From Hard Pellets to Extruded Feed: A Developme the Feed Industry or a Revolution in the Aquacultu Industry?

Detail Introduction :

Reference

I. What is an Extruder?

Extruded feed, also known as cooked feed, is a new type of feed processed u an extrusion process. After extrusion, the raw materials form a "popcorn" stat changing not only their physical appearance but also the molecular structure internal organic matter, making starch easier to digest and protein easier to u Extruded feed undergoes a high-temperature treatment at 130-160 degrees C during production, similar to the process of cooking rice. Cooking raw rice into cooked rice makes it easier for us to absorb its nutrients. Fish, as lower anima have relatively simple digestive systems and low absorption rates. High temperatures break down and soften the fiber structure, destroy anti-nutritiona factors, and increase starch gelatinization, all of which improve the fish's absc capacity and reduce waste. Furthermore, the high-temperature treatment kills pathogens, parasites, and parasite eggs in the feed, preventing disease and effectively protecting the health of the fish. Therefore, some say that the extru process, which transforms raw feed into cooked feed, represents a revolution change in the feed industry.

II. Advantages of Extruded Feed

1. The extrusion process places high demands on raw materials. High-quality materials are essential to ensure effective extrusion. For example, cottonseed should only use varieties with a crude protein content of 46%, while rapeseed should ideally be imported from Canada or high-quality domestic 200-type rap meal.

2. Because the protein is bound to the starch matrix, it is less likely to be lost feeding. The protein is only released when digestive enzymes in the animal's break down the starch, thus increasing the protein's value. The extrusion proc also denatures the protein, shortening the hydrolysis time in the intestines.

3. Extrusion releases encapsulated fats from the raw material molecules, incr the calorific value of the fat. Extrusion also forms complex products such as lipoproteins or lipopolysaccharides with fats, starch, or protein, reducing the c of free fatty acids and minimizing rancidity and spoilage of fat components du storage and transportation. Simultaneously, extrusion reduces the content of bacteria, mold, and fungi in the raw materials, improving the hygienic quality o feed and further ensuring its safety.

4. Extruded feed is not only safer and more nutritious, but also easier to diges absorb. It improves palatability and flavor, facilitates storage and aquaculture

management, and causes less water pollution.
5. Extruded feed has excellent buoyancy. Due to its buoyancy, workers only n
pour the feed into the water. Feeding status is immediately apparent, significa
reducing workload and preventing feed waste, thus saving costs.

III. Main Differences Between Pelletized and Extruded Fe

Extruded feed is a porous feed obtained by rapidly reducing pressure after be
processed in an extruder at high temperature and pressure. Pelletized feed is
generally extruded into granular form by the pressure rollers of a pellet mill, ty
in a cylindrical shape. Both extruded and pelleted feed can be used as fish fe
Extruded feed is more effective due to its better palatability and digestibility, b
much more expensive. Pelletized feed is sufficient for most freshwater fish, w
extruded feed is used for specialty, high-end fish.
The main difference between extruded feed and pelleted feed lies in the
conditioning, extrusion, and liquid spraying processes. In the feed conditionin
process, extruded feed production involves adding water and steam together,
resulting in a moisture content of around 25%. Pelleted feed, on the other han
only requires steam, resulting in a moisture content of around 17%. Furtherm
pelleted feed production eliminates the extrusion and liquid spraying processe
includes an additional pelleting step.

Extruded feed improves digestibility primarily because the processing require raw material grinding, and the high temperature during extrusion increases st maturation, facilitating digestion and absorption by fish. Secondly, the stability extruded feed in water for 12-36 hours allows for direct monitoring of fish feed reducing water pollution. Thirdly, the intense, high-temperature, and high-hum kneading during extrusion kills some harmful bacteria in the raw materials. De these significant advantages, and the acceptance of this novel processing technology by many feed manufacturers, the substantial initial investment in extruded feed production lines deters many developing feed processing comp from adopting this technology.

IV. How to Efficiently Mix and Feed Hard Pellets and Extruded Feed

Advantages of Mixed Feeding: It can better regulate water quality, preventing water from becoming too fertile or too nutrient-poor, and can also improve the growth rate of the main cultured species and adjust their body shape and con thereby increasing the yield of the co-cultured species.

1. Feeding hard pellets first, followed by extruded feed, allows farmers to obs the fish eating, thus rationally controlling their feed intake and reducing feed v

2. Feeding sinking feed in spring and winter (beginning and end of the year), extruded feed in summer and autumn. This feeding method is very popular in Jiaxing and Huzhou, Zhejiang. In summer and autumn, the water temperature high, and fish grow vigorously, making extruded feed particularly effective; wh spring and winter, the water temperature is low, and fish generally feed at the bottom of the pond, where sinking feed perfectly meets their feeding habits. Therefore, fish raised using this feeding method have good body shape, suffi weight, and are more resistant to transportation by the end of the year. 3. Gra carp fry farming, mainly concentrated in Huangpu Town, Zhongshan City, inv farmers mixing hard pellets and extruded feed before feeding, considering the aggressive feeding behavior during the high-temperature season. In autumn a winter, when water temperatures are low and fish feed slowly, and because h pellets have a short water resistance (generally less than 3 minutes) and diss easily in small fish, farmers feed a higher proportion of extruded feed to reduc waste and increase economic benefits.
4. Hard pellets are fed in the morning, and extruded feed in the afternoon.
5. Extruded feed is fed first, followed by hard pellets. Farmers believe extrude is more fragrant and palatable. After the fish have eaten about 60% of their ha pellets, they will still consume large amounts of extruded feed, leading to overeating, digestive problems, and intestinal diseases.

V. Disadvantages of Extruded Feed

The impact of extrusion on growth performance is not necessarily positive. Th
are reports from abroad that extruded feed leads to decreased feed intake an
impaired growth in fish. Extruded feed undergoes the Maillard reaction during
extrusion process, negatively impacting animal protein raw materials such as
fishmeal and meatmeal, reducing their utilization value. It also produces a
thermosensitive effect, accelerating fat oxidation and causing significant vitan
loss.

In traditional Chinese aquaculture models, whether carp-based or grass carp-
a certain degree of polyculture of silver carp and bighead carp is necessary to
increase yield, improve efficiency, and control water quality. However, when u
extruded feed, the polycultured silver carp and bighead carp often exhibit poo
growth, affecting overall profitability (as illustrated by numerous case studies)

Reference

The following are five authoritative foreign literature websites in the field of In
food machinery:

1. Food Engineering Magazine

Website: https://www.foodengineeringmag.com/

2.Food Processing Magazine

Website: https://www.foodprocessing.com/

3.Journal of Food Engineering

Website:https://www.journals.elsevier.com/journal-of-food-engineering

4. Food Manufacturing Magazine

Website:https://www.foodmanufacturing.com/

5. International Journal of Food Science & Technology

Website:https://onlinelibrary.wiley.com/