-running.</p> <p>1) Hosny, N.S., Morsy, A.S., Abo-elezz, Z.R., Hashem, N.M. 2025. Physiological responses and reproductive performance of naturally heat-stressed rabbit does treated with <b>postbiotic of Bacillus subtilis and Saccharomyces cerevisiae</b> in free and nano-encapsulated forms. BMC Veterinary Research 21: 288. <a href="https://doi.org/10.1186/s12917-025-04728-6">https://doi.org/10.1186/s12917-025-04728-6</a>.</p> <p>2) Hashem, N.M., Essawi, W.M., El-Demerdash, A.S., El-Raghi, A.A. 2024. Biomolecule- producing <b>probiotic</b> bacterium <b>Lactococcus lactis</b> in free or nanoencapsulated form for endometritis treatment and fertility improvement in buffaloes. Journal of Functional Biomaterials, 15, no. 6: 138. <a href="https://doi.org/10.3390/jfb15060138">https://doi.org/10.3390/jfb15060138</a>.</p> <p>3) Hashem, N.M., Hosny, N., El-Desoky, N.I., Soltan, Y.A., Elolimy, A.A., Sallam, S.M., Abu-Tor, E.M. 2023. Alginate nanoencapsulated <b>synbiotic</b> composite of pomegranate peel phytochemicals and multi-probiotic species as a potential feed additive: Physicochemical, antioxidant, and antimicrobial activities. Animals 13, 2432. <a href="https://doi.org/10.3390/ani13152432">https://doi.org/10.3390/ani13152432</a>.</p> <p>4) Mousa G.A., Allak M.A., Shehata M.G., Hashem N.M., Hassan O.G.A. 2022. Dietary Supplementation with a Combination of Fibrolytic Enzymes and <b>Probiotics</b> Improves Digestibility, Growth Performance, Blood Metabolites, and Economics of Fattening Lambs. Animals, 12, 476. <a href="https://doi.org/10.3390/ani12040476">https://doi.org/10.3390/ani12040476</a>.</p>
Interested areas of collaboration	<p>-Research &amp; Development: Joint development of microbial strains and fermentation processes tailored for agroindustrial waste conversion.</p> <p>-Technology Transfer: Sharing of bioprocessing techniques for scaling laboratory findings to pilot and industrial levels.</p> <p>-Product Development: Formulation of bioproducts such as organic fertilizers, probiotics, or feed additives from agro-waste.</p> <p>-Sustainability Assessment: Life cycle analysis and</p>

	<p>environmental impact assessment of bioconversion processes.</p> <p>-Capacity Building: Training and workshops for local stakeholders in bioprocessing and waste management.</p> <p>Pilot Plant Operations: Establishment and operation of pilot-scale bioreactors for process validation.</p>
Specific R&D contribution you are seeking/offering	<p><b>Seeking for:</b></p> <ul style="list-style-type: none"> <li>• Expertise in microbial strain selection and genetic optimization for waste conversion.</li> <li>• Advanced bioreactor design and process engineering.</li> <li>• Access to laboratory and pilot-scale fermentation facilities.</li> <li>• Knowledge in valorization pathways for specific agroindustrial wastes prevalent in Egypt and Spain.</li> <li>• Support in regulatory compliance and quality assurance for bioproducts.</li> </ul> <p><b>Offering to the Partner:</b></p> <ul style="list-style-type: none"> <li>• Access to local agroindustrial waste streams and data on waste composition.</li> <li>• Knowledge of Egyptian agroindustry and livestock sector needs.</li> <li>• Collaboration on pilot and demonstration projects in Egypt.</li> <li>• Shared insights into market potential and end-user requirements.</li> <li>• Opportunities for joint publications, patents, and commercialization efforts.</li> </ul>

**Signature**



**Name: Nesrein M. Hashem**

**Date: 16/9/2025**