

# Influence of moisture content on fungal growth in commercially salted-dried fishes in Kerala

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Salting and drying is the simplest and cheapest method of fish preservation. Salting is generally aimed at reducing water activity ( $a_w$ ) which inhibits the growth of spoilage microorganism as well as inactivates autolytic enzymes (Horner, 1997). Salted fish products have much demand in many countries including developed countries. One of the main problems faced in the salted dried fish is the fungal contamination which contributes to the quality of cured fish and has been considered as an important quality concern. Therefore determination of the fungal quality of such fishes is very important for safe guarding consumer's health. The dominant fungi in the salted dried fish vary from place to place. The fungal growth in fishes leads to off-flavors, softening of flesh and in certain cases produces potentially dangerous mycotoxins (FAO, 1982). In India, a tolerance limit of water activity of dried/dry-salted fishery products is less than 0.78 at 25 °C and total yeast and mold count less than 500 cfu/g (n=5, c=2, m=100 cfu/g, M=500 cfu/g) has been proposed under the Food Safety and Standards Regulations of FSSAI (2014-under revision). In the present study, fungal contamination of some commercially important dried/salted and dried fishes collected from the

retail markets of Cochin, Alappuzha and Kottayam during different seasons was analyzed.

A total of six different species (n=41), Shrimp (*Metapenaeus dobsoni*), Silver belly (*Leiognathus* sp.), Sole (*Cynoglossus semifasciatus*), Lizard fish (*Saurida tumbil*), Croaker (*Otolithes ruber*) and Mackerel (*Rastrelliger kanagurta*) were sampled in different seasons such as monsoon, post-monsoon and summer seasons. Yeast and mold count varied with seasons. High yeast and mold count of 3.08 log cfu/g and 3.04 log cfu/g were observed during monsoon season in mackerel and silver belly (Table 1). During the post-monsoon season higher yeast and mold count was observed in Lizard fish (2.32 log cfu/g) followed by Sole (1.68 log cfu/g). During summer season higher count was found in Lizard fish (2.36 log cfu/g) followed by Mackerel (2.2 log cfu/g) and Croaker (2.1 log cfu/g). Higher yeast and mold count in the salted and dried fish may be due to the use of contaminated salt, spoiled fish, unhygienic drying and pre-washing of landed catch with contaminated coastal water.

Moisture content in the commercially available dried fishery products ranged from 13.46% (Shrimp) to 48.91% (Mackerel) during

Table 1. Changes in the selected parameters in salted dried fishes during different seasons

Species	Yeast and Mold Count (log CFU/g)			Moisture content (%)			Water activity ( $a_w$ )		
	M*	PM*	S*	M*	PM*	S*	M*	PM*	S*
Shrimp	1.60	0.55	<1.00	13.46	14.81	11.01	0.73	0.72	0.64
Silver belly	3.04	1.17	1.36	45.57	43.41	32.98	0.75	0.74	0.75
Sole	2.46	1.68	1.95	42.69	42.50	31.58	0.75	0.75	0.75
Lizard fish	2.35	2.32	2.36	45.01	38.56	41.765	0.75	0.73	0.72
Croaker	2.10	0.45	2.00	44.02	41.34	36.72	0.75	0.75	0.75
Mackerel	3.08	0.90	2.20	48.91	37.33	42.44	0.75	0.75	0.75

\* M - Monsoon, PM - Post-Monsoon, S - Summer

monsoon season. During post-monsoon season, highest moisture content of 43.41% was recorded in Silver belly. In summer season it ranged from 11.01-42.49%. The seasonal variation in moisture content of salted and dried fish may be due to the variability in drying time, environmental changes and level of salt used for drying. In this study higher yeast and mold count correlated with high moisture content. Water activity was in the range of 0.73-0.75, 0.72-0.75 and 0.64-0.75 in monsoon, post-monsoon and summer seasons respectively.

Analysis of the results showed a seasonal variation in the quality of dried/salted and dried fishes. The microbial stability of the dried products mostly depend upon water activity and moisture content. When the moisture content is high during drying and storage, the chance of fungal growth is more. Therefore, the rapid reduction in water activity ( $a_w < 0.75$ ) and moisture content is an essential controlling factor to prevent fungal

growth during storage (Kolakowska, 2002). Establishment of protocols for monitoring critical parameters such as temperature, humidity, drying, transportation and storage conditions will help in objective forecast of fungal growth of salted and dried fishery products.

### References

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