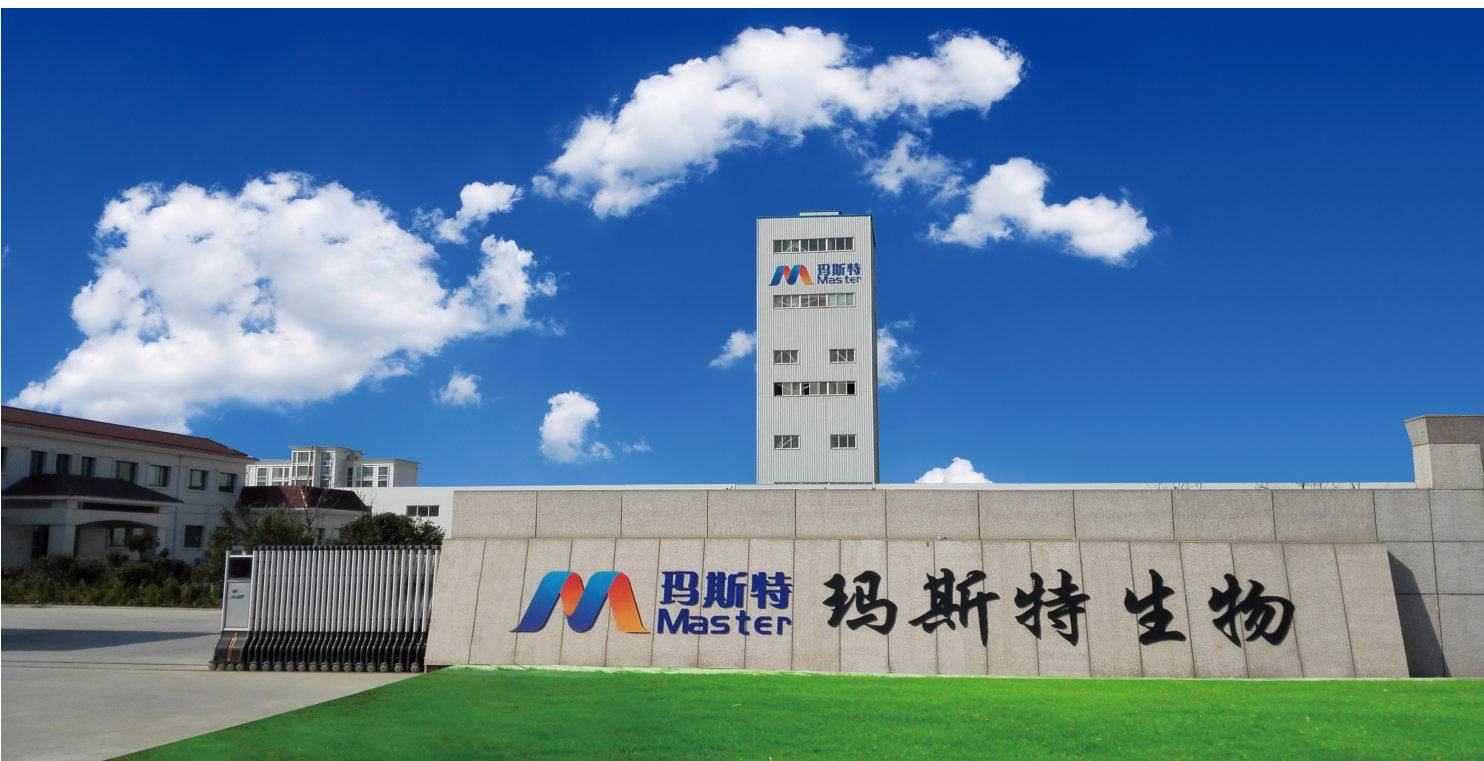


Potential of vitamin post-addition technology and post-fermentation technology in fishmeal substitution



Reported by: Lei Wang



Founded in 2002, Qingdao Mast Biotechnology Co., Ltd. is a high-tech enterprise focusing on aquaculture under Azure Bio, a leading company in the domestic enzyme preparation and microecology industry. The company maintains long-term and close scientific cooperation with many research institutions such as Ocean University of China, Guangdong Ocean University, Institute of Oceanography of Chinese Academy of Sciences and Yellow Sea Institute, focusing on the research and application of aquatic nutrition, feed and breeding technology, providing high-quality value solutions for aquatic feed and breeding industry. Relying on a strong scientific and technological innovation team, continuous investment in R&D and professional and rigorous work, the company has developed a series of new products with independent intellectual property rights, such as liquid vitamins (Liquid Vimax®), feed fermenters (Enzymatic Lipo®) and enzymatic shrimp paste ("Crown Peptide™" brand shrimp paste) for post-spraying, etc. The products are green, safe, high quality and efficient, cost-effective and meet the needs of the industry. Our products are green, safe, high quality, high efficiency, high cost performance, meet the industry and market demand, and have a broad application prospect! The company has passed ISO 9001 quality management system certification and is the first batch of "Feed Quality and Safety Management Standard Demonstration Enterprise" in Shandong Province.

General issues in fishmeal substitution

Nutrition

Low protein content of alternatives
Amino acid imbalance
Poor digestibility
Lack of "unknown" growth factors, etc.

Focus on "known" growth factors (vitamins)

Stress issues

Presence of anti-nutritional factors in alternatives, etc.
Damage to the intestinal tract caused by
Reduced digestive enzyme activity
Impaired immune system, etc.

Focus on the role of probiotics and enzymes

Palatability issues

Poor flavor of alternatives
Leads to low ingestion rate

Recognized "known" growth factors – vitamins

1、What is vitamin?

It is a small organic compound different from fats, carbohydrates and proteins, the natural composition of food contains very little, although trace but vital to the normal physiological function of the body, if lacking or insufficient will cause a special deficiency syndrome, the body can not be synthesized or synthesized in insufficient amounts to meet the physiological function of the body needs.



What are the factors that affect the effectiveness of vitamin use?

**It is important to find a non-destructive way to add vitamins
- post-vitamin addition technology**

1. With the process of feed processing, temperature, moisture, pressure, tempering time, friction and other serious damage to vitamins, data show that a variety of vitamins in the puffing process temperature loss rate of 60-80%.
2. The determination of vitamin requirements of the experimental environment and feed production parameters have serious differences, data distortion.
3. High-density breeding, high-intensity baiting, deterioration of the water quality environment, excessive proliferation of harmful bacteria and other strong stress caused to aquatic animals, increasing the demand for vitamins.
4. A \ D \ E \ K and other fat-soluble vitamin absorption and transit is carried out with fat, low fat content in the feed affects the absorption of fat-soluble vitamins.
5. The same vitamin has different effective forms and large differences in biological potency.

What is post-vitamin addition technology?



The fat-soluble and water-soluble vitamins are formed into a transparent or translucent, low-viscosity thermodynamically stable system by nanoemulsion technology. The vitamin nanoemulsion can be intermixed with oil in any ratio and added quantitatively in the oil circuit by specific equipment, and the quantitative and uniform addition of vitamins is realized with the help of vacuum spraying equipment.

Advantages of post-vitamin addition technology?

1. Post-addition technology bypasses the high temperature process and adds without damage.
2. The particle size of nanoemulsion is generally between 1~100nm, which can improve the bioavailability of encapsulated components due to its small particle size.
3. The fat-soluble vitamins (A/D/E/K) in vitamin nanoemulsion can be directly soluble in water, which improves the utilization of fat-soluble vitamins.
4. No need to worry about the stability of vitamin nano-milk, we have made it can be as stable as the conventional powder multi-dimensional premix.
5. No need to worry about the problem of feed mildew.



Enzymatic Libao®

蔚蓝生物
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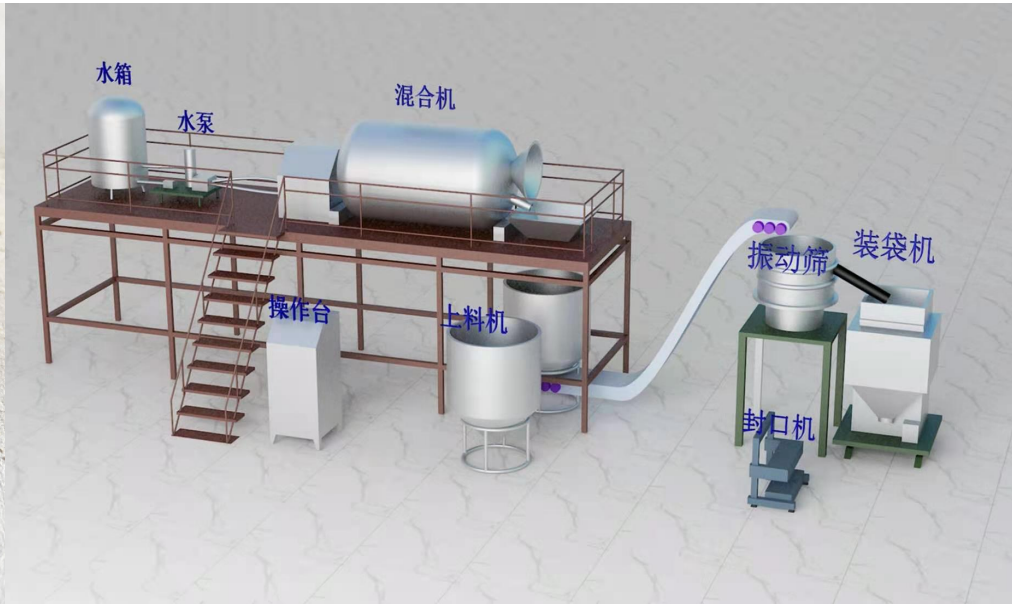
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- **Bacteria:** screened from the target animal intestinal tract "native bacteria", a variety of complex
- **Enzymes:** with a variety of "synergistic enzymes"
- **Microbial growth factors**
- **Buffering factor:** to ensure long-lasting fermentation

A new application model of probiotics and enzymes - post-fermentation technology



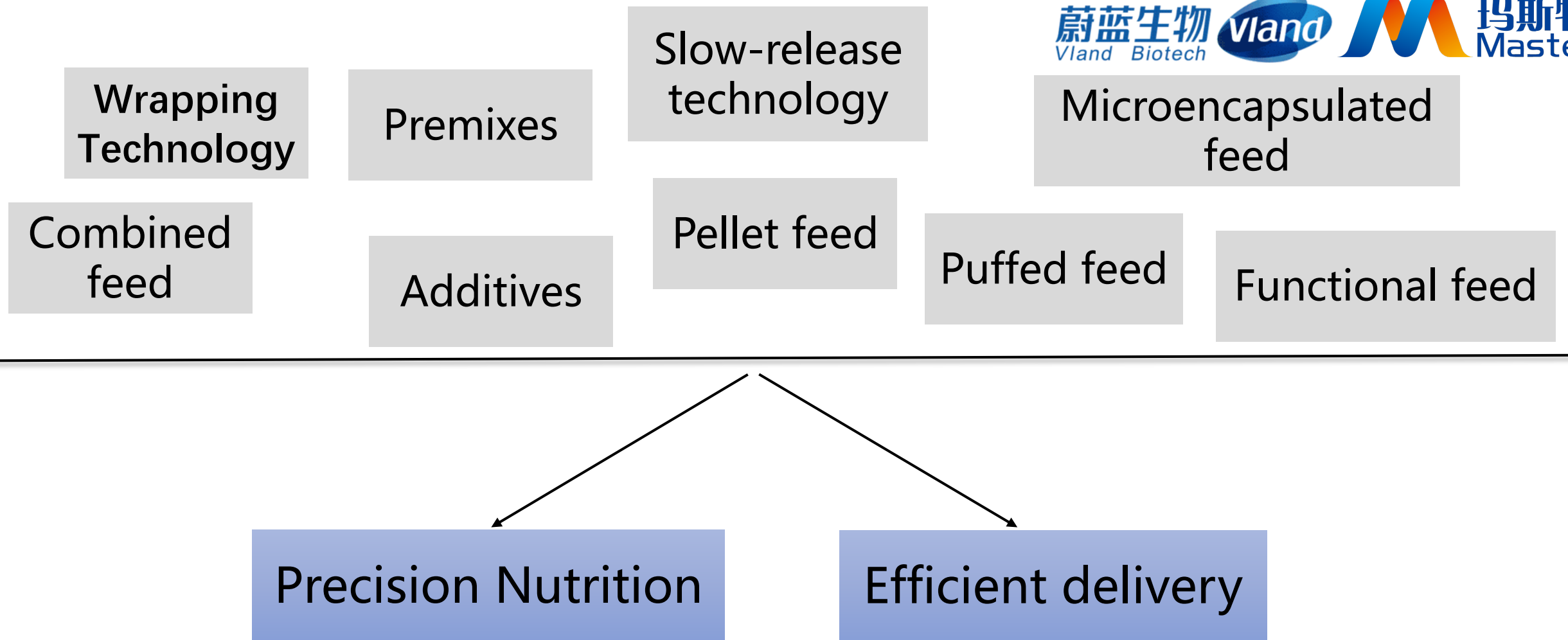
What is post-fermentation technology?

Post-fermentation technology is the fermentation of compound feed as a substrate in a constant temperature room after inoculation with probiotics and enzymes through special equipment. The feed processed by post-fermentation technology is called "soft pellet full-price fermented feed".

Advantages of post-fermentation technology?

- Bypasses high temperature process and retains active probiotics and enzymes
- Fermentation treatment improves feed digestibility
- Reduces anti-nutritional factors
- Complex probiotic metabolites are obtained
- Eats more with very little waste
- Nutritional "full price"





The essence of vitamin post-fermentation technology is **efficient delivery of vitamins**

The essence of post-fermentation technology is the **efficient delivery of probiotics and enzymes**



Thanks for listening!



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