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Species Diversity and Status of Asia's largest Dry Fish Market

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ABSTRACT

Jagiroad, located in Morigaon district of Assam is known for the Asia's largest dry fish market. The market is currently dealing with 300 different types of dried fish product with more than 100 species of freshwater and remaining from marine water fish. Among the freshwater fishes only 10-15 species (*Puntius* spp, *Notopterus Notopterus*, *Amblypharyngodon mola* and *Labeo* spp etc and from marine *sardinella*, *Mackeral* spp and *Harpodon neherus*) are highly in demand in market. Freshwater dry fish species are mostly procured from West Bengal, Uttar Pradesh, Bihar and Tripura and marine water dry fish species are received from Gujarat, Kerala and Andhra Pradesh. Dried fish products are available only for wholesale and the price of the product depends on several factors like type of dried fish product, transportation cost, cost of storage etc. In the present study protein content of dried fish was found higher than the fresh fish. It was also observed that women were actively participating in dry fish market as wholesaler, business dealer and as day labour etc. The major constraints observed in dry fish market were contaminated with faecal matter, blow flies, lack of infrastructure and proper storage facility.

Key Words: Analytical, Diversity, Participation, Sanitation, Women.

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INTRODUCTION

Dried fish is very popular in north eastern India and often consumed as a daily dish or as taste enhancer. Dried fish is used along with other food items for its specific flavor and aroma. Dried fish is the good source of protein, minerals and nutrients especially for economically weaker section of society who cannot afford meat or fresh fish. (Banu *et al,* 1985; Murray and Little, 2000). Jagiroad dry fish market located in Morigaon district of Assam is famous for its species diversity which includes both fresh water and marine water fish species (Mallick *et al,* 2022). Thus, in the present study, a detailed study was conducted on its species diversity, marketing channel and quality analysis of the dry fish imported from different states of India.

MATERIALS AND METHODS

Study Area

The study was carried out at Jagiroad dry fish market during August to December, 2022. During survey all fish retailers were questioned. Selected market intermediaries, other functionaries, and Jagiroad dry fish committee were questioned. Jagiroad dry fish market is situated near Jagiroad railway station and is at distance of 650 m from NH 127. It is well connected through rail and road transport. Identification of fish species was done following standard protocols given by Jayaram (1999).

Analytical study: - Analytical study was carried out for identification of different species, import-export price and management system of market

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Table1. Species diversity at Jagiroad dry fish market

Fish name	Family	Genera	Class	Local name	Imported from	Import price (Rs/ kg)	Wholesale Price (Rs/kg)
Notopterusnotopterus	Notopteridae	Notopterus	Actinopterygii	Kandhuli	Uttar Pradesh West Bengal, and Bihar	250	270
Puntius sophore	Cyprinidae	Puntius	Actinopterygii	Puthi	West Bengal, UP, Tripura, Morigaon	200-220	230-250
Puntiusjavanicus	Cyprinidae	Puntius	Actinopterygii	Javaputhi	West Bengal Bihar	70-100	100-120
Puntiusticto	Cyprinidae	Puntius	Actinopterygii	Ceniputhi	West Bengal Bihar	70-100	100-120
Acetessp.	Sergestidae	Acetes	Malacostraca	Singri/ micha mach	West Bengal Bihar,Tripura	120-130	150
Channa Punctatus	Channidae	Channa	Actinopterygii	Goroi	West Bengal, Bihar, UP	70	90
Amblypharyngodonmola	Cyprinidae	Amblypharyngodon	Actinopterygii	Mua-mach	Tripura West Bengal,Bihar	7	9-10
Labeobata	Cyprinidae	Labeo	Actinopterygii	Vangun	West Bengal Uttar Pradesh Bihar, Tripura	270-180	200-220
Channa striatus	Channidae	Channa	Actinopterygii	Shawl	West Bengal, Bihar, UP	40-50	60-70
Mystusvittatus	Bagridae	Mystus	Actinopterygii	Singhora	WestBengalBihar	150-200	200-250
Tenualosilisha	Clupeidae	Tenulosa	Actinopterygii	ilish	WestBengal	500-550	600-650
Anguilasp.	Anguillidae	Anguilla	Actinopterygii	Bami	West Bengal Bihar, UP	650-700	750-800
Sardinella longiceps	Clupeidae	Sardinella	Actinopterygii	Sardine	Gujarat, Kerala,AP	170-200	200-250

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Rastrelliger kanagurta	Scombridae	Rastrelliger	Actinopterygii	Mackerel	Gujarat, Kerala,AP	150-200	200-250
Chanos chanos	Chanidae	Chanos	Actinopterygii	milkfish/ chandusi	Gujarat, Kerala,AP	170-230	240-270
Johnius dussumieri	Scianidae	Johnius	Actinopterygii	Panna dry fish	Gujarat, Kerala, A P	90-130	150-200
Stolephorusindicus	Mandeli dryfish	Engruilidae	Actinopterygii	Stolephoru s	Gujarat mostly	150	200-220
Labeogonius	Cyprinidae	Labeo	Actinopterygii	Kuhi	WestBengalmostly	150-180	200
Gudusiachapra	Clupeidae	Gudusia	Actinopterygii	Karati	WestBengal,UP	180-200	220-250
Coiliadussumieri	Engruilidae	Coilia	Actinopterygii	(GoldenAnchovy)	Gujarat,Kerela	70-90	110
Heteropneustesfosilis	Heteropneustidae	Heteropneutes	Actinopterygii	Singhi	WestBengal,Tripura	250-270	300
Xenontodoncancila	Belonidae	Xenontodon	Actinopterygii	Kokila	West Bengal, UttarPradesh	200	250
Rasboradaniconius	Cyprinidae	Rasbora	Actinopterygii	Dorikona	WestBengal,AP	160-180	200
Glossogobiusgiuris	Gobidae	Glossogobius	Actinopterygii	Patimutura	WestBengal	140-150	180
Aorichthysaor	Bagridae	Aorichthys	Actinopterygii	Aari	West Bengal,Uttar Pradesh	200-220	250-300
Mystusspp	Bagridae	Mystus	Actinopterygii	Singora	WestBengal,Uttar Pradesh	150-170	200
Oreochromisniloticus	Cichilidae	Oreochromis	Actinopterygii	Tilapia	Tripura, West Bengal	120-140	150-170
Clariusmagur	Claridae	Clarius	Actinopterygii	Magur	WestBengal, AP	450	500
Macrognathuspuncalus	Mastacembelidae	Macrognathus	Actinopterygii	Tura	WestBengal,Bihar	750-780	800

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Ompoksp.	Siluridae	Ompok	Actinop-terygii	Pavo	WestBengal	670-690	700-800
Mastacembelu-sarmatus	Masta-cembeli-dae	Mastacembelus	Actinop-terygii	Bami	WestBengal	450-480	500
Nandusnandus	Nandidae	Nandus	Actinop-terygii	Gedgedi	WestBengal, Biha-r,UP	200	220-240
Labeocalbasu	Cyprini-dae	Labeo	Actinop-terygii	Mali,Ko-liajai	WestBengalUP	130-150	160-170
Wallagoattu	Siluridae	Wallago	Actinop-terygii	Borali	WestBengalmostly	270-290	300
Thryssamystax	Engrauli-dae	Thyrssa	Actinop-terygii	Gangeti-canchovy	Gujarat,WestBen-gal	200-220	230-250
Caranxmala-baricus,(Para)	Carangi-dae	Caranx	Actinop-terygii		Gujarat,AP	150-170	180-200
Harpadonne-hereus,(Bumla)	Synodon-tidae	Harpadon	Actinop-terygii	Bumla	Gujarat,Kerela	120-140	150-170
Labeobata	Cyprini-dae	Labeo	Actinop-terygii	Bhagan	MostlyWest Bengal	170-180	200

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Biochemical and Quantitative analysis: Protein was analyses for biochemical analysis following Lowry's *et al* (1951) method.

RESULTS AND DISCUSSION

Dry Fish market is currently dealing with more than 300 different types of dried fish product with more than 100 species of freshwater and remaining from marine water fish. Among the freshwater fishes only 10-15 species (*Puntius* spp, *Notopterus notopterus, Amblypharyngodon mola and Labeo* spp and from marine sardinella, *Mackeral* spp and *Harpodon neherus*) were high in demand in the market (Table 1)

Protein analysis- A quantitative analysis was done for five numbers of fish species that were also available in fresh in Morigaon district for both dried and fresh condition. The result reveled that crude protein content was almost twice in dried fish than those of fresh fish (Table 2).

Retail Price. Retail price of dried fish was mainly influenced by market demand, quality of dried fish, mode of transportation and cost of dried fish production.

Photo plates of different species collected from Jagiroad dry fish market



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TABLE 2. Quantitative Analysis of Protein of sun-dried and in Jagiroad dry fish market (Mean± Standard Deviation)

Fish species	Protein content (µg/mL)	
	Fresh fish	Sundried fish
Puntius sophore	140±0.07	200±0.40
Amblypharyngodon mola	140±1.01	155±0.42
Notopterus chitala	150±1.01	230±1.11
Channa punctatus	140±0.01	165±0.50
Labeo rohita	180±1.01	335±1.01

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Retail cost was calculated as follows

Retail cost = purchase cost from producer + transportation cost + labour charge + tax + storage charge + ice cost + packaging charge + electric charge.

Export of dry fish. Below figure (a) shows the export of dried fish to foreign nation from Jagiroad.

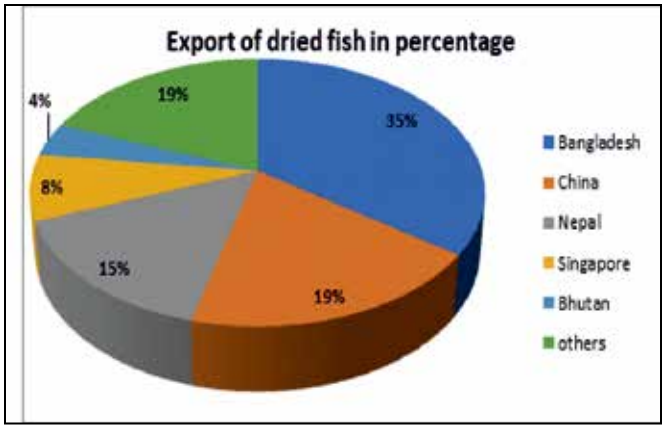


Fig a: Percentage Export of Dry Fish

Jagiroad dried fish market mostly exports to North east (70-80%). Maximum export took place in Tripura (25%) followed by other state (data shown on fig b)

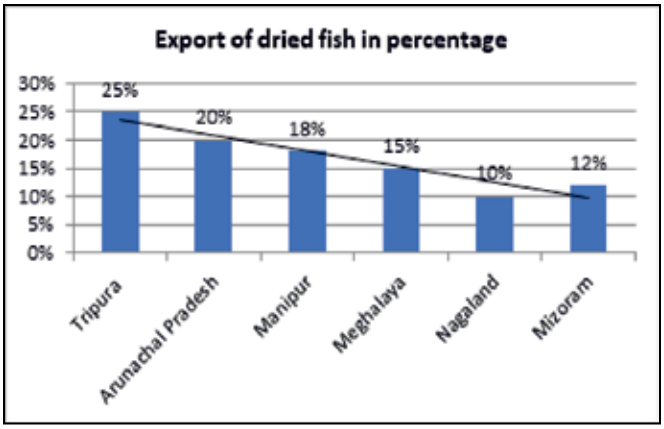


Fig b- Percentage export of dry fish in north eastern India

Import of Dry Fish- The import percentage of dried fish is fluctuating in different season but almost 50-55 % dried fish was procured from Gujarat followed by Uttar Pradesh (12-15%), West Bengal (10-12%), Andhra Pradesh (8-10%), Bihar (5-7%) fig (c).

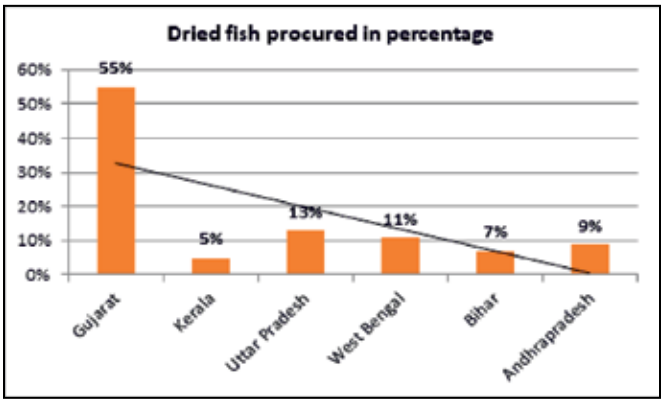


Fig. c: -Arrival of dry fish from different state of India Jagiroad fish market



Pic 5:-Blow flies in dried fish



Pic 6 :- Garbage's near the dried fish product



Pic 7: Interaction with first woman wholesaler of Jagiroad dry fish market

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Jagiroad fish market hygiene and sanitation hygiene and sanitation- During the market survey it has been observed that main market area was contaminated with fecal matter due to the lack of proper garbage eradication system. Some of the dried product gets contaminated by blow flies and insects. Quality of dried product also gets deteriorated by mold and fungal infection during rainy season.

Role of women in Jagiroad dry fish market. Women in dry fish market of Jagiroad plays a crucial role by actively participating in inter-state dry fish business especially in Meghalaya, Manipur and Mizoram. Women were also involved in cleaning of market, eradication of garbage andloading and unloading of dry fish bags. Puja Saha is the only woman wholesaler in the market who adopted her father's business after his sudden death in the year 2021.

Major limitations observed in Dry Fish Market

It was observed that lack of proper sanitation facility, lack of storage facility, lack of garbage eradication facility, poor infrastructure, lack of proper market management system, less number of women participation and contamination of dried fish product were common which needs special attention of the authorities.

CONCLUSION

Diversity in species was observed in dry fish market of Jagiraod. However, among the 100 different species available, only 10-15 species are widely available and have huge market demand in north-eastern India as well as in neighboring countries. Considering the nutritional aspect of dried fish, biochemical analysis of protein revealed that protein content of dried fish is almost double than



Pic 8:-Dried fish business woman from Meghalaya



Pic 9: Woman labour at dried fish market

that of the fresh fish. Species diversity fluctuation occurs in every month and season depending on factors like market demand, supply, cost of production, market chain, nutrient availability etc. Lack of proper hygienic and storage facility deteriorates the quality of dried fish which reduces the price of the product. During the survey, it was observed that sometimes due to spoilage, price of dried fish decreased upto Rs. 10-15 /kg which is used in local fish meal industry. Growth of the market is ceased due to poor sanitary condition, lack of proper infrastructure and storage facility. There is a need to develop policy for the growth and development of the largest fish market of Asia.

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