

## A Comparative study on quality of imported dried fish varieties in Sri Lanka

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### Abstract

Annual dried fish requirement of Sri Lanka is increasing rapidly with the demand being fulfilled by both locally produced dried fish and imported dried fish. The quality of these products is an essential factor which is required for the consumer acceptance and safety. The present study was carried out to investigate the microbiological, chemical and physical quality of imported dried fish varieties including tuna, sprat, sailfish and catfish with comparison to the locally produced dried fishes of the same variety. Imported dried fish (n= 60) were obtained from Sri Lanka Customs and retail market and locally produced ones (n= 25) were collected from the local market. All samples were tested for total bacterial count, yeast and mould count, total coliforms, *Escherichia coli*, *Staphylococcus aureus*, halophilic bacteria, histamine content, salt concentration and water activity ( $a_w$ ) with reference to Sri Lanka Standards (SLS) specifications. Locally produced samples showed high degree of bacterial contamination while imported samples showed high amount of yeast and moulds. Several imported sprat and sailfish samples were positive for total coliforms and all were negative for *Escherichia coli*, *Staphylococcus aureus* and halophilic bacteria. Histamine concentration in imported tuna samples were  $121 \pm 20$ , and exhibited the specified level in the Sri Lanka Standard (SLS) specification (100 mg / Kg). Locally produced tuna samples showed low histamine content ( $57 \pm 15$ ) and imported samples showed high percentage of salt content (15%) which were exceeded the specified level. There was a significant difference ( $p < 0.05$ ) between both origins. Water activity of both origins was in accepted levels. The quality of locally produced dried fish in terms of histamine content, salt content and yeast and mould count were better than imported samples except for the total bacterial count.

**Keywords:** Dried fish, quality, histamine

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### Introduction

Dried fish is a preserved fish product which involves removal of water. Reduction of water associated with its water activity, limits the decomposition of dried fish. Salted fish products are popular in many countries and are generally safe in developed



countries (Patterson and Ranjitha , 2012). Salting facilitates fish drying, preserves it from insect infestation and improves the quality and taste (Abowei and Tawari , 2011).

A better knowledge on quality and safety of imported dried fish is important because a reasonable quantity of dried fish is imported from international market annually. To continue the importation of these fishery products, the quality and safety of the product should be assured. Therefore, in the present study microbiological, chemical and physical analysis was carried out according to the Sri Lanka Standard 643:2007, to assess the quality of imported dried fish varieties.

## **Materials and Methods**

### *Sampling*

The present study was conducted from May 2014 to October 2014. Imported dried fish samples (n= 60) were collected from Sri Lanka Customs and retail market. Local dried fish samples (n= 25) were collected from local markets mainly from Negombo, Chilaw, Trincomalee, Pothuwil and Buththala areas in Sri Lanka. All samples were packed in sterile sealed polythene bags and brought to the laboratory at NARA.

### *Microbiological examination of dried fish*

In the laboratory, 10 g of dried fish were cut into small pieces and filled up to 100 g with Maximum Recovery Diluents. Then it was kept in refrigerator for 30 minutes and homogenized and series of dilutions were prepared. Total Plate Count was done using pour plate method incubating at  $30 \pm 1$  °C for 72 hours. Yeast and mould count was done using spread plate method incubating at  $25 \pm 1$  °C for five days. Using spread plate method samples were transferred into BairdParker agar plates and incubated at  $37 \pm 1$  °C for 48 hours and *Staphylococcus aureus* was identified. Faecal coliforms and *E. coli* were detected as MPN  $g^{-1}$  and halophilic bacteria were identified by using halophilic agar and incubated at  $35 \pm 1$  °C for 15 days.

### *Chemical and Physical examination of dried fish*

Histamine levels of tuna and sprat varieties were detected by a High Performance Liquid Chromatography (HPLC) method and salt content was detected by using standardized silver nitrate and standardized potassium thiocyanate solution.

Water activity of each sample was measured by using Novasina water activity meter (Novasina AW SPRINT)

### *Analysis of data*

Examined quality parameters were analyzed and compared using ANOVA, Tukey's comparison with Minitab 16 statistical software.



## Results and Discussion

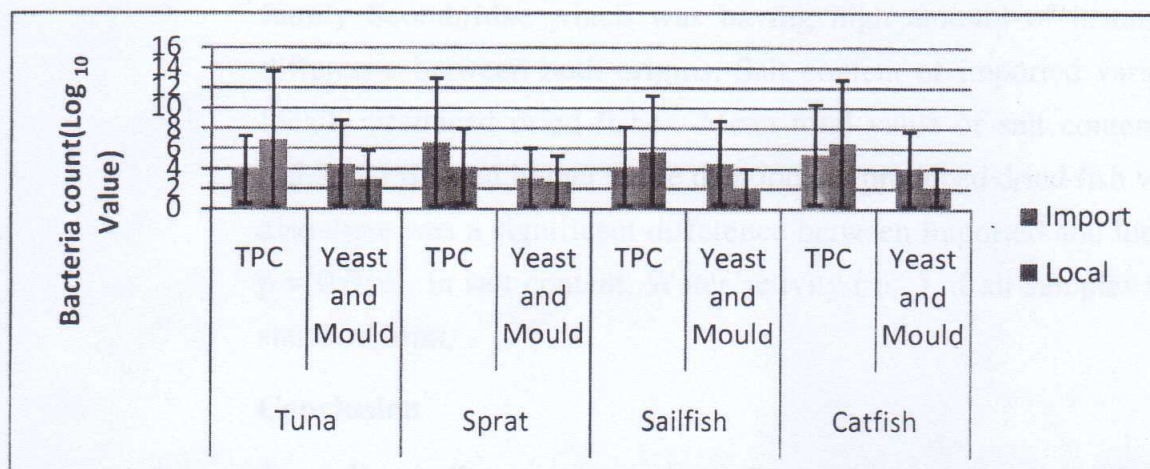


Figure 1: Mean Log values for total plate count (TPC) and Yeast and mould count of each variety (vertical bars indicate the standard errors)

Although all other imported samples showed low level of TPC, imported sprat samples showed exceeded level of TPC. Among the four varieties, three imported varieties were not in an acceptable limit of yeast and mould counts. Locally produced dried fish varieties showed low contamination of fungi. Considering all varieties dried catfish was the most unacceptable variety in both origins. There were five samples of sprat and two samples of sailfish which were found to be positive for the total coliforms, reflecting poor hygienic conditions of processing, handling and transportation.

Table 1 Mean values of histamine, salt and water activity of four varieties

Variety	Histamine (mg/kg)		Salt (%)		Water activity (a <sub>w</sub> )	
	Import	Local	Import	Local	Import	Local
Tuna	121.00 ± 19.91	57.12 ± 15.37	16.63 ± 0.67	11.78 ± 1.32	0.73 ± 0.00	0.73 ± 0.01
Sprat	8.16 ± 0.85	5.58 ± 1.10	10.35 ± 2.38	14.01 ± 3.62	0.62 ± 0.01	0.69 ± 0.01
Sailfish			15.78 ± 1.46	11.28 ± 2.81	0.73 ± 0.00	0.74 ± 0.00
Catfish			18.81 ± 2.63	12.48 ± 1.85	0.73 ± 0.00	0.72 ± 0.01

Imported dried tuna showed higher amounts of histamine which can be considered as an indication of spoilage. Considering both imported and local origins of tuna, spoilage



was higher in imported samples than locally produced samples. Although tuna is in family Scombridae which was having high amount of histamine, indicated much difference between both origins. Salt content of imported varieties was higher than locally produced dried fishes. Mean total value of salt content in imported samples (15.39%) showed higher value than locally produced dried fish varieties (12.39%). And also there was a significant difference between imported and local dried fish samples ( $p = 0.019$ ) in salt content. Water activity ( $a_w$ ) of all samples in both origins were at standard limit.

### **Conclusion**

According to the parameters investigated, it showed that locally produced dried fishes were in good quality for human consumption than imported dried fishes. The quality of the imported dried fishes must be ensured within the customs before being released to the local market. It must be investigated using suitable institutions to give non hazardous good food to the consumers.

### **References**

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