

# Histamine Content in Dried Fish Products from Kakinada Coast

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The content of histamine, total volatile base nitrogen and salt were determined in 31 varieties of dried samples collected from Kakinada. Most of the gutted, salted and dried fish samples contained histamine below 10mg/100g of muscle, Histamine content in un-gutted salted and dried fish was more than that in gutted, salted and dried fish. In whole dried mackerel it was  $80.6 \pm 48.22$  mg%. During summer, histamine level in whole sun dried white bait reached above 100mg/100g in a few cases while in winter histamine level was almost half. TVBN values did not show any correlation with the histamine content of fish samples.

Several workers (Kimata, 1961; Askar *et al.*, 1986) reported the histamine content of numerous fish varieties and fishery products collected from commercial fish market. Ritchie & Mackie (1980) reported that the histamine level of 100mg/100g of flesh was the accepted limit to cause definite poisoning; but presently the hazardous level of histamine is considered as 50 mg of histamine per 100g of fish muscle (Askar *et al.*, 1986). In Andhra Pradesh, a large quantity of fish are sun dried with and without curing. The tropical temperature range of 20 to 40°C can cause considerable influence to increase the production of histamine in fish muscle in pre-processing and processing steps of curing and drying. This paper reports the ranges of histamine content in different types of dried products available at Kakinada Coast.

## Materials and Methods

Dried fish samples were collected from local fish market at random. Moisture and sodium chloride content in fish muscle were determined by AOAC (1975). Total volatile

basic nitrogen (TVBN) content was estimated by Conway microdiffusion method (1950). Histamine was determined by A.O.A.C. (1975) method whereby histamine was isolated on a cotton acid succinate column, and after elution, estimated colorimetrically (470  $\mu$ m) by coupling with a diazonium salt.

## Results and Discussion

31 varieties of fish samples were analysed (Table 1). It was found that meat of the gutted, cured and dried fish contained histamine within 10 mg/100g of muscle; these samples included *Trichiurus haumela*, *Stremateus sinensis*, *Mugil keloarti*, *Mugil cephalus*, *Sciaenids*, *Chanos chanos*, *Saurida tumbil*, *Olige sp.*, *Carangids sp.*, *Kowala coval*, *Cynoglossus sp.*, *Arius sp.*, *Leiognathus equulus* and *Nemipterus japonicus*. TVBN content in these samples were in the range 100-200mg/100g of muscle. The histamine content in *Psenes indicus*, among the gutted cured and dried samples, was highest i. e.  $34.5 \pm 16.31$ /100g muscle. TVBN content in most of these samples were above 200 mg/100g of muscle (Table 1).

**Table 1.** Histamine, total volatile base nitrogen, salt and moisture content in dried fish

Fish	Moisture %	Salt %	TVBN mg%	Histamine mg%
<b>A. Unsalted sun dried whole fish</b>				
Big white bait ( <i>Stolephorus</i> sp.)	20.7 ± 1.56	-	132.0 ± 0.63	60.6 ± 38.54
Small white bait ( <i>Stolephorus</i> sp.)	22.4 ± 3.12	-	151.5 ± 18.26	29.2 ± 11.12
Small white sardine ( <i>Escualosa thoracata</i> )	18.5 ± 1.85	-	149.8 ± 10.6	15.03 ± 2.53
Small prawn (whole)	15.09 ± 5.42	-	135.3 ± 21.51	20.3 ± 4.51
<b>B. Unsalted smoked</b>				
Small prawn (whole)	18.3 ± 3.54	-	70.1 ± 7.04	8.1 ± 2.05
Big prawn (whole)	20.2 ± 4.62	-	125.6 ± 11.02	8.1 ± 2.53
<i>Mugil kolaarti</i> (guttled)	14.5 ± 2.68	-	150.8 ± 10.25	8.9 ± 4.31
<b>C. Guttled, salted and sun dried</b>				
Seer ( <i>Scomberomorus guttatus</i> )	48.4 ± 3.61	16.1 ± 2.12	147.2 ± 25.42	10.8 ± 2.28
Mackerel ( <i>Rastrelliger kanagurta</i> )	48.4 ± 2.58	12.8 ± 2.21	225.6 ± 50.62	19.2 ± 2.56
<i>Polynemus indicus</i>	36.7 ± 2.26	10.1 ± 2.61	183.3 ± 1.34	11.5 ± 3.21
<i>Psenes indicus</i>	39.9 ± 4.61	16.1 ± 1.56	225.5 ± 23.61	34.5 ± 16.31
Barracuda ( <i>Sphyraena jello</i> )	45.3 ± 3.68	14.61 ± 1.25	240.4 ± 24.32	17.2 ± 1.51
Ribbon fish ( <i>Trichiurus haumela</i> )	41.91 ± 3.04	14.62 ± 1.67	173.6 ± 20.71	4.1 ± 1.21
White Pomfret ( <i>Stromateus sinensis</i> )	40.3 ± 9.02	8.2 ± 1.24	161.6 ± 10.07	7.8 ± 1.02
<i>Mugil kelaarti</i>	37.4 ± 1.49	9.5 ± 1.22	147.8 ± 11.07	4.4 ± 1.51
<i>Mugil cephalus</i>	44.2 ± 3.08	12.6 ± 1.34	78.57 ± 8.61	4.1 ± 1.72

Table contd.

Table 1. contd.

Sciaenids	42.5 ± 1.72	12.8 ± 1.44	116.1 ± 10.05	6.6 ± 2.67
<i>Chanos chanos</i>	42.1 ± 2.87	12.7 ± 1.52	93.7 ± 9.88	3.21 ± 1.24
<i>Saurida tumbil</i>	52.1 ± 6.08	11.8 ± 2.31	90.7 ± 13.08	4.01 ± 1.56
<i>Oligo sp.</i>	43.1 ± 2.75	12.6 ± 1.41	91.4 ± 10.13	8.6 ± 1.35
<i>Carangid sp.</i>	42.3 ± 3.31	12.3 ± 1.37	88.1 ± 8.3	5.1 ± 1.05
White sardine ( <i>Kowala coval</i> )	43.8 ± 3.55	12.6 ± 1.31	190.2 ± 29.62	8.1 ± 1.81
Sole ( <i>Gynoglossus sp.</i> )	29.1 ± 2.84	8.8 ± 1.13	196.1 ± 18.24	4.1 ± 2.03
Cat fish ( <i>Arius sp.</i> )	43.1 ± 3.8	13.4 ± 1.54	183.3 ± 0.52	5.2 ± 1.06
Silver bellies ( <i>Leognathus equulus</i> )	40.5 ± 2.11	11.8 ± 1.17	190.5 ± 22.51	6.4 ± 2.26
<i>Nemipterus japonicus</i>	38.5 ± 2.64	9.1 ± 1.41	165.1 ± 18.52	8.1 ± 1.14
D. Salted and sun dried whole fish				
Mackerel	45.1 ± 4.54	12.63 ± 3.31	256.5 ± 0.86	80.6 ± 48.22
<i>Decapterus sp.</i>	40.2 ± 4.01	16.4 ± 1.54	192.3 ± 21.21	35.2 ± 11.43
<i>Gerres filamentosus</i>	37.1 ± 2.31	10.6 ± 2.15	154.5 ± 5.10	18.8 ± 4.51
Silver bellies ( <i>Loignathus sp.</i> )	29.1 ± 4.62	9.4 ± 1.56	240.8 ± 20.06	12.1 ± 1.44
<i>Sillago sihama</i>	31.8 ± 5.22	10.8 ± 3.15	143.6 ± 15.23	17.1 ± 2.63

The histamine content in salted and dried whole fish was above 10mg/100g; it was above hazardous level in mackerel and was near the hazardous level in decapterus. No correlation was noticed between histamine content and TVBN content in these fish.

Sun dried unsalted whole fish had histamine above 15mg/100g. During summer, histamine level in whole sun dried big white bait reached above 100mg/100g (Table2)

in a few cases. The presence of histamine forming mesophilic bacteria in gut increases histamine content considerably in fish (Hardy & Smith, 1976; Salguoro and Mackie, 1979). Thus the longer drying period of unsalted whole big white bait in comparison with the same type of other sun dried products can possibly explain the higher histamine content in big white bait at higher ambient temperatures (Smith *et al.*, 1980). Average histamine content in gutted, salted and dried fish samples

Table2. Seasonal variation of histamine, total volatile base nitrogen and moisture content in white bait

	October - January		Histamine mg%	Moisture %	March - June	
	Moisture%	TVBN mg%			TVBN mg %	Histamine mg%
Big white bait	20.7 - 22.2	91.4 - 136.7	21.04 - 53.25	19.2 - 21.1	130.2 - 172.6	71.33 - 100.21
Small white bait	22.1 - 25.6	133.8 - 155.4	18.10 - 25.6	19.1 - 23.6	145.4 - 169.3	31.06 - 40.24

was lower than that in whole salted and dried fish products. TVBN did not show any correlation with the histamine content in fish samples.

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