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# Agriculture Research is Vital to BioZyme's Mission

(SAINT JOSEPH, Mo., December 13, 2024) You may be wondering why BioZyme® puts such a premium on agriculture research. Surely agriculture hasn't changed so much that we need to reinvent the wheel? What is there to gain from continuing to change an industry humankind has had for thousands of years? Well, to put it simply: quite a lot.

Agricultural research plays a pivotal role in addressing key challenges related to global food production, environmental sustainability and economic development. With the world population projected to surpass 9 billion by 2050, agricultural research is crucial for boosting food yields and ensuring food security.

But that research can take a variety of forms. Some businesses invest in crop genetics, soil management techniques, irrigation methods and pest control strategies. Here at BioZyme, our goal remains to serve animals, advocates and producers. Our goal is to optimize the productivity of your livestock while minimizing required resource inputs at your operation. This is essential for meeting the increasing demand for food here at home and around the world.

**Supporting Our Changing World**

BioZyme, a leading player in the agricultural industry, prioritizes research as the cornerstone of its operations. With an unwavering commitment to innovation, BioZyme invests heavily in scientific inquiry to drive product development and enhance agricultural outcomes. That's why we have prioritized thorough research into animal nutrition, microbial technology and feed and resource utilization. Our goal is to deliver cutting-edge solutions that optimize animal health, improve feed efficiency and bolster overall productivity.

Who do these innovations serve? Farmers, ranchers and livestock producers. Our goal is, and always will be, to empower our community with the tools and knowledge needed to thrive in a rapidly evolving agricultural landscape.

Furthermore, our focus on agriculture research is a passion for our industry's future. Collaborative partnerships between academia, industry and government facilitate technology transfer and knowledge dissemination, leading to enhanced market competitiveness and inclusive prosperity.

Agriculture research is essential for addressing the complex challenges facing the global food system. By investing in scientific research and innovation, we can improve food production, promote environmental sustainability and stimulate economic development in agricultural communities around the world.

All of that investment begins with the research happening here at BioZyme Inc.

**What Agriculture Research Looks Like at BioZyme**

For more than 70 years, BioZyme has served the agriculture industry as an innovator in fermentation and animal health. What started as a feedstore across from the historic Saint Joseph, Missouri, stockyards evolved into much more. Founder Larry Ehlert purchased a patent and marketing rights to an unheard-of direct fed microbial produced from a fungus called *Aspergillus oryzae* in 1968.

Since that time, agriculture research has been the very heart of BioZyme's growth. That same strain of *Aspergillus oryzae* is what BioZyme uses today to develop new pre- and post-biotics under the brand AO-Biotics.

Additionally, BioZyme offers supplements and animal health products for a variety of animals including cattle, swine, poultry, sheep, goats, horses and dogs. Headquartered in St. Joseph, Missouri, BioZyme reaches a global market of customers throughout North and South America, Europe, Asia, the Middle East and Africa.

**Agriculture Research and AO-Biotics®**

AO-Biotics® is a line of fermentation products derived from BioZyme's innovative fermentation of Aspergillus oryzae (AO) to promote resilience.

Since the discovery of AO, BioZyme has conducted countless research and studies. The first AO-derivative was AO-Biotics Amaferm®, a prebiotic research proven to enhance digestibility. Amaferm is produced from a proprietary multi-step fermentation process developed by scientists at BioZyme. This process yields a high-quality product that is solely engineered manufactured for use in animal feed and supplements.

During this time, Amaferm has been extensively researched by universities and private facilities worldwide and more than 100 peer reviewed papers, abstracts and field trials have been published or presented. This research proves Amaferm's mode of action and impact on the microbes and the animal in which those microbes reside.

The effects of Amaferm have been demonstrated across multiple species. The mechanism is quite unique because it stimulates both bacteria and fungi in the gut. Specifically, research shows Amaferm increases fungal growth, providing more attachment sites for bacteria and maximizing fiber digestion. Amaferm has also been shown to significantly increase production of microbial enzymes that assist in fiber and starch degradation.

Bacteria in the gut also benefit from Amaferm. Studies have shown increased growth rates, faster replication and an increase in the total number of bacteria present. The increase in bacteria along with increased fungal growth, which increases the available surface area for bacteria attachment, provides maximum digestion of nutrients.

**Current Research Priorities Create Growth**

“For the past seven years, our efforts have been focused on advancing and refining a research program dedicated to unraveling the biological actions of AO-derived biotics with direct implications for animal performance and health. The core of this initiative is located at the University of Kiel in Germany, where BioZyme has cultivated a longstanding and fruitful research partnership,” said Ignacio Ipharraguerre, Ph.D., Vice President of Research and Innovation for BioZyme Inc.

“This collaboration, coupled with several other global research alliances, is driven by a primary objective: to construct a robust knowledge foundation that steers the enhancement and innovation of BioZyme’s products and services.”

This collective endeavor has yielded impactful insights, such as those instrumental in shaping the development of AO-Biotics EQE. Furthermore, it holds the potential to broaden our portfolio by paving the way for the development of new biotic products tailored for all species of animals.

AO-Biotics® EQE is Added

In 2022, BioZyme introduced its first postbiotic. AO-Biotics EQE is the first-and-only AO postbiotic developed specifically for layers.

Research studies show that feeding this innovative postbiotic results in:

- More sellable eggs
- Improved egg mass
- Increased productive life span.

“EQE stands as the inaugural additive arising from the aforementioned research program. The extensive research efforts that culminated in this breakthrough spanned over six years. It encompassed the completion of a Ph.D. program, along with multiple studies conducted in collaboration with research partners primarily in the USA and Europe,” Ipharraguerre said.

AO-Biotics EQE is marketed globally as a feed additive and included in one of BioZyme’s poultry products domestically.

**Biotics Defined**

There is definite confusion in the marketplace between prebiotics, postbiotics and probiotics. We ensure our AO-Biotics products are correctly classified by upholding them to standards set by the International Scientific Association for Probiotics and Prebiotics (ISAPP).

“We believe that organizing knowledge through science-based definitions is crucial for preventing ambiguity and confusion, fostering innovation and ensuring the proper use and expectations of biotic products. To achieve this goal, we adhere to the definitions established by ISAPP, classifying biotic products into categories such as prebiotics, probiotics, synbiotics and more recently, postbiotics. The key distinction among these products, based on these definitions, lies in their mode of action,” Ipharraguerre explains.

The following are the ISAPP definitions:

- **Prebiotic**: A substrate that is selectively utilized by host microorganisms conferring the host a health benefit.

- **Postbiotic:** A preparation of inanimate microorganisms and/or their components that confers a health benefit on the host.
- **Probiotic:** Live microorganisms that, when administered in adequate amounts, confer a health benefit on the host.
- **Synbiotic:** A mixture comprising live microorganisms and substrate(s) selectively utilized by host microorganisms that confers a health benefit on the host.

BioZyme also has definitions of prebiotics and postbiotics as they pertain to our AO-Biotics brand. They are as follows:

- **Prebiotic:** AO-Biotics prebiotics are derived from *A. oryzae* to promote growth and activity of beneficial gut microbes to confer a benefit on the host.
- **Postbiotic:** AO-Biotics postbiotics are derived from nonliving components of *A. oryzae* (metabolites or other bioactive compounds) to target specific problems affecting animal health, welfare and/or productivity.

"Our research indicates that certain compositions derived from AO fermentation processes primarily function by altering the gut microbiota, aligning with the definition of prebiotics. On the other hand, we have observed that other compositions resulting from AO fermentation processes exert effects that extend beyond the gut microbiota, impacting systems such as the immune system. These latter compositions are more accurately categorized as postbiotics," Ipharraguerre said.

**Research Makes BioZyme the AO-Biotics Experts**

With continued research across the globe, BioZyme has earned its reputation in the industry as AO experts. And, we have just reached the tip of the iceberg.

"To the best of our knowledge, BioZyme stands as the sole company within the sector with a dedicated research program focused on AO." Ipharraguerre said. Thereby, we are AO experts and are, as we like to say, **A**nything but **O**rdinary.

**Learn More From our Team**

Do you want to learn more about AO-Biotics and the benefits that they offer? Our Team of experts will be in person at the 2025 International Production & Processing Expo (IPPE), January 28-30 in Atlanta, Georgia. Stop by booth A2746 to visit with the BioZyme team to learn more.

Our talented experts travel around the globe to train our partners, give presentations and support our customers at various industry events, conferences and trade shows. Be sure to follow BioZyme on LinkedIn to stay informed about when and where our team is traveling.

Stay informed about our latest research and advances in the AO-Biotics field.

## About BioZyme® Inc.

With a continued commitment to excellence, the BioZyme Stockyards location earned the American Feed Industry Association (AFIA) and Feedstuffs 2024 Feed Facility of the Year honor. BioZyme Inc., founded in 1951, develops and manufactures natural, proprietary products

focused on animal nutrition, health and microbiology. With a continued commitment to research, BioZyme offers a complete line of feed additives and high density, highly available vitamin, mineral, trace mineral and protein supplements for a variety of animals including cattle, pigs, poultry, sheep, goats, horses and dogs. BioZyme brands include AO-Biotics®, VitaFerm®, Gain Smart®, Sure Champ®, Vitalize®, DuraFerm® and Backyard Boost®. With headquarters in St. Joseph, Missouri, the company reaches a global market of customers that stretches into countries across five continents. For more information about BioZyme, visit www.biozymeinc.com.

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