

Current Status of Fish Meal Industry in India: Issues and Prospects**S. Sundhar¹ and S. Aanand²**¹Research Scholar, Fisheries College and Research Institute, TNJFU, Thootukudi, Tamil Nadu²Assistant Professor, Erode Bhavanisagar Center for Sustainable Aquaculture, TNJFU, Bhavanisagar, Erode, Tamil Nadu**SUMMARY**

Fish meal is one of the high protein ingredients used to prepare farmed animal feed made from bycatch. Fish meal industry is the fastest growing seafood sector. Peru is one of the world's leading fishmeal producers and exporters, followed by Vietnam, China, and Denmark. Overfishing is caused by fish meal manufacturing, which puts stocks at risk of reaching their replacement levels.

INTRODUCTION

Fish meal is a commercial product prepared from fishes that are mainly not used for human consumption but generally prepared from bycatch mainly used for farmed animals in agricultural and aquaculture. It is vital to developing the growth of farmed animal because of its high nutritional and caloric value. The protein content of high-quality fishmeal is usually between 60% and 72 percent by weight. The total protein content of a typical fish diet can range from 32 percent to 45 percent by weight. Fishmeal development and use on a wide scale are contentious. Corporate fisheries are encouraged by the lucrative market for fishmeal as a feed to not reduce their yields of bycatch (from which fish meal is made), resulting in habitat depletion, environmental damage, and the collapse of local fisheries. The role of fish meal is to facilitating the breeding and over-feeding of pigs and chickens on factory farms. Manufacturers of fishmeal counter that fishmeal role in the feeding and breeding of farm animals leads to more food and the feeding of millions of people worldwide.

Fish meal was primarily used as fertilizer before 1910, but now it is a critical protein supplement in artificial feed preparation. As of 2010, 56% of fish meal was used to feed for farmed fish, 20% was used in pig feed, 12% in poultry feed, and 12% in other uses. The cost of 65% of protein fishmeal was varied from \$385 to \$554 per ton in 2010. As people in developing countries move away from red meat and other meat protein sources, demand for fish has increased, with farmed fish accounting for half of all fish consumed globally in 2016. Fish meal demand has risen in tandem, but harvests are limited, and supply cannot grow. Fish meal has sparked a movement toward the use of other ingredients such as soybean meal, cottonseed meal, leftovers from corn and wheat processing, legumes, and algae, as well as a rise in study to find alternatives to fish meal and new strategic applications (for instance, in the growth phase, after newborn fish are established). Almost all types of fish are used to make fish meal, but those made from wild caught, small marine fish contain a high percentage of bones and oil, making them unfit for direct human consumption. "Industrial" fish are those captured solely for the purpose of making fishmeal. Bycatch and byproducts of trimmings made during processing (fish waste or offal) of various seafood products intended for direct human consumption are other sources of fishmeal. The primary fish sources by country are anchovies, horse mackerel in Chile; pout, sand eel, sprat in Denmark; pout, capelin, sand eel, and mackerel in European Union; capelin, herring, blue whiting in Iceland and Norway; sardine, pilchard, sauries, mackerels in Japan; anchovies in Peru; pilchard in South Africa; menhaden, pollock in the United States and various species in China and Thailand. Almost to produce 1 ton of fish meal, there is a need of 4 to 5 tons of fish; about 6 million tons of fish are harvested each year solely to make a fish meal.

Fish Meal Industry

Fishmeal is one of the fastest growing segments of the seafood industry and the fishery industry across the globe. The main factors contributing to the global fishmeal market are increasing demand for naturally derived protein additives in animal feed, expanding the feed industry, extensive development of salmon aquaculture and increased fish consumption as a significant food in various regions the world. The aquaculture industry's significant growth during the forecast period is also propelling the fishmeal industry. The number of aquacultures is increasing worldwide; hence the demand for fishmeal is growing. The major countries that have stimulated demand for fish meals are Peru, China, Thailand, Vietnam, the United States, Chile, Japan, Denmark, India, Norway, Ecuador, Morocco, Russia, Iceland, and Malaysia.

Peru is one of the world's leading fishmeal producers and exporters. The world's largest fish meal producer, importer, and exporters are Vietnam, China, and Denmark. Since salmon is a popular source of fishmeal, salmon and trout farmers have increased their production to meet the increasing demand of customers worldwide. The fish and seafood industry was also in a state of flux, with major market players and government fisheries collaborating with small-scale inter-and intra-regional fishing farms to create a quality demand loop in the aquafeed additive market. In addition, increasing demand for various health supplements among both infants and adults would spur the production of human-made edible fishmeal that includes omega-3 supplements. According to the International Fishmeal and Fish Oil Organization (IFFO), the country's total amount of fish meal production amounted to be 211 thousand metric tons in 2017 in the USA.

Issues and prospects

Fish meal production contributes significantly to overfishing and puts stocks at risk of exceeding their replacement rate. Fish meal production has increased dramatically in some parts of the world, such as Western Africa, harming local fisheries and leading them to extinction. Fish meals can spontaneously combust from heat generated by oxidation of the polyunsaturated fatty acids. Factory ships have sunk in the past as a result of such explosions. Antioxidants have been added to the meal to eliminate this risk. Ethoxyquin was the most widely used antioxidant in 2001, with doses ranging from 200 to 1000 mg/kg. There has been speculation that ethoxyquin in pet foods is to blame for a variety of health issues. To date, the USFDA has only discovered a verifiable connection between ethoxyquin and the accumulation of protoporphyrin IX in the liver, and elevations in liver related enzymes in certain animals, with no known health implications. In 1997, the Center for Veterinary Medicine requested pet food manufacturers to restrict ethoxyquin levels in their products to 75 parts per million (ppm) before more data was available. Most ethoxyquin-containing pet foods, on the other hand, have never surpassed this limit. Fish are slightly poisoned by ethoxyquin. Ethoxyquin has not been adequately tested for its carcinogenic potential, despite being approved for fruit spray insecticide in the United States. Ethoxyquin has long been suspected of being a carcinogen, and a compound that is very similar to it, 1,2-dihydro-2,2,4-trimethylquinoline, has been shown to have carcinogenic activity in rats and has the potential to cause cancer in fishmeal before storage or transportation.

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