

# Development and Evaluation of Banana Blossom Incorporated Dark Chocolate

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**Abstract:** *The present study entitled "Development and Evaluation of banana blossom incorporated dark chocolate" was carried out for the formulation and incorporation of banana blossom flour into ready to eat product namely dark chocolate. The nutrient composition and sensory evaluation was also determined. To formulate banana blossom dark chocolate by the incorporation of banana blossom flour and cocoa powder at the level of 10 per cent, 20 per cent and 30 per cent variations. Whereas dark chocolate prepared out of without incorporation of banana blossom flour were served as control. Among the different treatments, 20 percent incorporation of banana blossom dark chocolate was recorded highest scores for overall acceptability.*

**Keywords:** Banana blossom flour, Dark chocolate, Cocoa powder

## 1. Introduction

Nutrition, nourishment or aliment is the supply of materials because food is required by organisms and cells to stay alive. In science and human medicine, nutrition is the science or practice of consuming and utilizing foods. Nutritional science studies how the body breaks food down and repairs and creates cells and tissue so catabolism and anabolism gives metabolism. Nutritional science also examines how the body responds to food [1]. Nutrition is the study of nutrients in food, how the body uses nutrients, and the relationship between diet, health and disease [2]. Health is a "State of complete physical, mental, and social well being, and not merely the absence of disease or infirmity." Health is a dynamic condition resulting from a body's constant adjustment and adaptation in response to stresses and changes in the environment for maintaining an inner equilibrium called homeostasis [3]. "Early to bed and early to rise, makes a man healthy wealthy and wise"-Benjamin Franklin (1758).

The banana blossom is a large, dark purple-red blossom that grows from the end of a bunch of bananas. Its sizable bracts, or leaves, snugly enclose delicate, sweetly scented male blossoms [4]. The female blossoms, which do not require fertilization to become fruit, grow farther up the stem from the male blossoms. The banana blossom grows at the end of a bunch of bananas. It is a leafy maroon coloured cone with cream coloured florets layered inside [5]. These florets need to be cleaned well before they are cooked as a vegetable. The banana blossom is rich in vitamins, flavonoids and proteins [6]. The flower has been used in traditional medicine to treatment bronchitis constipation and ulcer problems. It eases menstrual bleeding. The extracts of banana blossom have antioxidant properties that prevent free radicals and control cell and tissue damage. The flavour is a little starchy and bitter. The banana is a typical climacteric fruit and mainly grows in tropical and subtropical regions [7]. Blossom of the banana plant (*Musa acuminata* cola) is often consumed as a vegetable in many Asian countries such as India, Sri Lanka, Malaysia, Indonesia and the Philippines

[8].

Banana blossom has tremendous nutritional value and were consumed as food additive in many Asian countries such as Sri Lanka, Indonesia and Thailand. In Sri Lanka, it is consumed as a curry as well as a boiled or deep fried salad with rice and Wheat bread. Besides being consumed fresh banana blossom can also be made into various products such as dehydrated vegetable, pickle and canned food [9]. The banana blossom has excellent nutritive value. The 100g of banana blossom, contains 51 kcal of energy, 1.6g of Protein, 0.6g of Fat, 9.9g Carbohydrate, 5.7g of Fiber, 56mg of Calcium, 73.3mg of Phosphorous, 56.4mg of Iron, 13mg of Copper, 553.3 mg of Potassium, 48.7mg of Magnesium, 34mg of Vitamin-E and it also contains 137mg of flavonoids especially quercetin [10].

The banana blossoms are good source of minerals such as magnesium, iron and copper. It contains high quality protein because of its well balanced essential amino acid in addition to high dietary fibre and flavonoid concentrations [11]. Plantain blossom is generally helps to cure stomach ulcers and also useful in treating throat ulcers. It can cure inflammation of eyes and eye afflictions. It can also help in treating vata diseases and nervous debilities. The blossoms contain a class of photochemical known as saponins. Saponins lower LDL or bad cholesterol, boost our immunity against infection and are thought to inhibit the growth of cancer cells. They also have antioxidant activity and so can reduce our risk of chronic diseases including cardiovascular disease. [12].

The major physiological function of vitamin E is its antioxidant activity. Vitamin E protects the fatty acids by interfering with the free radical reactions that can result in cellular damage and is protective against approximately 80 diseases, such as cancer, cardiovascular diseases [13]. Quercetin is a major representative of the flavones subclass has received considerable attention. Quercetin and its sugar bound or glucosylated, forms represent 60-75% of flavonoids intake Quercetin has displayed the ability to

prevent the oxidation of low Density lipoproteins (LDL) by scavenging free radicals and chelating transition metal ions [14].

## 2. Materials and Methods

Banana blossoms were used for the incorporation of banana blossom dark chocolate. The Banana blossoms were cleaned, peeled, discarded and dried for two or three days in a hygienic manner. The blossom was grinded in to powder form. Then, banana blossom flour was incorporated into dark chocolate. The treatments for preparation of banana blossom flour incorporated in dark chocolate were as follows;

## 3. Treatment

T1- cocoa powder (control)

T2- cocoa powder + 10% banana blossom flour

T3- cocoa powder + 20% banana blossom flour

T4- cocoa powder + 30% banana blossom flour

The banana blossom flour incorporated dark chocolate was prepared by mixing the cocoa powder with specified amount of banana blossom flour as mentioned treatments. All the ingredients such as pineapple, artificial sweetener and water were used for fruit juice in the level of variations. The sensory evaluation of the researcher's experimental and respective control products were carried out by 10a.m among the semi-trained (N= 30) panel members. The staffs and students of Mother Teresa Women's University, Chennai,

Tamilnadu, India, from the Department of Home Science were included as semi-trained panel members and also students of Madras Medical Mission College of Health science, Chennai, Tamilnadu, India, from the Department of Clinical Nutrition. The evaluation of criteria includes organoleptic characteristics such as appearance, sweetness, taste, firmness, melting quality, flavour, creaminess, appetizing, softness and overall acceptability were determined by rating scale. The mean scores given by thirty members were used for statistical analysis. The panelists were explained about each quality attributes to avoid judgment variability.

## 4. Results and Discussion

The organoleptic properties of dark chocolate were evaluated Appearance, Sweetness, Taste, Firmness, Melting Quality, Flavour, Creaminess, Appetizing, Softness and Overall Acceptability. The data pertaining to the organoleptic evaluation was influenced by different treatments were presented in Table 1. The overall acceptability and rating scale score was higher for the 20% level of incorporation of banana blossom flour. The data reveals that there were significant differences at the level of 1% significances among 20%.

## 5. Conclusion

Banana blossoms are considered as "Good package of Anti-

oxidants" due to their availability of vitamin-E and flavanoids. As banana blossom contains high amount of anti-oxidants and quercetin, it can be supplemented among the community. It is recommended that analysis of banana blossom from different regions of the state can be carried out to get a range of anti-oxidant and quercetin levels. The future nutritionists should consider a special effort in inculcating the banana blossom into routine diet and to create awareness and share knowledge to the community at large. Hence the food industry should focus on the incorporation of banana blossom into ready to eat products.

**Table 1:** Organoleptic evaluation of banana blossom flour incorporated dark chocolate

S.NO	Leve of incorporation (%)	Mean $\pm$ S.D	t-value	Level of significance
1	Control (0)	45.6 $\pm$ 3.55	8.58	NS
2	10	44.9 $\pm$ 3.98	0.2	1%
3	20	47.8 $\pm$ 3.54	2.02	1%
4	30	39.3 $\pm$ 5.54	9.13	NS

NS- Not Significance

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