Volume : 3 | Issue : 8 | Aug 2014 • ISSN No 2277 - 8179

Research Paper

Development and Quality Evaluation of Coconut Milk Chocolate By Incorporation of Fat and Corn Flour

Food Science

KEYWORDS : Coconut Milk, Chocolate, Coconut Shreds, Corn Flour, Sensory Parameter

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ABSTRACT

The demand of milk product is increasing. Among all the milk products, chocolate is mostly preferred confectionary product. Coconut (Cocus nucifera) is the stone of the drupes borne by the coconut palm, a member of the monocotyledonous family Palmae. It is known as the "wonder food" and is regarded as perfect diet because it contains almost all essential nutrients needed by the human body. Milk is one of the most important ingredients in chocolate production. Coconut milk may be considered as a substitute for cow milk. Soymilk/Coconut milk can be added in chocolate to improve the texture and to increase the binding capacity of chocolate. The texture, flavor and level of mouth feel are unique characteristics. It may be used by the people who cannot tolerate cow milk. For formulation coconut milk, cocoa powder, GMS, coconut shreds, sugar, corn flour and vegetable shortening was selected. The six samples was prepared. These six samples were analyzed for sensory and chemical and microbial analysis. In sensory evaluation the sample which is having (coconut milk: 130ml, sugar: 100g, cocoa powder: 15g, corn flour: 4g, veg. fat shortening: 6g, and coconut shreds: 32g) was having good flavor, taste, color, texture and mouth feel and overall acceptability.

INTRODUCTION

Coconut (*Cocusnucifera)* is the stone of the drupes borne by the coconut palm, a member of the monocotyledonous family Palmae. It is known as the wonder food and is regarded as perfect diet because it contains almost all essential nutrients needed by the human body. It is nourishing, strengthening and fattening food. It has high oil content. The protein is of high quality and contains all amino acids essential for the growth and maintenance of the body. It is rich in K, Na, Mg and S. The energy value of the dried coconut is 662 calories per 100 g. Fresh coconut contains fat 36.2%, protein 6.1%, ash 1.6%, crude fiber 3.1%, moisture 43.8%. (Rehman 2004).

Coconut is grown in more than 93 countries in the world in an area of 12.19 million h, with an annual production of 61,165 million nuts or 13.59 million tons of copra equivalents. India occupies a predominant position in respect of production of coconut in the world. Coconut is grown in 1.94 million ha in 19 states and 3 Union Territories of the country producing 15730 million nuts with an average productivity of 8303 nuts per ha or 44.27 nuts/palm/year. Traditional areas of coconut in India are the states of Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Orissa, Goa, West Bengal, Pondicherry, Maharashtra and Islands of Lakshadweep and Andaman and Nicobar. Non-traditional areas are the states of Assam, Gujarat, Madhya Pradesh, Bihar, Tripura, Manipur, Nagaland and Arunachal Pradesh. Coconut milk is quite good for our heart health, it helps control weight and keeps blood sugar under normal level, and it also reduces your bad cholesterol and is a great cure for joint pains. Vitamins C, E, and B vitamins are abundant in coconut milk, and coconut milk is also rich in magnesium, potassium, phosphorous and iron. Chocolate (Cocoa) is consumption of chocolate to reduce the risk of cardiovascular disease due to chocolates high levels of stearic acid and antioxidant flavonoids. It maintained the blood pressure, it refreshes the body, it reduces the asthma, delay the growth of white hair (Manisha, 2011).

The objective of the research was:

1. To standardize the levels of ingredients for preparation of coconut milk chocolate.
2. To study the chemical composition and organoleptic properties of coconut milk chocolate prepared by different formulations.
3. To study the microbiological quality of coconut milk chocolate.

MATERIALS AND METHODS

The present investigation entitled "Development and Quality Evaluation of Coconut Milk Chocolate" work was carried out in Department of Food Science and Technology, Queens College of Food Technology and Research Institute, Aurangabad, under the guidance of **Prof. Abdul Raheem M.I.** The good quality of coconut fruit and other ingredients viz, cocoa powder, sugar, refined corn flour, vegetable fat, and GMS are purchased from local market of Aurangabad. The prime objective of this research was to standardize the levels of ingredients for preparation of coconut milk chocolate and prepare the best or ideal substitute of cow/buffalo milk as ingredients in chocolate. Where some modifications were made for giving good color, flavor, texture, mouth feel, taste, after taste and consistency. The coconut milk chocolate was prepared by varying different ratios and formulations. The quantity and formulation was Tabulated in Table.1

Cocoa powder, coconut milk, and coconut milk chocolate samples was analyzed for physico-chemical analysis like, carbohydrates, crude fat, crude protein, ash content, moisture content. The standard procedure was used for determination and these results are in good agreement with the results reported by Gatade (2009). The sensory evaluation of coconut milk chocolate samples was evaluated by panel of judges on a 9 point hedonic scale. The mean values of scores with respect to quality attribute.. The results are given in Table.3. From the levels of each ingredients used in the trails of corn flour and vegetable shortening was changed and levels of coconut milk, cocoa powder, coconut shreds & GMS were kept constant. Han (2006). The optimized coconut milk chocolate formulation was to be selected for further trials various ratio of vegetable shortening fat. The level of fat and corn flour was changed and sugar, cocoa powder, coconut shreds and GMS were kept constant. The chocolate was prepared by using selected levels of ingredients.

For preparation of coconut milk chocolate the six sample was prepared with different ratios in which, coconut milk: 130ml,

Volume : 3 | Issue : 8 | Aug 2014 • ISSN No 2277 - 8179

cocoa powder: 15g, corn flour: 4g, vegetable shortening: 6g, GMS: 3g, and coconut shreds: 32g. Incorporation of fat ratio was given, in which fat was factor with having ratio [coconut milk: fat: corn flour] (130:10:00), (130:08:02), (130:06:04), (130:04:06), (130:02:08), (130:00:10).

RESULTS AND DISCUSSION

The effort was also made to utilize coconut milk as an ingredient in chocolates or to use as ideal substitute for buffalo and cow milk in chocolate. The results pertaining to different analytical investigations were viewed under scientific relevance and are summarized as follows under suitable headings.

CHEMICAL COMPOSITION OF COCONUT MILK CHOCOLATE

The chemical analysis of constituents of coconut milk chocolate was carried out having Moisture Content in a range of 8.03- 8.41%, Ash content 0.89-1.30%, Crude Protein content in range of 4.01-5.66%, Crude Fat 21.07-23.91%, and Carbohydrate was calculated by the difference method having range of 60.07- 67.13%, and Energy value 473-495 kcals.

The chemical composition of milk chocolate was given in Table.3. With the reference to Table.3, It was found that different levels of addition of vegetable fat, and corn flour, will change the chemical composition of the coconut milk chocolate. Gatade et al (2009).

SENSORY EVALUATION OF COCONUT MILK CHOCOLATE

From Table.4, due to incorporation of different levels of fat, it improves the quality of coconut milk chocolate. The best results are obtained in case of selected sample with respect to quality attributes. Although the sample was also good but overall acceptability of sample was not good. In which the samples T1 and T2 its having the 10g and 08g of vegetable shortening, that's why this sample was gives the too much oil from to chocolate and detect the same amount of flavor of corn flour. Ahmad (2004).

MICROBIAL ANALYSIS OF SAMPLE AT ROOM TEMPERATURE

The sample was kept at room temperature was having good microbial quality till 60th day from preparation as there was some sort of mould growth started in chocolate sample. Mesophillic aerobes started growth after 15th day and Yeast and mould started to grow after 45th day. Jark (1998).

MICROBIAL ANALYSIS OF SAMPLE AT REFRIGERATION TEMPERATURE

The sample was kept at refrigeration temperature and studied for microbial quality for 60 days from preparation as there was some sort of mould growth started in chocolate sample. Mesophillic aerobes started growth after 45th day and Yeast and mould started to grow after 30th day. Jark (1998).

CONCLUSION

On the basis of above investigation we can conclude that the Replacement of buffalo milk/Cow milk by Coconut Milk in chocolate preparation can be done by optimization of the procedure and its suitability can be judged on the basis of sensory evaluation, Samples with different formulations the selected sample was found to be best. It concluded that coconut milk chocolate prepared by using various combinations are found to be acceptable, but the sample having 3g of GMS, 130ml of coconut milk, 100g of sugar, 15g of cocoa powder, 4g of corn flour, 6g of vegetable fat and 32g of coconut shreds can be suitable for the recommendation.

ACKNOWLEDGMENT

First of all I am grateful to Almighty **"ALLAH" (S.W.T)** the supreme the creator of every being of the world. I take this opportunity to express my profound gratitude and deep regards to my guide **Prof. Abdul Raheem M.I** for his exemplary guidance, monitoring and constant encouragement throughout the course of this thesis.

Table.1: Composition of Coconut Milk Chocolate

Sr. No	Trails No.	Coconut Milk(ml)	Cocoa Powder (g)	Sugar (g)	Veg. fat (g)	GMS (g)	Corn Flour (g)	Coconut Shreds (g)
1	T1	130	15	100	10	3	00	32
2	T2	130	15	100	8	3	02	32
3	T3	130	15	100	6	3	04	32
4	T4	130	15	100	4	3	06	32
5	T5	130	15	100	2	3	08	32
6	T6	130	15	100	0	3	10	32

Table.2: Chemical composition of Coconut Milk chocolate

Sr. No.	Treatments	Moisture Content	Ash Content	Crude Protein	Crude Fat	Carbohydrate	Energy Value
1	T1	8.16	1.20	5.66	21.07	63.01	473.28 kcal
2	T2	8.03	0.89	4.83	22.01	61.80	473.50 kcal
3	T3	8.60	1.26	4.01	23.89	60.07	480.71 kcal
4	T4	8.41	1.30	4.37	23.91	63.17	490.49 kcal
5	T5	8.37	1.21	5.12	21.30	61.23	465.86 kcal
6	T6	8.28	1.20	4.18	22.30	67.13	495.30 kcal
	F- test	S	S	S	S	S	
	S. Ed. (±)	0.101	0.092	0.472	0.504	0.536	
	C. D. (P = 0.05)	0.215	0.195	1.006	1.074	1.142	

Table .3: Sensory Evaluation of Coconut Milk Chocolate

Sr. No.	Treatments	Color	Flavor	Taste	Mouth feel	Texture	Overall Acceptability
1	T1	7.4	6.8	7.0	7.3	7.0	7.2
2	T2	7.0	6.5	7.0	6.3	7.3	6.8
3	T3	9.0	8.9	8.5	8.6	8.7	8.8
4	T4	6.8	7.3	7.0	7.5	7.6	7.2
5	T5	7.0	6.6	7.1	6.8	7.8	7.1
6	T6	7.1	7.0	7.0	6.8	7.3	7.0
	F- test	S	S	S	S	S	S
	S. Ed. (±)	0.437	0.454	0.417	0.391	0.363	0.326
	C. D. (P = 0.05)	0.931	0.967	0.888	0.833	0.773	0.695

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