Seafood Canning Industry in India: Potential and Future Trends

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ABSTRACT

India's seafood canning industry offers a promising avenue for preserving marine resources, reducing post-harvest losses, and boosting exports. Although freezing dominates seafood processing, canning provides shelf-stable, convenient products suitable for both domestic and international markets. This article examines the current status, quality and safety aspects, key challenges, and emerging opportunities in the sector. With proper focus on raw material quality, by-product utilization, and sustainable practices, the industry can achieve significant growth while supporting food security and environmental goals.

INTRODUCTION

India possesses one of the longest coastlines in the world and rich marine biodiversity, making fisheries a vital part of its economy and food system. Canning is an effective preservation technique that involves hermetic sealing and thermal processing to produce safe, long-shelf-life products without refrigeration (Pais-Costa *et al*., 2025). This method not only extends the usability of perishable fish but also adds value and convenience for consumers.

Historically, India's fish processing relied on traditional sun-drying and curing. Over time, modern methods like freezing and canning have gained importance. While frozen shrimp leads exports, canning of species such as mackerel, sardines, tuna, and pink perch

contributes to diversification (Vinay *et al*., 2016). The sector generates employment, supports export earnings, and helps minimize waste. However, challenges related to raw material supply, quality control, and sustainability need attention to unlock its full potential.

Current Status and Quality Considerations

India's marine product exports have shown remarkable growth, rising from modest levels in the early 1960s to over 9 lakh tonnes by 2013-14 (Vinay *et al*., 2016). Canning remains a smaller but strategically important segment compared to freezing.

Quality of the final canned product depends heavily on the freshness of raw material. Studies indicate that fish iced for up to two days are most suitable for canning. Lean fish such as pink perch perform better than fatty fishlike mackerel during ice storage and subsequent canning. Fatty fish tend to undergo faster lipid oxidation, resulting in higher peroxide values (PV), free fatty acids (FFA), and total volatile base nitrogen (TVB-N) (Naik *et al*., 2017).

For example, in canned mackerel and pink perch stored in brine, peroxide values increased from initial levels of about 1.03 and 0.75 millimoles O_2/kg fat to 18.90 and 17.45 respectively after storage. Similar rising trends were observed in FFA and TVB-N, while sensory scores declined gradually. Overall, lean varieties maintained better acceptability (Naik *et al*., 2017).

Table 1: Changes in Quality Parameters of Canned Fish during Storage

Parameter	Mackerel (Initial)	Mackerel (75 days)	Pink Perch (Initial)	Pink Perch (90 days)
Peroxide Value (meq O_2/kg fat)	1.03	18.90	0.75	17.45
Free Fatty Acids (% oleic acid)	1.38	10.32	0.94	9.73
TVB-N (mg%)	11.58	49.75	9.16	45.25
Overall Acceptability	7.99	6.80	8.56	6.84

Source: Adapted from Naik *et al*. (2017)

Proper icing (1:1 fish-to-ice ratio) and prompt processing are essential for maintaining chemical and organoleptic quality (Naik *et al*., 2017).

Challenges in the Industry

The seafood processing sector, including canning, faces several constraints. Inconsistent raw material supply due to seasonal catches leads to underutilization of processing units, especially in states like Kerala (Netto, 2019). Strict international quality standards, high compliance costs, and competition in export markets add pressure.

Safety is another important concern. Heavy metals such as mercury, lead, and cadmium can accumulate in fish and may transfer during processing, though levels generally remain within acceptable limits when good manufacturing practices are followed (Rana *et al*., 2023). Environmental contaminants and proper thermal processing are critical to prevent issues like histamine formation or can corrosion (Pais-Costa *et al*., 2025).

Additionally, canning generates significant by-products (heads, viscera, skins, and effluents) that pose disposal challenges if not managed properly.

Potential and Future Trends

The canning industry has strong potential for growth through sustainability and innovation. By-products from canning are rich in proteins, lipids, enzymes, and minerals. These can be converted into high-value items such as fish protein hydrolysates (FPHs), bioactive peptides, collagen, chitosan, and even biodegradable plastics like polyhydroxyalkanoates (PHAs) (Almeida *et al*., 2025; Nag *et al*., 2022). Such valorization

supports a circular economy and reduces environmental impact.

Emerging trends include development of novel canned products enriched with bioactive compounds, ready-to-eat meals, and optimized thermal processes that preserve nutrition while ensuring safety (Pais-Costa *et al*., 2025). Improved packaging, better supply chain management, and focus on lean fish species can enhance quality. Government support for infrastructure and adherence to standards like HACCP will improve competitiveness in global markets (Vinay *et al*., 2016).

CONCLUSION

The seafood canning industry in India holds considerable promise for economic growth, employment generation, and sustainable resource use. By addressing challenges in raw material quality, waste management, and safety through scientific practices and innovation, the sector can expand significantly. Embracing by-product valorization and novel product development will not only strengthen exports but also contribute to a more sustainable blue economy. Collaborative efforts among researchers, industry stakeholders, and policymakers are essential to realize this potential in the coming years.

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