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Traditional and indigenous fish products of Chhattisgarh, India

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Abstract

Bhunji machhli and sukshi machhli are the popular traditional dried and smoked-dried fish products, developed by fisher folks of Chhattisgarh. The traditional and indigenous knowledge for the production of sukshi machhli and bhunji machhli are discussed. Small size and low value fish species such as *Puntius ticto*, *Puntius sophore*, *Mystus tengara*, *Parluciosoma daniiconius*, *Anabas testudineus*, and *Mastacembelus armatus* are mostly used for preparation of these products. Majority (68.18 %) of fisher folks and vendors involved in production and marketing of these products are women with age group of 30-50 years. About 76% fisher folks and vendors are illiterate, while 14% had primary or secondary education. Fisher women prepare these fish products and sold at local markets that strengthen the women empowerment and nutritional status in Chhattisgarh. In addition, these traditional fish products preserve the fish for off season and help in providing year round availability of the fish. The study concluded that the intervention of new technology in the field of fish processing will help in reducing the post harvest loss and produce superior quality fish products.

Keywords: Bhunji machhli Dried fish, Smoked fish, Sukshi machhli

Introduction

Fish is an important dietary component of people in the world and represents a relatively cheap and accessible source of protein [1]. Among the other animals protein, fresh fish are more perishable and get spoil within a few hours [2]. Appropriate fish processing and preservation methods such as drying, salting, smoking, fermentation and, frying are applied individually or in combination to limit the post-harvest loss [2-3]. The selection of processing and preservation methods are greatly influenced by the area's geographical location, socio-economic status of fishermen and the food habits of the local people [4]. In Chhattisgarh, traditional drying and smoking methods are mostly used for fish preservation [5]. Chhattisgarh state has 1.837 Lakh ha water area available for fisheries that contribute 4.69 Lakh ton fish production. The state has 6th position for inland fish production in India and around 2 Lakh people are engaged in fisheries sector [6]. The Kevat, Dhiwar, Mallah, Manjhi, and Navik are the main fishing communities in Chhattisgarh, which are engaged in fishing and fish processing activities. The Dhamtari, a district of Chhattisgarh is located between latitude 20°42'N to longitude 81°34' E covering large water resources including rivers, reservoirs and ponds.

Fisher folks living near the rivers and reservoirs of Chhattisgarh preserve the surplus catch through traditional drying and smoking. During the late monsoon period, the main catch of harvested fish is sold in domestic markets and the remaining catch, by-catch, minor carp, and less valuable weed fish are used for the preparation of various traditional indigenous fish products. The earlier documentation of various traditional and indigenous fish products such as numsing [7], hentak [8], ngari [9], tungta [9] and shidal [10-11] have been well reported from different states of India but the information about traditional fish processing and preservation

methods, types of packaging material, distribution and socio-economic conditions of fisher folks are not documented. Therefore, a study was conducted to document the traditional fish processing and preservation methods employed in the Dhamtari district of Chhattisgarh.

Methodology

The study was carried out in the Kurud, Sihawa and Nagari blocks of Dhamtari district, Chhattisgarh, India. These blocks were identified as the major fish harvesting and fish processing sites situated around the rivers, and reservoirs. The survey was conducted through personal interviews and group discussions with fisher folks, fish processors, traders and, stake holders. During the survey, different socio-cultural and age groups of the respondents were interviewed using pre tested questionnaires and on site observations of processing sites. The secondary data were also collected from fisheries inspectors (Department of Fisheries, Government of Chhattisgarh), NGO and, local fish entrepreneurs. The data pertaining to the sources of raw materials, methods of preparation, storage of final products, mode of consumption, selling patterns and other relevant information were collected.

Results and Discussion

Socio-cultural status of fisher folks

The fisher folks living near the rivers and reservoirs preserve the surplus catch through traditional drying and smoking methods, which are sold in local markets and stored for fish scare season. Ethnic people of Chhattisgarh prepare sukshi machhli and bhunji machhli by using their indigenous knowledge of fish processing without using any additives or chemicals. These traditional fish processing activities are prominent by women fishers (68.18 %) with age group of 30-50 years. Most of the fish processors (90%) received the knowledge of traditional fish processing methods from their parents while remaining acquired by themselves. During the study, about 76% of fisher folks and vendors were found illiterate, while 14% had primary or secondary education. Sixty four percent (64%) of the fisher folks produce both sukshi machhli and bhunji machhli, while 27% fisher folks produce bhunji machhli and 9 % produce sukshi machhli. The fisher folks claimed that such traditional and indigenous fish products are very much popular in Chhattisgarh because of their health benefit and a unique taste. Previous study reported that smoked fish have low values of saturated fatty acids and high ratio of omega-3/6 fatty acids that helps in reducing the coronary heart disease (CHD) [12].

Traditional smoked and dried fish products of Chhattisgarh

Bhunji machhali

Bhunji machhali is a traditional and indigenous smoked-dried fish product of Chhattisgarh. This is mostly prepared from July to March with a peak period from September to October. The fresh fish harvested from nearby river, irrigation canals, streams, and reservoirs are directly brought to the processing sites. Fish were segregated according to species, size and then primary washing was done to remove the dirt and other contaminants. The big size fish were scaled and gutted while small size fish were used as whole for the preparation of bhunji machhli. The addition of salt to fish was not practiced before being dried and smoked. After primary washing, fish were spread on fishing net or feed bags for initial sun-drying for 2-3 hrs in open environment. For half burning, fisher folks

used an indigenous made bamboo pole platform on which bed of paddy straw was made. The initially air dried fish were kept on the bed of paddy straw and the top of fish was also covered with paddy straw in order to uniform smoking. The fish were allowed to burn in paddy straw for 20-30 minutes and thereafter, half smoked fish were removed and allowed for final sun drying for 48-96 hrs. During the sun drying, the fish were turned upside down after a time interval for uniform drying. These smoked-dried fish are locally known as bhunji machhli. The steps involved in the preparation of Bhunji machhli have been represented in Fig.1-6. These smoked-dried fish are packed in a gunny bags locally called 'bori' or 'chundi' and stored in tent or room for at least one month before marketing. The Bhunji machhli are sold in the local markets of Jagdalpur and Dantewada districts of Chhattisgarh. The people of Chhattisgarh prepare a delicious curry of Bhunji machhli and serve with rice. The Bhunji machhli are also exported to fish markets of neighbouring states like Orrisa, Andhra Pradesh, and North-East states. Among the other fish species, *Puntius spp*, *Mystus spp*, and *Parluciosoma daniocoonius* were found most frequently used for production of *Bhunji machhli* and that might be because of their huge availability, physical accessibility and consumer preference. The fish species which are mostly used for preparation of Bhunji machhli have been represented in Fig. 10-17.

Sukshi machhli

Sukshi machhli is a popular traditional sun dried fish product of Chhattisgarh. The local fisher-folks had developed their own traditional and indigenous methods for fish drying. During the study, it was observed that fish processing sites for sukshi machhli are situated near the fish markets for easy transportation and communication. The kurud, sihawa and nagari, blocks of Dhamtari district were identified as a major fish drying areas. Among the others, kurud block was identified as a largest fish drying area. Fresh water fish harvested from nearby rivers, reservoirs and, streams were brought to the processing sites and segregated based on their species and size. The de-scaling and gutting was done only for big size fish and small size fish were processed as whole fish. Fish salting step was not practiced before drying. After sorting, fish were spread on the fishing net or mat or feed bags and exposed to sun light for 48-72 hrs in open environment. According to the respondents, fish drying duration varies according to the fish size, intensity of sun light and, air velocity in the environment. The fish were turned over after a time interval for uniform sun drying. These traditional sun dried fish are locally known as sukshi machhli. The sun-dried fish were then packed in jute made bag or plastic bag and stored in room. The sukshi machhli are sold at local fish market of kurud, known as 'sukshi machhli bazar' that opens only on every Tuesday of week. There is considerable consumption of sukshi machhli in Chhattisgarh and also in the neighboring states particularly, Andhra Pradesh, Telangana, and North-East states of India. The traditional sun drying of fish was found more prevalence from June to October due to the huge availability of catch and high intensity of sun light. During the study, it was also observed that the fish were almost in direct contact with sand and blowflies during handling and processing and that might affect the nutritional quality of dried fish and consumer safety. Therefore, fish processors were advised to use at least bamboo rack and hanging methods for fish drying that will help in improving the quality of final products. There is an

ample scope for intervention of mechanical methods for fish drying which will produce the superior quality of sukshi machhli.

Commercialization of Bhunji machhli and sukshi machhli

The most dried and smoked fish marketed are belong to the fish species such as *Puntius ticto* & *Puntius sophore* (72.72%), *Mystus tengara* (59.09%), *Parluciosoma daniconius* (36.66 %), *Anabas testudineus* (27.27%), *Mastacembelus armatus* (22.72%), *Lepidocephalichthys guntea* (13.63%), *Heteropneustes fossilis* (13.10%), *Channa*

striatus (9.09%), *Salmostoma bacailai* (8.91%), and *Ambylopharyngodon mola* (4.54%). The average selling price of sukshi machhli and Bhunji machhli are Rs.130/kg and Rs.180/kg, respectively. The respondents reported that the selling price of Bhunji machhli made up of *Heteropneustes fossilis* is fetch at higher price in the fish market and that might be because of nutritional value of fish and consumer preference. The overall quality of sukshi machhli and bhunji machhli is good but there is an ample scope in improvement of traditional and indigenous fish product of Chhattisgarh.



Fig. 1 to 9; 1. Bamboo platform for fish smoking; 2. Paddy straw (*Para*) used for smoking ; 3. Spreading the fish on Paddy straw; 4-6. Fish smoking by traditional method; 7. Sun-drying of fish on fishing net; 8-9. Sun-drying of fish on plastic sheet or feed bags



Fig. 10 to 17; Traditional smoked-dried fish; 18-24. Traditional sun-dried fish

Conclusion

The study revealed that drying and smoking process varied according to the size, species and end product. Thus, some dried and smoked fish species have limited shelf life while other fish species can be preserved for longer time. The sun light and paddy straw was used as a main source of fuel for preparation of sukshi machhli and bhunji machhli respectively. The storage facilities, insect infestation, rotting of products, and emission of unpleasant smell from dried and smoked fish are observed as a major problems faced by fish processors. Hygienic conditions followed by the fish processors during fish handling and processing are not satisfactory. Therefore, quality of sukshi machhli and bhunji machhli can be improved through trainings on hygienic handling of fish and fish products. The fish processing at Dhamtari district of Chhattisgarh will definitely thrive and will become a boom for the source of income of fisher folks, if the skills of fishermen and processing methodology are get motivated.

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