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Research Paper :

Performance study of solar tunnel dryer for drying of fish variety *Dhoma*

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ABSTRACT

Locally available fish variety Dhoma was selected for evaluation of solar tunnel dryer. These selected fish were treated with salt and without salt before drying in solar tunnel dryer and open sun drying. Drying rate was higher in solar tunnel dryer compared to open sun drying due to higher temperature (53.5^{0}C) attained. Time required to reach safe moisture content was observed. Drying time required for salted fishes was more compared to unsalted fish. In case of the fish sample with salt treatment moisture content reduced upto 19.29 % (d.b.) within 35 hours for upper tray, 19.63 % (d.b.) within 37 hours for lower tray and 19.41 % (d.b.) within 39 hours for open sun drying. While for the fish sample without salt treatment moisture content reduced upto 19.05 % (d.b.) within 32 hours for upper tray, 19.90 % (d.b.) within 35 hours for lower tray and 23.73. % (d.b.) within 37 hours for open sun drying. In open sun drying method, moisture absorption during night was higher than solar tunnel dryer. In solar tunnel dryer contamination due to insects, birds, wind and the animals were not found as in case with open sun drying.

Key words : Fish drying, Organolyptic evaluation, Solar tunnel dryer

Preservation of fish is a great problem because it decays fast by the action of enzymes and bacteria on the fish and also by chemical oxidation of the fat in open atmosphere. Fish drying increases the storage time from catch till consumption. The annual fish production in the year 2004-2005 was 6.30 million tonnes from which 2.78 million tonne from the marine sector and 3.52 million tonne from the inland sector (Annual report 2005-06, Ministry of Food Processing Industries).

Maharashtra state offers an excellent opportunity in the fisheries sector because of the vast natural resources. The state stands at 3rd position in the marine fish production and 6th position in inland fish production in the country. The annual fish production of Maharashtra state was 3.9 lakh tonne in year 2002-2003. Total 720 km long seashore of Arabian Sea falls under the Konkan region of Maharashtra with average production of marine product of about 3.5 lakh tonnes per year. It is estimated that out of total marine products produced in the state, nearly 30 per cent are dried and sold as a dried food in the market mostly during the off-season from June to September. At present various types of fish such as Ribbon fish / Bala (*Trichiurus lepturus*), Golden anchovies/ Mandeli (*Coilia dussumieri*), Croker / Dhoma (*Johnius dussumieri*), Prawns / Kolambi (*Penaeus monodon*), Pomphlet (*Pampus argenteus*), Surmai (*Scomberomorus guttatus*) etc., are used as dried fish due to their availability and good market value. Dried fish can be stored for longer period without deterioration. Traditional method of fish drying may add impurities like dust, sand, insects and bird waste. The open sun drying requires longer drying time as well as it is an uncontrolled drying process. The conventional method of fish drying causes loss of material and quality of the product during the drying and hence reduces the market value of final product. Use of solar dryer helps not only to reduce losses and maintain the quality of the product but also helps in conserving the conventional energy sources.

The present investigation was, therefore, undertaken to study the performance evaluation, quality assessment, and organoleptic evaluation of fish variety Dhoma dried in solar dryer.

METHODOLOGY

The experiment was conducted in solar tunnel dryer and in open sun drying with treatments *viz.*, with salt and without salt.

The essential components of the dryer are air inlet (air vent), absorber box, drying tray, transparent dome, GI frame and chimney. The wall of the solar drying system was made of Kaddapa to reduce the heat losses. Inside the wall flat G.I. plate with black paint were used as an absorber. The glass wool and thermocol material was used as an insulator between the absorber and wall of the solar dryer. A door was provided to the dryer for easy loading and un-loading of product. A dome was then provided for the resting of the transparent thick plastic sheet. The UV polythene sheet of 200-micron gauge was used to collect