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**MICROBIAL INTERACTIONS IN
AQUATIC SYSTEMS AND
ECOLOGICAL SUSTAINABILITY**

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MES Ponnani College, Ponnani
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4

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improve health outcomes. These studies demonstrate that natural plant compounds offer effective, sustainable disease management for aquaculture and serve as eco-friendly alternatives to synthetic antibiotics. The implications of these findings are significant for the future of aquaculture. Plant-based antimicrobials could help reduce dependency on chemical antibiotics. Further research must optimize use, dosage, and safety, ensuring these antimicrobials enhance fish health and sustainable aquaculture.

Keywords: Anti-microbial compounds, Bacterial disease, Fish pathogens, Fish immunity



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ADDITIVES FOR OXIDATIVE DURABILITY OF FISH OIL-A REVIEW

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Fish oil is one of the optimal sources of omega 3 fatty acid. Studies prove that regular consumption of oils enriched from fatty fishes such as mackerel, oil sardine and reduces cardiovascular disease, hypertension, menopause, inflammatory disease etc. and improves overall health. Oxidative durability is the primary risk factor for fish oil products. The oxidative stability depends upon many factors such as quality of raw fish, composition of fatty acid, impurities in oil, processing, packaging, storage and other related aspects. The oxidative degradation of fish oil results in the formation of undesirable compounds, such as peroxides and aldehyde, which negatively impact sensory attributes and safety. Anti-oxidation is one of the effective methods to reduce or extend the shelf life of fish oil, but chemical anti-oxidation treatment leads to adverse effects on human health. Codex Alimentarius allowed adding synthetic additives such as butylated hydroxytoluene (BHT), butylated hydroxyanisole (BHA), *tert*-butylhydroquinone (TBHQ), and propyl gallate (PG), in fish oil. Usage of these additives leads to allergy, headache, asthma, and dermatitis. Natural antioxidants derived from spices offer a promising alternative to synthetic options. The plants from the family, Zingiberaceae, Piperaceae, Lauraceae, Lamiaceae, Myrtaceae, Apiaceae, Alliaceae, and Liliaceae contain bioactive compounds with phenolic potent anti-oxidative properties, which can effectively inhibit lipid oxidation. The various studies proposed that the usage of natural extract from spices added in vegetable oils increases the anti-microbial (anti-bacterial, anti-fungal properties) and anti-oxidant properties. Natural alternatives not only improve the oxidative stability of fish oil but also align with consumer preferences for cleaner, safer, and more health-conscious products.

Keywords: Fish oil, Chemical Anti-oxidants, Natural Anti-oxidants, Oxidative stability