



Assessment of Antihistamine Potential of Local Herb Extract (Cinnamon, Turmeric, Curry Leaves) in Inhibiting Histamine Formation of Fish

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Histamine is a biogenic amine formed by the microbial decarboxylation of histidine, and its accumulation in fish is a major cause of scombroid poisoning. Therefore, maintaining fish safety and quality during storage requires the prevention of histamine production. This study shows the antihistaminic potential of three local herbals, curry leaves (*Murraya koenigii*), cinnamon (*Cinnamomum verum*), and turmeric (*Curcuma longa*), applied in powder and extract form to Genus *Thunnus* in ambient settings. Fresh fish samples were divided into treatment and control groups. Treated samples were subjected to appropriate herbal formulations, and a spectrophotometer was used to check the histamine levels. Results showed that the untreated control group's histamine levels gradually increased with incubation time, reaching $11.78 \pm 0.13 \text{ mg kg}^{-1}$ for the extraction method and $11.80 \pm 0.04 \text{ mg kg}^{-1}$ for the powder method, suggesting typical food spoiling. The inhibitory effect of the herbal bioactive components was demonstrated by the delayed rise in histamine levels seen in all herb-treated samples. Curry leaf extract was the most successful extraction treatment, keeping histamine levels almost constant during storage, maintaining histamine levels at $10.44 \pm 0.01 \text{ mg kg}^{-1}$, followed by turmeric ($11.09 \pm 0.12 \text{ mg kg}^{-1}$) and cinnamon ($11.33 \pm 0.03 \text{ mg/kg}$). For the powder method, curry leaf powder exhibited the lowest histamine concentration ($10.47 \pm 0.01 \text{ mg kg}^{-1}$), while cinnamon ($10.66 \pm 0.05 \text{ mg kg}^{-1}$) and turmeric ($11.18 \pm 0.05 \text{ mgkg}^{-1}$) also showed significant suppression compared to controls ($11.80 \pm 0.04 \text{ mg kg}^{-1}$). Turmeric and cinnamon extracts also generated significant suppression ($p < 0.05$). Compared to other powder treatments, curry leaf powder had the greatest impact on reducing histamine formation. Herbal extracts are more effective due to high solubility and release of phytochemicals, including flavonoids, phenolics, and essential oils that block bacterial enzymes that produce histamine. Results indicate that curry leaf extract is an effective natural inhibitor of histamine production, offering a safe and sustainable substitute for artificial preservatives, preserving fish freshness, and avoiding histamine toxicity during storage.

Keywords: Histamine, Curry leaves, Cinnamon, Turmeric, Natural preservatives