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J Manisha
College of Food Science and
Technology, Rudrur, Telangana,
India

T Roja
College of Food Science and
Technology, Rudrur, Telangana,
India

S Saipriya
College of Food Science and
Technology, Rudrur, Telangana,
India

R Jayaprakash
College of Food Science and
Technology, Rudrur, Telangana,
India

G Rajender
College of Food Science and
Technology, Rudrur, Telangana,
India

R Swamy
College of Food Science and
Technology, Rudrur, Telangana,
India

Corresponding Author
J Manisha
College of Food Science and
Technology, Rudrur, Telangana,
India

Development of value added food products from palm jaggery

J Manisha, T Roja, S Saipriya, R Jayaprakash, G Rajender and R Swamy

Abstract

Borassus flabellifer is greek word commonly known as Palmyra palm. Neera is unfermented toddy obtained from palmyra trees. Many of the people are consuming the sap in the form of neera or toddy. Palm jaggery is a sugar rich and high medicinal properties product. There is a huge demand in the market for high nutritive products made with jaggery in place of refined sugar. This study was conducted to develop palm jaggery based chocolates. The palm jaggery chocolates, Sugarcane jaggery chocolates and Sugar based chocolates were prepared with different proportions of palm jaggery, sugarcane jaggery and sugar. i.e., 50%, 50% and 50% respectively. The developed palm jaggery chocolates were compared with sugarcane jaggery and Sugar based chocolates through proximate and sensory analysis. These developed palm jaggery chocolates were acceptable with good flavor and desirable textural properties.

Keywords: Palm jaggery chocolates, Sugarcane Jaggery chocolates, sensory evaluation and value added products

Introduction

Palmyra palm is commonly known as toddy palm or toddy tree in south India especially in Andhra Pradesh and Telangana State. Toddy or palm jaggery products are used in the preparation of ayurvedic medicines to reduce the chances of cancer, diabetes, obesity etc. (Madhava *et al.*, 2015) [1]. Jaggery has many other benefits over sugar as it contains many vital vitamins and minerals, such as calcium, phosphorus, magnesium and potassium.

Chocolates are usually thought of as a source of pleasure with very high calorific value but lacks in nutritional properties especially vitamins and minerals. It has very less nutritive values are refined sugar is being added as a component and is mainly responsible for various diseases like bad teeth, tooth decay, dental caries, diabetes etc. Thus chocolate needs to be modified and made healthier for consumption by addition of Jaggery in place of refined sugar.

Much research has not been conducted on development of value added products from toddy or palm jaggery. Keeping all this in view the present study was conducted to prepare palm jaggery chocolates and also to study variour nutritional and sensory properties in comparison with the sugar jaggery and sugar based chocolates

Material and Methods

Raw Materials

Formulation for preparation of chocolates

The following three numbers of formulations were taken namely S₀, J₁ and J₂. The formulation details were given in table 1. Chocolate moulds are hollow containers used to give shape to liquid chocolate when it cools and hardens.

Preparation of Palmyra palm Jaggery chocolates, sugar cane Jaggery chocolates and sugar based chocolates

The Palmyra palm Jaggery chocolates, sugar cane Jaggery chocolates and sugar based chocolates were prepared as per the formulations. The fresh Jaggery was heated in an iron pan at 110°C for 10 min. All the ingredients were added to it and mixed with the help of a glass rod. The contents were mixed for 2–3 min on a stirrer at 80 rpm. The chocolate mould is greases by applying a thin layer of melted butter to prevent sticking of chocolates while removing. The chocolate mix was poured in the moulds and allowed to cool until it got set. The chocolates were kept for 24 h for setting at an ambient temperature. The chocolates were removed from the moulds and kept for conditioning for at room temperature (Khan chand *et al.* 2011) [7].

Table 1: Formulation of palm Jaggery, sugar cane Jaggery and sugar based chocolates

S. No	Ingredients(g)	Sugar based chocolates (S ₀)	Sugarcane Jaggery chocolates (J ₁)	Palm Jaggery chocolates (J ₂)
1	Sugar	49%	-	-
2	Sugarcane Jaggery	-	49%	-
3	Palm Jaggery	-	-	49%
4	Cocoa mass	21%	21%	21%
5	Butter	17%	17%	17%
6	Milk powder	12%	12%	12%
7	Xanthan gum	0.16%	0.16%	0.16%
8	Water	30ml	30ml	30ml
9	Vallina essence	0.84%	0.84%	0.84%

Where, S₀- Sugar control sample with 50% sugar chocolate

J₁- Jaggery chocolate sample with 50% sugarcane Jaggery

J₂- Jaggery chocolate sample with 50% palm Jaggery

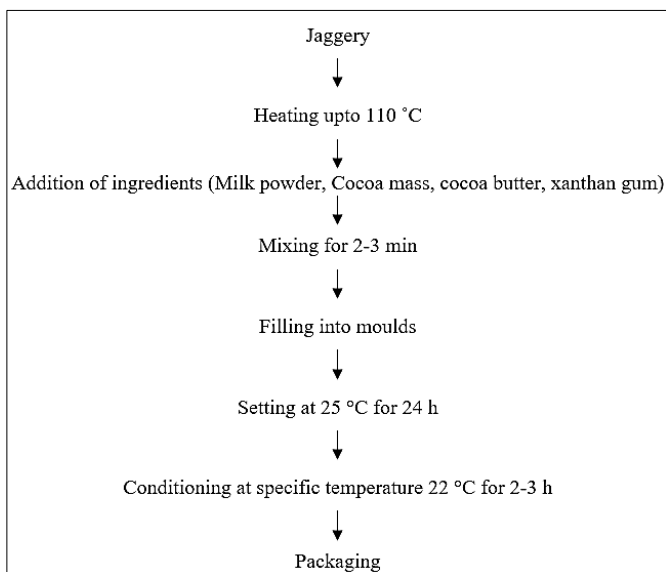


Fig 1: Flow chart for preparation of palm Jaggery chocolates



(b) Mixing of Ingredients



(c) Filling into Moulds



Fig 2: Chocolate moulds



(d) Final product (Chocolate)



(a) Ingredients

Fig 3: Preparation of chocolates with palm Jaggery, sugar cane Jaggery and sugar

Analysis of chocolates prepared with palm Jaggery, sugar cane Jaggery and sugar

The proximate analysis was carried out for prepared Jaggery, sugar cane Jaggery and sugar based chocolates by using AOAC standard methods.

Sensory evaluation

The sensory evaluation of chocolates prepared with palm Jaggery, sugar cane Jaggery and sugar were carried using hedonic 9 point scale at college of Food science & Technology, Rudrur.

Results and Discussion

Estimation of Moisture content

Highest moisture content in palm Jaggery chocolate recorded for the sample with 57% and the lowest moisture content in sugarcane Jaggery chocolate recorded in the sample with 48%. Moisture content in the palm Jaggery chocolate is highest value compare to sugarcane Jaggery chocolate and sugar chocolate.

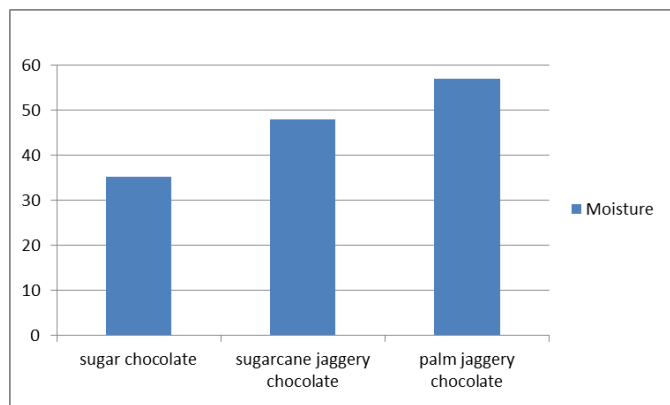


Fig 4: Estimation of moisture content in prepared chocolates

Estimation of Fat content

The results obtained were highest fat content in palm Jaggery chocolate recorded for the sample with 14.6% and the lowest fat content in sugarcane Jaggery chocolate recorded in the sample with 14.4%. Fat content of the sugar chocolate 13.6% is comparatively lower when compared with the sugarcane Jaggery sample palm Jaggery chocolate 14.6%. The low fat content in Jaggery chocolates samples was obtained due to variation in the cocoa mass during formulation of chocolates.

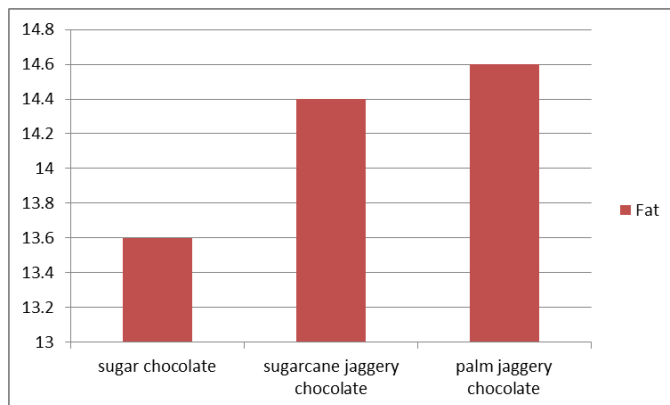


Fig 5: Estimation of fat in prepared chocolates

c) Estimation of Protein content

The results obtained were highest protein content in palm

Jaggery chocolate recorded for the sample with 1.2% and the lowest protein content in sugarcane Jaggery chocolate recorded in the sample with 0.4%. Protein content of the sugar chocolate 0.4%. Protein content of palm Jaggery chocolate sample was high when compared with sugarcane Jaggery and sugar chocolates.

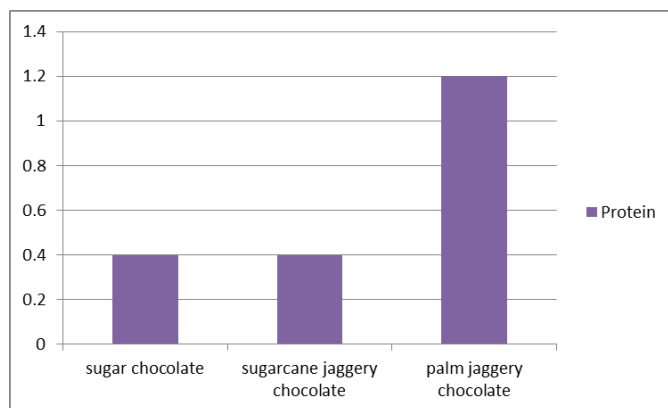


Fig 6: Estimation of protein content in prepared chocolates

Sensory evaluation

Sensory evaluation acceptance test was conducted for all prepared chocolates based on the formulations.

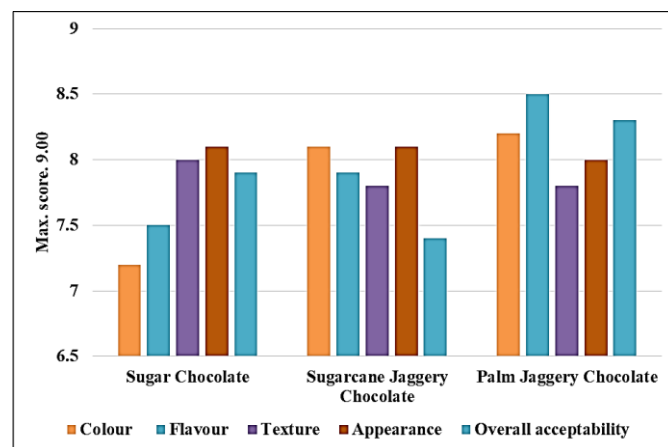


Fig 7: Sensory evaluation of developed chocolates

It was observed that the highest overall acceptability score was awarded for sample palm Jaggery chocolate 8.5 because it got acceptable results in color, flavor, texture, appearance, whereas lowest value 7.4 received for sample sugarcane Jaggery chocolate. The next parameter i.e., color, serve as important parameter for the acceptance of food samples. The highest score found in sample palm Jaggery chocolate 8.5 because of its acceptable color whereas the lowest score was observed for the sample sugarcane Jaggery chocolate 7.4. The appearance of sample palm Jaggery chocolate was significantly superior to the other samples. In texture profile the highest score was observed in palm Jaggery chocolate. The lowest for sample sugarcane Jaggery chocolate the highest value of flavor obtained for the palm Jaggery chocolate and the lowest for the sample sugarcane Jaggery chocolate.

Conclusion

Three different chocolates were developed i.e. sugar based chocolates, sugarcane Jaggery chocolates and palm Jaggery chocolates with different formulations. Palm jaggery

chocolates have more protein than other prepared chocolates. In sensory evaluation process most acceptable formulation in Jaggery chocolates is J2 of 50% palm Jaggery because this formulation shows best results in overall acceptability of the product.

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