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To Check Acceptability and Safety of Dark Chocolate Incorporated with Hibiscus Flower Powder and Psyllium Husk

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Abstract: *This study was undertaken to check the acceptability and safety of Dark Chocolate Incorporated with hibiscus flower powder and psyllium husk. Chocolate is a raw or processed food product made from the seed of the tropical tree Theobroma cacao. Dark chocolate is majorly beneficial for heart and brain health. Hibiscus has a rich phytochemical profile responsible for beneficial health effects. Hibiscus has antioxidant properties and positive effect on health. Psyllium husk is a rich source of dietary fiber and has beneficial effects on metabolic functions. And also helps in weight management. 2 Types of chocolates were made, A was simple Dark Chocolate and B was Dark chocolate(100gm) incorporated with Hibiscus flower Powder (30gm) and Psyllium Husk(10gm). Sensory evaluation of Chocolate samples was carried out for attributes such as flavor, texture, taste and overall acceptability. Results of sensory evaluation shows that sample B is most acceptable. Sample B contains 1.02% Moisture, Total Fat content is 29.28%, Ash insoluble in dilute HCL is 0.11% and insect & Fungus Infestation and Harmful or Injurious Matter is absent in sample thus it proves that sample B is acceptable and safe for human consumption.*

Keywords: Dark chocolate, hibiscus, psyllium husk, health, safe, acceptable

I. INTRODUCTION

The obroma cacao seeds are ground into a powder and typically sweetened with sugar. Vanilla is frequently added as a flavouring. [1]. It can be produced as a liquid, paste, block, or as a component for flavouring other sweet meals. A variety of items, including chocolate, are made from cocoa (cacao), which is combined with fat (cocoa butter) and finely powdered sugar to create a solid confectionery.[2]. Dark chocolate also known as black chocolate. When sugar and fat are added to cocoa, dark chocolate is created. It is chocolate that either contains little to no milk or substantially less milk than milk chocolate. Dark chocolate can be consumed on its own or used in recipes often with high cocoa percentages ranging from 70% to 99%, are available for this purpose. [3]. Chocolate is the finest source of energy, protein, magnesium, calcium, iron, and riboflavin, all of which are necessary for heart and brain health and are present in varied amounts in cocoa goods. Cocoa seeds are good source of copper, sulphur, and vitamin C[4]. Flavonoids are naturally abundant in dark chocolate [5]. The positive effects of chocolate on the cardiovascular system appear to be supported by recent studies from both the United States and Europe.[6].

Local tropical plant known as roselle (Hibiscus sabdariffa) has a variety of nutritional advantages [7]. There are more than 300 species of hibiscus spread across the world's tropical and subtropical regions [8]. Numerous researchers have thoroughly examined the use of hibiscus in treating a variety of medical conditions, such as cancer, inflammatory illnesses, and other cardiovascular problems. [9].

Psyllium is also known as ispaghula, and plantago ovata. It has a long history of use as a dietary fibre supplement, primarily as a mild bulk-forming laxative to support the regulation of large bowel function. Additionally, psyllium supplementation has been demonstrated to lower blood cholesterol levels, particularly LDL cholesterol, over the past decade [10]. Dietary fibre is abundant in psyllium husk. When people have diarrhoea or constipation, they frequently drink water or milk with psyllium, a natural source of dietary fibre. When it absorbs water, it primarily consists of indigestible dietary fibre and contains very few calories; it then often expands multiple times and transforms into a

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jelly-like material. This substance makes the intestines lubricated and stimulated, which causes the bowel movements to begin[11].

II. MATERIALS AND METHODS

2.1 Preparation of Sample

Dark Chocolate Compound, Hibiscus Flower powder and Psyllium Husk were Collected from local market.

2 Types of chocolates were made, A was simple Dark Chocolate and B was Dark chocolate(100gm) incorporated with Hibiscus flower Powder (30gm) and Psyllium Husk(10gm). Chop Dark Chocolate into small pieces. Place chocolate pieces on Double boiler. Keep bowl of dark chocolate over saucepan and heat the water. Water should not touch the bowl with the chocolate. Keep starring, it will melt by steam that arises from boiling water below. Once the chocolate is completely melted add Hibiscus flower powder and Psyllium Husk in melted chocolate and keep starring until all ingredients mix properly. Pour the melted chocolate into moulds and tap slightly to remove air bubbles. Place mould into freezer(0°C) for 5 minutes. Remove from freezer and demould the chocolate. Wrap chocolate in chocolate paper. All Chocolates were used for testing.

2.2 Sensory Evaluation

Sensory evaluation of Chocolate samples was carried out for attributes such as flavor, texture, appearance and overall acceptability by 10 semi-trained members based on a 9-point hedonic scale. Both samples were coded as A and B, the order of presentation of samples was randomized for each panelist. The samples were kept without giving any prior information about the coded samples. They were supposed to taste it and give score on the scale.

Once, the tasting was done panelists were asked to fill the sensory sheet. Most accepted sample were tested for Moisture, Total Fat (ODB), Ash insoluble in dilute HCL, Added colour and Artificial sweeteners and safety.

2.3 Determination of Moisture - Vacuum Oven method

Aluminum dish – 75mm diameter and about 25mm height with close fitting cover.

Dessicator

Vacuum oven

Accurately weigh about 10 g of sample in a dish previously dried and weighed. Distribute the material as evenly as practicable over the bottom of the dish by gentle sidewise movements. Place dish in vacuum oven, remove cover of dish and dry the material for six hours at 80 ± 1°C at a pressure not exceeding 5 mm of Hg. During heating admit slow current of air into oven.Cover dish, transfer to dessicator and weigh soon after room temperature is attained. Redry for one hour and repeat the process till the difference between the two successive weighing is less than 2 mg. Report percent loss in weight as moisture %.

Moisture content, % by mass = [W3-W2÷W1]×100

Where: W1 = Weight of prepared sample taken for test in g

W2 = Weight of empty moisture dish in g

W3 = Weight of (dish + dried sample) in g

2.4 Determination of Fat

Buchner funnel – of 9 cm size.

Soxhelet Apparatus - with 250 ml flat bottom extraction flask

8 M Hydrochloric acid - sp.gr. 1.16

Filter aid - a suitable brand

Petroleum ether - redistilled below 60˚C

Sodium sulphate - anhydrous

Weigh accurately about 10 to 20 g of the prepared sample into a 400-ml beaker and add 30 ml of water and 25 ml of hydrochloric acid. heat for 30 minutes on a steam bath, with frequent stirring. Add 5 g of filter aid and 50 ml of ice-cold water and chill for 30 minutes in ice-cold water. Fit a heavy piece of linen into the buchner funnel and moisten with water. Apply gently suction and pour over it a suspension of 3 g of filter aid in 30 ml of water. Filter the hydrolyzed

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mixture by gentle suction, rinsing the beaker three times with ice-cold water, taking care to leave a layer of liquid on the filter. Finally wash three times with ice-cold water and suck dry. Transfer the filter-cake from the funnel to the original beaker, using a small piece of filter paper to transfer any material adhering to the funnel. Wash the funnel with petroleum ether into the beaker and evaporate the ether on a steam bath. Break up the cake with a glass rod and allow it to remain on the steam bath until the contents are so dry as to enable pulverizing easily. Place in an oven at 100 + 2˚C for one hour. Add 15 g of powdered anhydrous sodium sulphate and mix well. Transfer the mixture to the fat extraction thimble of the soxhlet apparatus. Wash the beaker with 50 ml of petroleum ether and transfer the washings to the thimble. Extract the fat with petroleum ether so that at least 300 ml has been circulated. Transfer the extract to a tared dish and evaporate the petroleum ether on a steam bath. Dry the fat till the difference in weight between successive weighing is not more than 1 mg.

Total Fat % by mass (moisture free basis) = (1000 × w) ÷ W × (100-M)

Where, w = weight in g of fat

W = weight in g of prepared sample taken for the test

M = moisture, percent by weight, in the prepared sample

2.5 Determination of Ash Insoluble in dilute HCl

Dilute hydrochloric acid - Approx 5 N (445 ml in 1 litre).

Weigh accurately about 10 g of the prepared sample in a tared, clean and dry platinum basin of 100ml capacity. Carbonize the material in the dish with the flame of a burner. Complete the ignition by keeping in a muffle furnace at 550 ± 10°C until gray ash results. Cool in a desiccator.To the ash, add 25ml of the dilute hydrochloric acid, cover with a watch glass and heat on a small flame of a burner to near boiling. Allow it to cool and filter the contents of dish through Whatman filter paper No. 42 or its equivalent. Wash the filter paper with hot water until the washings are free from chlorides. (To check this, add few drops of 2M Nitric acid and 0.1 M Silver nitrate solution to the filtrate obtained. No precipitate or milky turbidity should occur in the solution, if it is chloride-free.). Return the filter paper and the residue to the dish. Keep it in an air oven maintained at 105+2˚C for about three hours. Ignite in the muffle furnace at 550 ± 10˚C for one hour. Cool the dish in a desiccator and weigh. Heat again for 30 minutes in the muffle furnace, cool and weigh. Repeat this process of heating for 30 minutes, cooling and weighing till the difference between two successive weighing is less than one milligram. Note the lowest mass.

Acid insoluble ash, percent by mass = 100 x M1 ÷ M2

Where, M1 = mass in g of the acid insoluble ash and M2 = mass in g of the prepared sample taken for the test

2.6 Insect & Fungus Infestation

Visual Examination Method is used to detect insect and Fungus Infestation in sample.

2.7 Harmful or Injurious Matter

Visual Examination Method is used to detect Harmful or Injurious Matter in sample.

III. RESULTS

3.1 Sensory Evaluation Results

Sample	Flavour	Texture	Taste	Overall Acceptability
A	5.6	5.7	6.1	5.9
B	7.3	6.9	7.4	7.7

Most accepted chocolate sample is Sample B which contains 100gm Dark Chocolate, 30gm Hibiscus flower powder and 10gm Psyllium Husk. Therefore Sample B is tested.

3.2 Test Results

Test	Result
Moisture	1.02%
Total Fat (ODB)	29.28%

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Ash	0.11%
Insect & Fungus Infestation	Absent
Harmful or Injurious Matter	Absent

According to test results sample B contains 1.02% Moisture. The lower Moisture content ensure prevention of microbial growth it is important factor in Preservation. Total Fat content is 29.28%, Ash insoluble in dilute HCL is 0.11% and insect & Fungus Infestation and Harmful or Injurious Matter is absent in sample thus chocolate sample B is safe for human consumption.

IV. CONCLUSION

The aim of study is "To Check Acceptability and Safety of Dark Chocolate Incorporated with Hibiscus flower powder and Psyllium Husk". Chocolates have always been the most popular among all the age groups. It can be concluded from above results and study that Chocolate is a good source of energy and good for heart and brain health. Hibiscus flower powder has Antidiabetic and Anti-Hypertensive effect. Psyllium husk contains high amount of Fiber which support the regulation of large bowel function. Incorporation of Hibiscus Flower Powder and Psyllium Husk improve Health Benefits of Chocolate. Two chocolate samples were made sample A contains 100gm Dark Chocolate and sample B contains 100gm Dark Chocolate, 30gm Hibiscus flower powder and 10gm of Psyllium Husk. Sensory evaluation of Chocolate samples was carried out for attributes such as flavor, texture, taste and overall acceptability by 10 members based on a 9-point hedonic scale. The results sensory evaluation shows that Sample B is most acceptable. Chocolate sample B got 7.7 overall acceptability indicates that the chocolate ranged between like moderately and like very much. Chocolate sample B contains 1.02% Moisture, Total Fat content is 29.28%, Ash insoluble in dilute HCL is 0.11% and insect & Fungus Infestation and Harmful or Injurious Matter is absent in sample thus it proves that chocolate sample B is safe for human consumption. Dark Chocolate Incorporated with Hibiscus and Psyllium husk is good healthy alternative as compared to normal chocolate.

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