

# EnzoMeal™

## A Sustainable Food Source for Farm-Raised Fish

An advanced soybean-based fish feed, EnzoMeal addresses a key impediment to widespread expansion of aquaculture, the fastest-growing food production sector. Historically, fisheries have used fishmeal as fish feed, but the primary ingredients—wild fish and shrimp—are rapidly dwindling resources, making the feed expensive and unsustainable. Soybean meal presents an attractive alternative. It closely meets the dietary requirements of fish: it is rich in protein content, essential fatty acids, and unsaturated fats, and it has the most balanced amino acid composition of all agricultural-based meals. Yet conventional soybean meal contains carbohydrates that fish cannot easily digest.

Airable Research Lab partnered with Battelle to develop a technology that removes nondigestible carbohydrates and increases crude proteins in the soybean meal, resolving the challenges that to date have limited soybean use as a substitute fish feed protein.

### THE TECHNOLOGY

Digestive systems for aquatic species, particularly carnivorous fish, are unaccustomed to the plant proteins and carbohydrates that occur in soy. The EnzoMeal process removes the non-starch polysaccharides and anti-nutritional factors (ANFs). This safe procedure does not rely on fermentation. Instead, a tandem chemical and biochemical process hydrolyzes the alpha galactose bond, removing almost 100% of the oligosaccharides—the most challenging ANFs to eliminate.

### THE BENEFITS

With the ANFs removed, fish can easily digest the soybean meal. The meal can compose 50%-75% of the protein diet for fish (rainbow trout and yellow perch) and 100% of the diet for shrimp, while maintaining the growth and health of fish on a 100% fishmeal protein diet. Moreover, the EnzoMeal process increases crude protein and does not compromise the amino acid composition, making it a substantial improvement over conventional soybean meal. Initial testing has shown that EnzoMeal outperforms 100% fishmeal diets—and at a much lower cost.



*Enzomeal received the 2017 R&D 100 Gold Special Recognition Award—the highest level of this prestigious award for invention and innovation—in the Corporate Social Responsibility category.*