

Research Paper :

Study of effect of different packaging material on quality of coconut chips

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ABSTRACT

An experiment was carried out at Department of Agriculture Process Engineering, College of Agricultural Engineering and Technology, Dr. B.S.K.K.V., Dapoli to study preparation and quality of coconut chips. Coconuts of *Banawali* variety were selected for preparation of chips. Firstly sweetened coconut chips were prepared for the study. By using sugar syrup sweetened coconut chips were prepared. Bags of different packaging materials like Polyethylene, low density polyethylene and aluminium foil were used and by using hand sealing machine every packaging material was packed with different number of sealing strips after filling with coconut chips. 20 g quantity was used for filling each bag. Some of the samples of coconut chips were kept open to the atmosphere as control samples. After every 10 days interval observations for moisture content and peroxide value were taken. After three months of storage these samples were kept for the organoleptic. It was found that irrespective of the packaging material moisture content and peroxide value of coconut were increased in case of every treatment of packaging. Sensory evaluation showed that the coconut chips stored in the aluminium foil having polyethylene bag inside with four sealing strips were having more average overall acceptability score and lowest increase in the moisture content and peroxide value.

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Key words : Packing material, Packaging process, Storage life, Quality of coconut chips

The coconut palm (*cocos nucifera* L.) is widely known as the "Tree of Heaven or Kalpavriksha". The bounded relationship between a common man and the coconut palm can be perceived from the use of the coconut and its products in his social and cultural life. The area under coconut cultivation is 1.93 million hectares with the production of 15840 million nuts. As coconut is not grown in all places, it is transported to such regions either as whole coconut or in partially dehusked form.

The dehydrated coconut chips are ready to eat and can be used as snacks. Osmotic medium for preparation of chips may be salt or sugar (Vennila and Pappiah, 1998). By using sugar syrup sweetened coconut chips are prepared. There are different flavour can be used with sweetened coconut chips such as vanilla, pineapple, lemon etc. By using salt solution salty coconut chips can be prepared. Packaging is one of the most important unit operations in the processing to increase the shelf life of the commodity or the processed product (Roopa *et al.*, 2006). The main function of a package is to contain the product and protect it against a variety of hazards which might adversely affect its quality during handling, distribution and storage. In the packaging process packaging materials plays very important roll. Use of improper packaging material may cause the effect on the nutritive value of the food product, cash value of the product and also the storage life of the food product. The

good packaging material must be inert it should not have any reaction with the packed food because it may contaminate the food.

METHODOLOGY

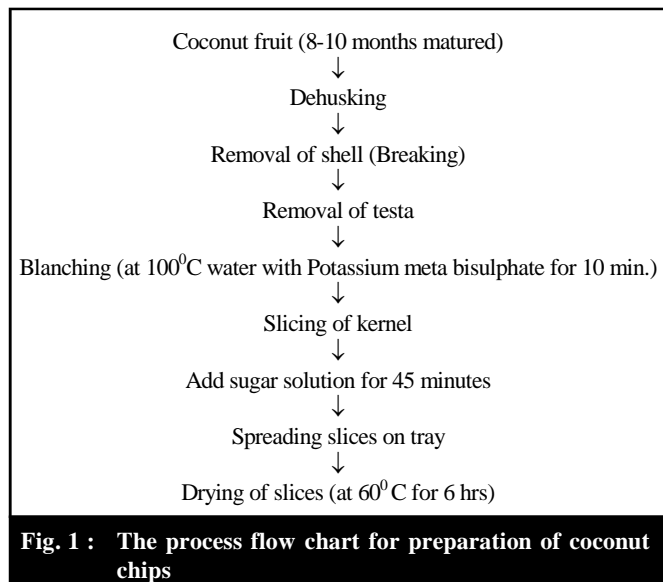
An investigation was carried out to study effect of different packaging materials on quality of coconut chips. Coconuts of *banawali* variety were selected for the study. The details of materials used and methods adopted in course of investigation are given below.

'*Banawali*' variety of coconut was used for preparation of coconut chips. potassium metabisulphate was used for blanching of coconut chips while its preparation. The sugar was also used for the experiment and it was purchased from local market. The packaging materials like polyethylene bags, low density polyethylene bags, aluminium foil bags and aluminium foil bags having Polyethylene bag inside were selected for packaging of coconut chips.

Instruments:

Tray dryer available in the Grain Processing Laboratory was used for drying of coconut chips. Refractometer was used for measurement of total soluble solids of the sugar solution. Coconut chips were sealed by the sealing machine. Weighing machine was also used for experiment. A precision balance was used to measure

minute difference in moisture content of coconut chips. The gravity air oven was used to measure the moisture content.



The dried chips were placed in different packaging materials. These packs were placed at room temperature for checking its quality after every 10 days interval.

The moisture content was determined with the help of air oven method. The weight loss of the coconut chips was measured for different temperature *i.e.* 60, 70, 80°C in the air oven for every 5 min interval till getting constant weight. The observations recorded showed that the constant weight was found after half hour of duration at 80°C. Therefore the 80°C temperature for half hour was used for determination of moisture content in the further whole experiment.

The rancidity occurs in oils due to reaction with oxygen of air (oxidative rancidity) or due to micro-organisms (ketonic rancidity). The oxygen in oxidative rancidity is taken up by the fat which forms peroxides. Rancidity is measured in terms of peroxide value. The peroxide value was determined by chemical analysis (Ranganna, 1986).

Sensory evaluation for different organoleptic properties namely colour, crispiness, flavour and taste were carried out by the panel of 21 judges of different age groups, sex and food habits on the basis of nine point hedonic scale.

RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been summarized under following heads:

Moisture content of coconut chips:

The coconut chips after drying divided into 145 groups of 20 g sample size. The packaging materials like polyethylene, low density polyethylene, aluminium foil and aluminium foil having polyethylene bag inside were filled with coconut chips 20 g each. The sealing of these packaging materials was done in different strips like one strip, two strips, three strips and four strips. Total nine no. of bags of each packaging material and every strip

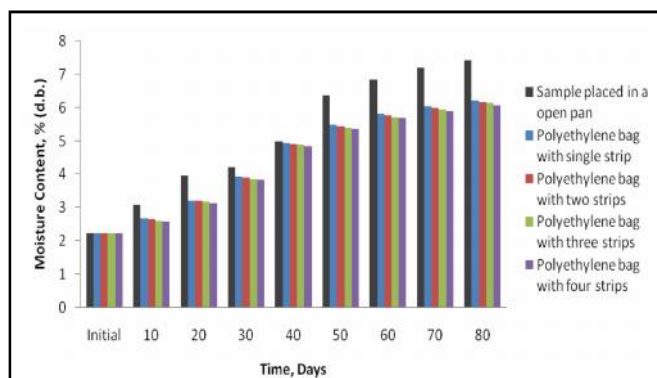


Fig. 2 : The moisture profile in polyethylene packaging material during storage

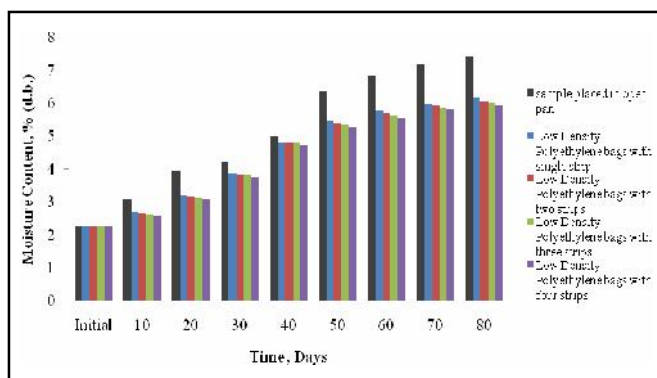


Fig. 3 : The moisture profile in low density polyethylene packaging material during storage

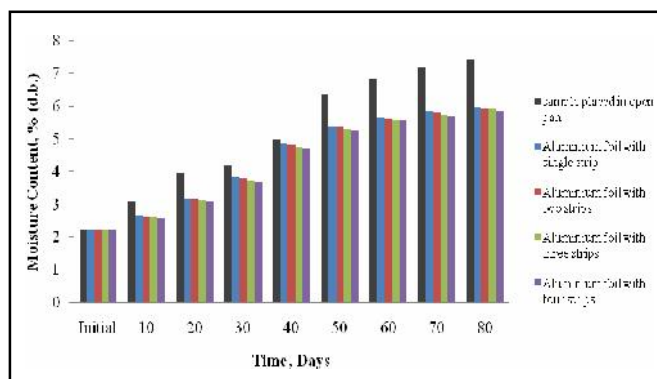


Fig. 4 : The moisture profile in aluminium foil packaging material during storage

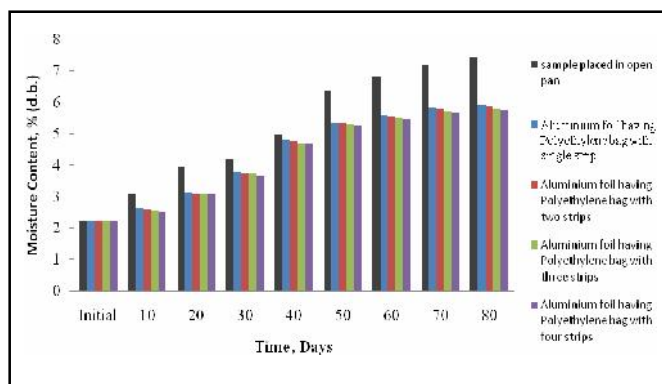


Fig. 5 : The moisture profile in aluminium foil having polyethylene bag inside packaging material during storage

were prepared, and a sample was kept open in a pan as control. All the sample were kept at room temperature.

The moisture content of coconut chips in polyethylene bag with one strip was increased from 2.23% (d.b.) to 6.22% (d.b.). The moisture content of coconut chips in polyethylene bag with two strips was increased from 2.23% (d.b.) to 6.17% (d.b.). The moisture content of coconut chips in polyethylene bag with three strips was increased from 2.23% (d.b.) to 6.14% (d.b.). The moisture content of coconut chips in polyethylene bag with four strips was increased from 2.23% (d.b.) to 6.07% (d.b.). Rate of increase in moisture content of coconut chips in polyethylene bag was higher till 40th day of storage, there after the rate of moisture content was decreased till the end of storage period that is on 80th day (Fig. 1).

This trend was found for all the packaging materials. The increase in the moisture content was highest in polyethylene bag with single strip *i.e.* 3.99% (d.b.) compared with other treatments. The control sample showed highest increase in moisture content compared to all samples *i.e.* 5.19% (d.b.).

The moisture content increase in aluminum foil having polyethylene bag inside with four sealing strip was lowest *i.e.* 3.55% (d.b.) compared to other samples.

Organoleptic testing:

Organoleptic testing was arranged on 19th May 2009 at the Department of Agricultural Process Engineering, Collage of Agricultural Engineering and Technology, Dapoli. where, 21 judges were present and 18 different samples including fresh sample of coconut chips where tested. The test was carried out for colour, flavour, crispiness and taste of the coconut chips.

Among the treatments, freshly prepared samples got highest acceptability *i.e.* it got 28.70 score out of 40. The sample stored in aluminium foil having polyethylene bag inside got highest acceptability value *i.e.* 27.40 out of 40 as compared to all other stored samples. The control sample got lowest acceptability value *i.e.* 23.90 out of 40 as compared to stored sample.

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