

# *Fish Silage: A Noble Fish Feed Ingredient*

**Puneet Kumar Patel\*, Brundaban Sahu, Laxmi Prasad and Dinesh Kumar**

*College of Fisheries (NDUAT), Kumarganj, Ayodhya -224229, U.P.*

## **Corresponding Author**

Puneet Kumar Patel

Email: puneetpatel28@gmail.com



**OPEN ACCESS**

## **Keywords**

Fishery, Discard, Acid lactic bacteria, Fermentation, Byproducts

### *How to cite this article:*

Patel, P. K., Sahu, B., Prasad, L. and Kumar, D. 2024. Fish Silage: A Noble Fish Feed Ingredient. *Vigyan Varta* 5(4): 31-33.

## **ABSTRACT**

Different fishing activities generate a waste volume related to the processing species (viscera, heads and bones), the discards of the companion fauna, species of low commercial value and the losses related to handling problems. The biological silage could be the technology of choice to promote a sustainable waste management. Studies highlight the possibility of using a wide variety of carbohydrate sources, biological starters and fish waste fermentation conditions. This work could contribute to the fisheries that decide to adopt this kind technology in order to provide an innovative and viable recycling bioeconomy.

## **INTRODUCTION**

**A**quaculture is known as a sunrise sector having huge potential to provide food security as well as



livelihood for the society. Mushrooming growth of aquaculture activity has created a huge demand for fish feed among farmer.

Unlike terrestrial animals, feeding fish is a challenging task, as feeding fish is almost equal to applying feed to the culture water. The feed that is not consumed within a reasonable time leads not only to an economic loss, but greatly reduce water quality. Feeding fish costs more than 50% of production cost (Tanuja *et al.*, 2017), for which balanced feeding is essential for optimum performance

with economic viability. Further, cost of protein source accounts for about 60% of the total cost of all ingredients taken together (Arruda *et al.*, 2009).

Increase in demand for fish feed is leading to increase in the demand for these ingredients. Accordingly, these ingredients are becoming scarce day by day with increase in price, which is influencing the cost of feed. Hence, the research needs to focus on utilizing less expensive and readily available resources to replace fish meal (Sayed *et al.*, 1999) and other conventional ingredients like soyabean meal and groundnut oil cake (Hanafy, 2016); without reducing the nutritional quality of feed.

The use of fishing waste in different parts of the world is allocated to animal feed and is of great interest as it represents an environmental and public benefit as well as reducing the cost of animal production. Fish silage is a valuable and nutrient-rich byproduct derived from the processing of fish. It is prepared through a controlled fermentation process which transforms fish waste, such as heads, tails, bones, and other parts not typically consumed by humans, into a highly nutritious feed ingredient. This process helps to reduce waste in the fisheries industry and provides a sustainable alternative for feeding livestock, poultry, and aquaculture species.

Fish silage has gained popularity as a sustainable alternative to conventional feed ingredients such as fishmeal or soybean meal. The fisheries sector may minimize waste and contribute to more ecologically responsible practices by using components of the fish that would otherwise be discarded. Furthermore, by providing a high-quality protein source for animals, fish silage supports the aquaculture sectors. Its inherent antibacterial characteristics also help to prevent disease in animals.

### Let us learn how to make fish silage?

Fresh fish waste should be used to make silage, which will be preserved by adding an organic acid such as acetic acid or formic acid. The quantity of acid required to inhibit bacterial growth varies on the raw material, but commonly, 2-3% formic acid (w/w) is applied. The final combination, however, should have a pH of less than 4.0 to inhibit the growth of fungus and bacteria.

**Advantages:** Rich in Nutrients, It is high in protein, necessary amino acids, and beneficial fatty acids, making it an excellent animal feed additive. Fish silage can be a cost-effective feed alternative when compared to standard feed components such as soybean meal or fishmeal. It may be produced locally, lowering shipping costs. Sustainable Resource Utilization and disease Prevention, fish silage has natural antibacterial substances that can help prevent disease in animals fed it. This is especially true in aquaculture, where disease outbreaks can have serious economic and environmental effects. Fish silage can be used in feed formulations for a variety of animals, including chickens, pigs, cattle, and aquaculture species such as shrimp and fish.

### Problems with Fish Silage

**Quality Variability:** The nutrient content of fish silage can vary depending on factors like fish species, processing methods, and fermentation conditions. This variability can pose challenges for consistent feed formulation.

**Storage and Shelf Life:** Fish silage has a limited shelf life and may require special storage conditions to keep its quality. Inadequate storage might result in rotting or nutritional deterioration.

**Concerns about odor:** Fish silage can have a strong odor, which can be a problem for feed

makers and may influence the palatability of some animals.

**Allergy:** Some people and animals may be allergic to fish proteins. This can be a problem if fish silage is used in feeds for animals such as chickens or pigs, which may eventually be consumed by humans.

**Regulatory Compliance:** Regulatory standards or rules regulating the production and use of fish silage as a feed element may vary by area. Complying with these requirements might be difficult.

### Solution

Defined manufacture procedures, Quality Control Measures, Improved Storage and Handling techniques, Odor Control Techniques, Allergen Labeling and Considerations, Regulatory Compliance Maintain awareness of, and adherence to, local and international legislation governing the production and use of fish silage in animal feeds. Research & Development, Education and Training.

### CONCLUSION

By addressing these issues and adopting suitable solutions, the fisheries sector may maximize the value of fish silage as a byproduct, so contributing to sustainable and efficient resource usage. Furthermore, fish silage is a wonderful source of critical nutrients such as protein, amino acids, and essential fatty acids, which are needed for the growth and health of a wide range of animal species. This, in turn, increases the health and production of cattle, poultry, and aquaculture

stocks, eventually improving the industry's economic sustainability. The findings highlight the feasibility of using fish waste for various applications, including the recovery of chemicals from fish biomass. By promoting the use of this sustainable technology, this work can help to advance the transition towards a circular bioeconomy and contribute to the scientific community's efforts to find eco-friendly solutions for waste valorization and resource recovery.

### REFERENCE

- Arruda LFD, Borghesi R, Portz L, Cyrino JEP and Oettere, M. 2009. Fish silage in Black bass (*Micropterus salmoides*) feed as an alternative to fish meal, *Brazilian Archives of Biology and Technology*, 52: 1261-1266.
- Hanafy MA. 2006. Effect of replacement of soybean meal by linseed meal on growth performance and body composition of the Nile tilapia (*Oreochromis niloticus*) cultured in concrete ponds, *Egyptian Journal of Aquatic Biology and Fish*, 10(3): 185-200.
- Sayed MA. 2005. Partial and Total replacement of soybean meal by raw and heat-treated linseed meal in Tilapia diet, *Egyptian Journal of Nutrition and Feeds*, 8(1): 1091-1109.
- Tanuja and Azzaydi TA. 2000. Effect of feeding regime on selected species of fish. *Article publication of FISON*, Feb., 2000, Agora.