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Studies on preparation and quality evaluation of Dark chocolate nutri bar

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Abstract
Dark Chocolate Nutri Bar prepared for the nutritional point of view to improve and fulfill the nutritional requirement to the body. Bar eat as a snakes and complement to main meals. Dark Chocolate Nutri bar contain Pumpkin seeds, Ragi puff, Dark chocolate, sesame seeds, chia seeds, dates and honey. All ingredients are good source of micro nutrients and fulfill all the body requirements. Dark Chocolate Nutri Bar prepared by mixing of all the ingredients with Honey, after mixing sheeting was done & cut to make a proper shape than molding with melted Dark chocolate to make a proper Nutri Bar. Sensory evaluation of Dark Chocolate Nutri Bar prepared Sample T3 recorded highest sensory score in all quality attributes and use for further study. Proximate analysis of Dark Chocolate Nutri Bar that moisture content (9.32 %), Fat (23.12 %), Ash (2.28 %), Carbohydrate (62.71 %), Protein (8.75gm) and Energy (493.92 kcal) respectively. Dark Chocolate Nutri Bar storage done at ambient temperature(30°C) and refrigerator(0°C-4°C) temperature and check through sensory panel member. According to the sensory evaluation Dark Chocolate Nutri bar having good storage stability upto 60days at both temperature. So the Dark Chocolate Nutri Bar can be satisfy the consumer in accepts & good in all the Quality parameters.

Keywords: Dark chocolate, preparation, sensory evaluation, proximate analysis, storage study etc

Introduction

Dark chocolate, also known as “plain chocolate” or “black chocolate”, is produced using higher percentages of Cocoa, traditionally with cocoa butter instead of milk, but there are also dark milk chocolates and many degrees of hybrids. Dark chocolate can be eaten as is, or used in cooking, for which thicker, baking bars, usually with high Cocoa percentages ranging from 70% to 99% are solid. Dark is synonymous with semisweet, and extra dark with bittersweet, although the ratio of cocoa butter to solids may vary (Monica Reshi *et al*. 2018).

Dark chocolate is a chocolate without milk solids added. A dark chocolate has more pronounced chocolate than milk chocolate because it does not contain milk solids to compete with the chocolate taste. However, the lack of milk additives also means that dark chocolate is more prone to a dry, chalky texture and a bitter taste (Corina Aurelia Zugravu, 2019).

Chocolate is enjoyed by customers all over the world due to its unique taste, texture and aroma. It can be made in form of liquid, paste or in a block, or used as a flavor ingredient in other foods. Chocolate manufacturing is a complex process and require several technological operations and processes to achieve the desired product quality (Monica Reshi *et al*. 2018).

The food bars are snacks of good sensory and nutritional characteristics due to their high carbohydrates, proteins, lipids, and minerals contents. Snack foods such as potato chips, extruded products, chocolates bars available in market cannot meet the requirement of balanced diet. Increasing demand from consumers for nutritious snacks, has provoked the food manufacturers to develop food bars that provide nutrition and convenience. The imported fruit bars are available at super stores only in the big cities. Some popular brands are Kellog’s Nutri Grain, Nature Velley, and so forth. The market price for these bars is exorbitant and ranged from rupees 85–130 per 35–45 g bar. This price is out of reach for low and middle income families. Quality and price are key factor for the development of a competitive product. To achieve this objective, economical and underutilized food sources with good nutritional value should be explored. Dates and Indian vetch (*Lathyrus sativus* L.) are good options in this regard as these are abundantly produced but are underutilized. Dates were passed through mincing machine to make paste. Other ingredients (roasted gram flour and corn flour, peanuts, almonds, whey protein concentrate and vetch protein isolates, common salt, cardamom, potassium sorbate, and butylated hydroxytoluene) were mixed thoroughly to distribute uniformly and to make a blend. After mixing, sheeting was done, which was cut into bars of 2.5 cm width, 1 cm height, and 7 cm in length. Each bar of approximately 25 g was packed individually in aluminum foil (Nadeem *et. al.,* 2012) [11].

Materials and Methods

Ingredients, Chemical and Equipments

Raw materials required during present investigation were procured from local market of Saralgaon such Pumpkin seeds, Ragi puff, chocolate, sesame seeds, chia seeds, dates and honey etc. Most of the chemicals and equipments used in this investigation were of analytical grade which are obtained from College of Food Technology Saralgaon, Thane.

Physical and Chemical Analysis

In the chemical analysis process, moisture content is evaluated through the application of a hot air oven, while fat content is determined using the Soxhlet apparatus. Protein levels are ascertained through the Kjeldahl's method. Acidity values are obtained through titration, and pH measurements are acquired with the aid of a digital pH meter. All the quality parameters were assessed following the guidelines specified in the AOAC (2000).

Organoleptic Evaluation

The sensory evaluation of the prepared product was conducted, focusing on aspects such as appearance, color, flavor, aftertaste, texture, and overall acceptability. A group of 10 semi-trained panel members, consisting of academic staff, utilized a 9-point Hedonic scale to rate the product. Ratings ranged from 'like extremely' (9) to 'dislike extremely' (1). The results were documented in a sensory scorecard.

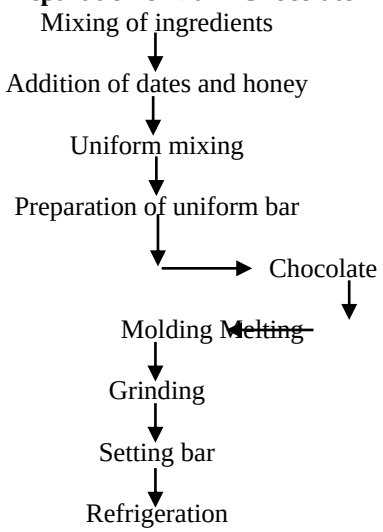
Statistical Analysis

The data was analyzed using a Completely Randomized Design (CRD) with different treatments, following the method outlined by Panse and Sukhatme in 1967. The analysis of variance showed significance at a p-value less than 0.005. Standard error (S.E.) and Critical Difference (C.D.) at the 5 percent level have been reported when necessary.

Preparation of Dark Chocolate Nutri Bar

Raw materials such as Ragi puff, sesame seeds, chia seeds are used for bar preparation were clean and kept in a Pan for roasting at 60-80ºC for 15-20min and then ground to fine powder, sieved and stored in air tight container.

Flow sheet for Preparation of Dark Chocolate Nutri Bar



Results and Discussion

Table 1: Physical Properties of Nutri white chocolate Bar

Sr. No.	Physical Properties	Selected sample
1.	Colour	White
2.	Length	7.4 cm
3.	Breadth	2.6 cm
4.	Width	1.1 cm
5.	Weight	20 gm

The physical properties of Dark Chocolate Nutri bar were carried out which shows values colour were Brown due to Chocolate, Length (7.4 cm), Breadth (2.6 cm), Width (1.1 cm) and Weight of one chocolate (20 gm) respectively

Table 2: Chemical Properties of Dark Chocolate Nutri Bar

Chemical Parameter	Selected sample {as per 100 gm}
Ash	2.28 %
Moisture	9.32 %
Fat	23.12 %
Protein	8.75 %
Carbohydrate	62.71 %
Energy	493.92 kcal

The chemical parameters were found more or less similar with result found by AOAC 1990 standard method. The chemical properties of Dark chocolate Nutri bar were carried out which shows moisture content (9.32 %), Fat (23.12 %), Ash (2.28 %), Carbohydrate (62.71 %), Protein (8.75gm) and Energy (493.92 kcal) respectively. Chemical parameter shown that Dark Chocolate Nutri Bar contain high amount of protein carbohydrates and Energy.

Sensory Evaluation of Dark chocolate Nutri Bar

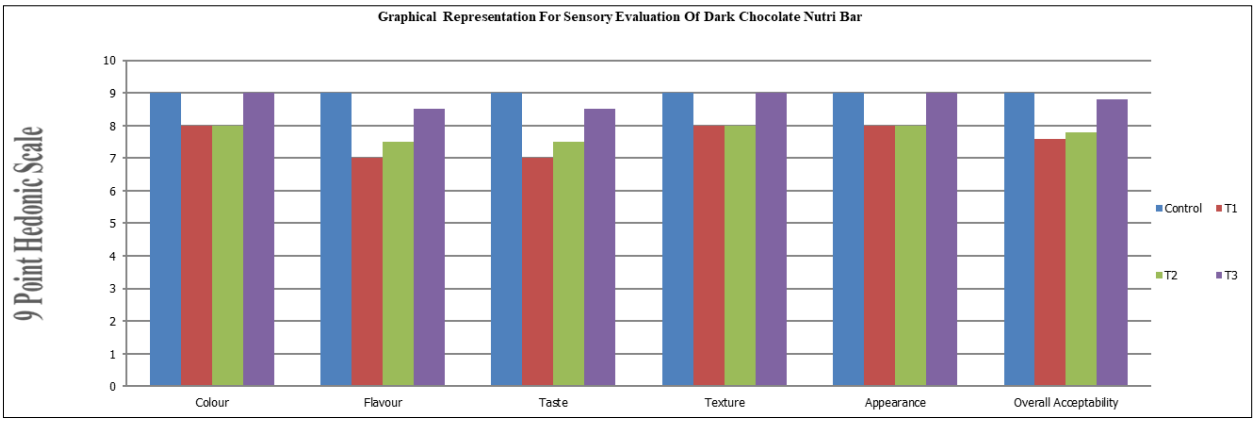


Fig 1

Prepared various formulations of Chocolate Bar was evaluated for sensory characteristics in terms of parameters like Colour, Flavour, Taste, Texture and Appearance. In this evaluation sample T_3 is more acceptable than sample T_1 and T_2 because sample T_3 contain 50g which gives better flavor and taste as compared to sample T_1 and T_2 which gives excessive taste as it contain 60gm and 55gm Dark chocolate respectively. Sample T_3 contain 50g of chocolate which gives better texture than T_1 (60g) and T_2 (55g). The sensory score given for selected sample T_3 by panel members was Colour (9), Flavour (8.5), Taste (8.5), Texture (9) and Appearance (9). In all the quality parameter sample T_3 best in class.

Storage Study of Dark Chocolate Nutri Bar

The sensory evaluation of selected Chocolate bar (T_3) was further carried out for storage study of at ambient temperature and refrigerated condition. The different sensory attributes like color and appearance, taste, texture and overall acceptability were evaluated by panel members.

Graphical representation for Organoleptic Evaluation of Dark Chocolate Nutri Bar Stored at Ambient Temperature (30^0C)

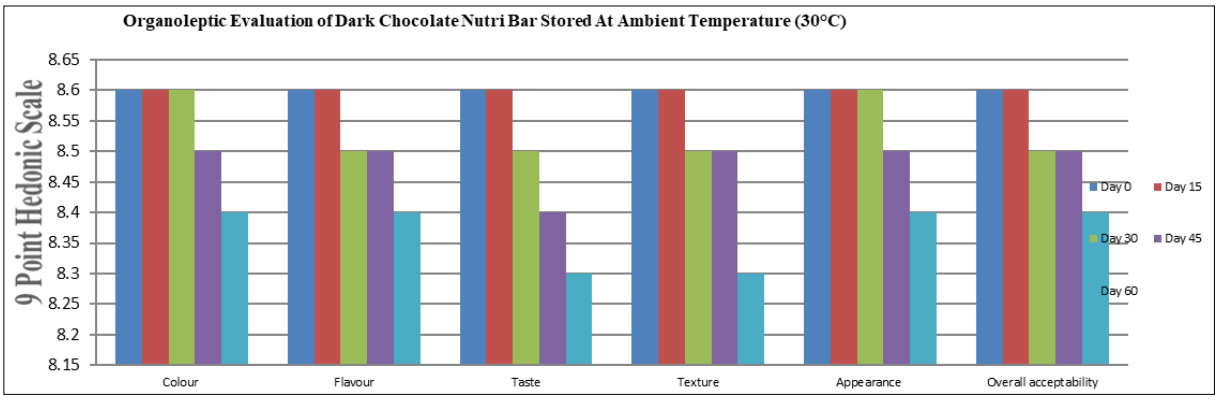


Fig 2

From the above tabular it was clear that color recorded lowest score (8.3) on 60th days of storage. During storage of Dark Chocolate Nutri Bar from 0 to 60 days there was decrease in sensory score for overall acceptability (8.3) which was found to be at par with fresh sample. However on 60th day of storage, there was significant decrease in sensory score for texture, taste and overall acceptability (8.2) was observed but liked moderately by the panel member.

Organoleptic Evaluation of Dark Chocolate Nutri Bar Stored At Refrigeration Temperature (0 to 4°C)

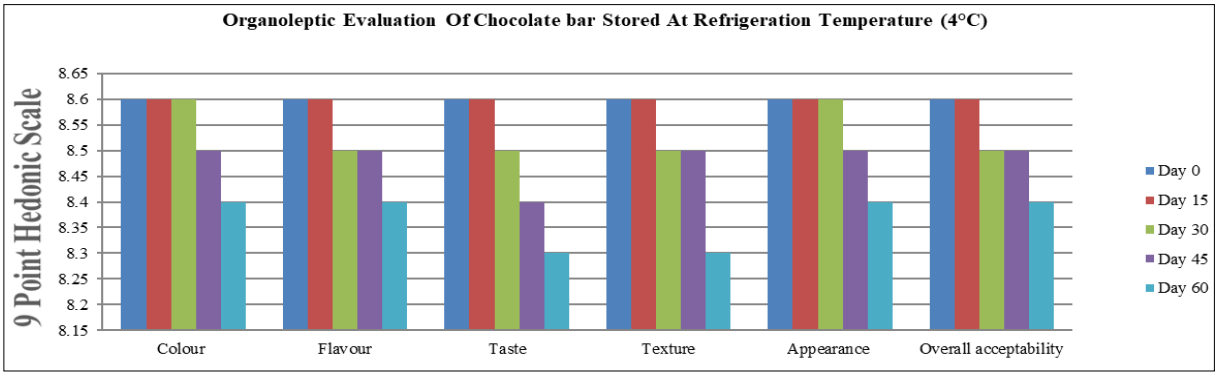


Fig 3

The data in the above Table revealed that there was slight change in quality parameters of sample stored at refrigeration temperature (4ºC) for 60days. Changes in organoleptic qualities were observed at 30 days interval. It was observed that fresh Chocolate bar scored the highest score (8.6) as compared to stored nutri bar. From the above Table it was clear that there was slight variations in taste of the Chocolate bar (8.6 to 8.3) observed during the storage period of 60 days. During storage of Chocolate bar from 0 to 60 days there was decrease in sensory score for overall acceptability was found from 8.6 to 8.4 on 60th day of storage. There was significant decrease in sensory score for texture, taste and overall acceptability were reported by the panel members. There was no significant evidence of microbial spoilage.

It could be concluded from the table that Chocolate bar can be stored for 60 days at refrigerated temperature (4ºC) without affecting sensorial parameters. However its acceptability score was slightly decreased and liked moderately. Similar results were reported during storage of increase shelf life of Chocolate bar.

Conclusion

It can be concluded from the result that Chocolate bars made with incorporation of Pumpkin seeds, Ragi puff, chocolate, sesame seeds, chia seeds, dates and honey etc. can improve the nutritional value of bar and was found acceptable by the panel members. Chocolate bar packed in aluminum foil was found stable and acceptable upto two months of storage.

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