

## FORMULATION AND NUTRIENT ANALYSIS OF STEVIA (*STEVIA REBAUDIANA*) INCORPORATED VALUE ADDED PRODUCTS

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### ABSTRACT

**Objectives:** To incorporate the stevia in the value added products like jam, Ice cream and chocolates and conduct organoleptic evaluation of the stevia incorporated value added products and to analyse the nutrient contents of the stevia incorporated prepared items. To create awareness of the beneficial effects of the Stevia to the diabetic patients.

**Methods:** This study we incorporated the stevia in many value added products like chocolate, ice cream, cake, jam and milk shake. The Organoleptic evaluation was conducted and the results were tabulated. The nutrients like energy, protein, fat, calcium, phosphorous, iron, carbohydrate, dietary fibre, Vitamin C were analyzed using standard methods. The Physico-chemical constituents like moisture, ash, acid insoluble ash, and total sugar were analyzed using standard methods. The mean and standard deviation was used for the statistical analysis.

**Results:** The sensory evaluation of Stevia incorporated mixed fruit jam and chocolate got less marks when compared to the control sample. Stevia incorporated chocolate cake got maximum marks when compared to the control sample. The energy and the carbohydrate was very low for the stevia incorporated mixed fruit jam, Chocolate Cake, Chocolate and Chocolate Ice Cream when compared to the control sample. Protein and fat of Stevia incorporated mixed fruit jam. Chocolate Cake, Chocolate and Chocolate Ice Cream have maximum value when compared to the control.

**Conclusion:** It is very useful to prepare many sweets for the diabetic patients with the incorporation of stevia. The supplementation and evaluation of blood glucose levels for diabetic patients will be used to generate new views in future research. So as a nutritionist, we have to create the awareness about the benefits of *Stevia* to the community.

**Keywords:** Organoleptic, Stevia, Physico-chemical parameters, Diabetics.

### INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder that prevents the body to utilize glucose completely or partially. It is characterized by raised glucose concentration in the blood and alterations in carbohydrate, protein and fat metabolism. This can be to failure in the formation of insulin or action [1]. Type I diabetes, also known as Insulin Dependent Diabetes Mellitus, occurs between the ages of 1-16 yr and includes from ten to twenty percent of all diabetic cases. Type II diabetes, also known as adult onset diabetes or Non Insulin Dependent Diabetes mellitus, usually occurs after the age of forty [2]. Gestational diabetes is another type that actually occurs during pregnancy, which increases a risk for mother as well as foetus. Ovarian and placental hormones reduce insulin sensitivity increasing insulin requirement [3]. The most common causes of diabetes are heredity, improper dietary habits, lack of exercise, side effects of drugs and toxins, effect of hormones, psychological factors, as a sequel to other diseases like pancreatitis and heart attacks, faulty food habits, sedentary lifestyle, toxicity of drugs and toxins [4]. The main symptoms of diabetes mellitus include polydipsia, polyuria, polyphagia, ketoacidosis and coma. Chronic complications include retinopathy, nephropathy, neuropathy, and recurrent myocardial infarction with an increase in the incidence of congestive heart failure, ulceration, sepsis of feet and even gangrene [5]. The three cornerstones of diabetes management are diet therapy, physical activity and medication if needed (insulin and oral glucose lowering agents). A high complex carbohydrate and low fat diet, which contains a variety of fruits and vegetables, would be an ideal diet for diabetics [6]. In these circumstances, development of sugar substitute functional food seems to be most important. The Herb, *Stevia rebaudiana*, has been used for centuries by the Guarani Indians of Paraguay, who had several names for the plant, several of which are referring to the sweet leaf or honey leaf [7]. Stevia rebounding bertonii is a natural sweet perennial plant of the Asteraceae family and a native of North Eastern Paraguay. Stevia is

150-170 times sweeter than sugar [8]. It is certified as safe to use, has no calories, and is appealing to health and body conscious youngsters, adults and children. Stevia leaves contain a complex mixture of sweet glycosides, including stevioside, stevio bioside, rebaudio sides (A, B, C, D, E, F) and stevioside is isolated and purified from *stevia rebaudiana*. It is calorie free and does not have any side effects like some artificial sweeteners [9]. It will not affect the blood sugar level. It is a flavour enhancer, prevents cavities and recommended for diabetics. It is a non-toxic. This leaves can be used in their natural state and it has huge sweetening power and only small quantities are need to be used for cooking.

### MATERIALS AND METHODS

For this study Stevia is selected and incorporated in products like jam, ice cream and chocolates. Organoleptic Evaluation and Nutrient contents were analysed in stevia incorporated products. The stevia powder was purchased from the Kawarlal & Co, Raghunaykulu Street, Chennai.

#### Preparation of stevia incorporated mixed fruit jam

The fresh ripped fruits, pine apple, apple, grapes, and papaya were used for the preparation of mixed fruit jam. The fruits were washed and cut. Pulp was taken by the traditional method. The pulp was divided into two portions. One part was boiled and sugar is added for the preparation of control. Another part was boiled and stevia is added for the preparation of the test sample. A pinch of sodium benzoate and citric acid is added as preservative.

#### Preparation of stevia incorporated chocolate cake

The butter was beaten well sugar is added and mashed with butter evenly. The maida was added beaten egg, coco butter, baking powder also mixed with this and prepare a dough for control. The same procedure was followed in separately, and the dough was prepared by the incorporation of stevia in the test sample and other ingredients were same.

### Preparation of stevia incorporated chocolate

Ingredients like coco powder, milk powder, sugar and butter are mixed with small amount of water and made it to a creamy form. Placed in a chocolate mould tray and refrigerated for 15 minutes. The same procedure was followed for the test sample with the addition of stevia.

### Preparation of stevia incorporated ice cream

The milk was boiled continuously with proper stirring until it gets half and sugar, corn flour and fresh cream were added and kept in a refrigerator. The same procedure was followed for the test sample with the addition of stevia.

### Organoleptic evaluation of the stevia incorporated value added products

Organoleptic evaluation attributes like appearance, colour, flavour, texture, taste and overall acceptability were evaluated using 9 point hedonic scale. Scorecard method was used for evaluating the

sensory characteristics of the Stevia incorporated value added products. Five trained staff members and 25 semi trained students were evaluated sensory characteristics of foods.

### Nutrient analysis of the stevia incorporated value added products

The nutrients like energy, carbohydrate, protein, fat, calcium, phosphorus were analyzed using standard methods.

### Statistical analysis of stevia incorporated value added products

The results of the sensory evaluation and nutrient analysis are processed by standard statistical procedures. The mean and standard deviation was used for the statistical analysis.

## RESULTS AND DISCUSSION

Organoleptic evaluation attributes like appearance, colour, flavour, texture, taste and overall acceptability were evaluated using 9 hedonic scales. The mean sensory scores for various values added products were given in following tables.

Table 1: Organoleptic evaluation for the control samples

Criteria	Appearance	Colour	Flavour	Texture	Taste	Overall Acceptability
Mixed Fruit Jam	4.3±0.82	4.6±0.53	4.3±0.74	4.4±0.91	4.7±0.63	4.5±0.54
Chocolate Cake	4.3±1.03	4.7±0.83	4.4±0.81	4.4±0.58	4.7±0.49	4.6±0.61
Chocolate	4.6±0.21	4.7±0.36	4.8±0.51	4.5±0.71	4.6±0.85	4.3±0.92
Chocolate Ice Cream	4.5±0.92	4.4±0.81	4.3±0.67	4.6±0.48	4.7±0.78	4.6±0.36

Table 2: Organoleptic evaluation for the test samples

Criteria	Appearance	Colour	Flavour	Texture	Taste	Overall acceptability
Mixed Fruit Jam	4.1±0.65	4.3±0.21	4.0±0.60	4.0±0.48	3.5±0.33	3.7±0.38
Chocolate Cake	4.4±0.74	4.6±0.35	4.6±0.86	4.6±0.55	4.5±0.39	4.5±0.62
Chocolate	4.4±0.60	4.7±0.59	4.5±0.28	4.4±0.49	4.4±0.56	4.1±0.70
Chocolate Ice Cream	4.3±0.27	4.5±0.53	4.4±0.83	4.6±0.24	4.5±0.90	4.5±0.46

The appearance (4.3±0.82), colour (4.6±0.53), Flavour (4.3±0.74), texture (4.4±0.91), taste (4.7±0.63) of the control has got the maximum score when compared to the test sample in mixed fruit jam. The overall acceptability of Stevia incorporated Jam has got 3.7±0.38 and control sample got 4.5±0.54. The organoleptic characteristics of the test sample had got the maximum score when compared to the control. But the overall acceptability of the control had higher value than the test sample. The appearance, flavour, texture, tastes and overall acceptability of the control sample has maximum score when compared to test sample. The appearance (4.5±0.92), taste (4.4±0.81), texture (4.6±0.48) and overall acceptability (4.6±0.36) of controls have maximum marks when compared to test sample in chocolate ice cream. The colour (4.5±0.53) and flavour (4.4±0.83) of the test sample has the maximum mark when compared to control. But overall evaluation control samples got scored than test samples.

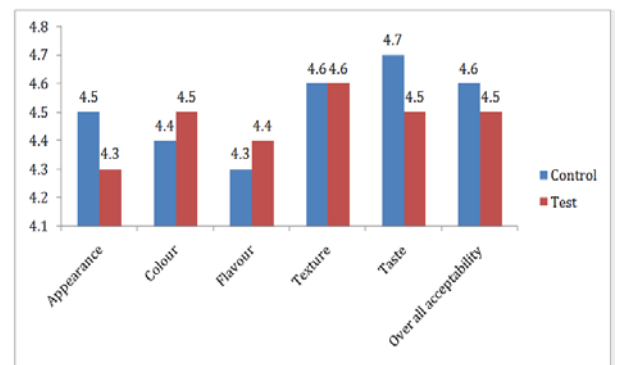


Fig. 1: Organoleptic evaluation for the chocolate ice cream

Table 3: Nutrient analysis of control

Parameter	Energy	Carbohydrate	Protein	Fat
Mixed Fruit Jam	155.56±8.23	38.00±2.38	0.26±10.60	0.89±0.32
Chocolate Cake	450±13.48	50±4.17	20±1.84	23.44±2.52
Chocolate	370.25±9.52	42.25±3.95	5.0±0.97	15.64±2.18
Chocolate Ice Cream	355.25±9.52	32.25±3.95	4.0±0.97	13.64±2.18

Table 4: For nutrient analysis of test sample

Parameter	Energy	Carbohydrate	Protein	Fat
Mixed Fruit Jam	75.18±3.52	20.29±1.56	0.20±0.05	0.96±0.23
Chocolate Cake	275.15±10.60	25.42±3.45	24.34±2.62	24.34±1.97
Chocolate	193.01±7.23	22.31±2.27	6.90±1.06	18.24±1.34
Chocolate Ice Cream	173.01±7.23	20.31±2.27	5.90±1.06	16.24±1.34

From table energy ( $75.18 \pm 3.52$ ) and the carbohydrate ( $20.29 \pm 1.56$ ) was very low for the stevia incorporated mixed fruit jam when compared to the control sample. The energy ( $275.15 \pm 10.60$ ) and the carbohydrate ( $25.42 \pm 3.45$ ) were very low for the stevia incorporated chocolate cake when compared to control sample. Protein and fat of the test sample have maximum value when compared to control. The energy ( $193.01 \pm 7.23$ ) and the carbohydrate ( $22.31 \pm 2.27$ ) were very low for the stevia incorporated chocolate when compared to control sample. Protein and fat of the test sample have maximum value when compared to control. The energy ( $173.01 \pm 7.23$ ) and the carbohydrate ( $20.31 \pm 2.27$ ) were very low for the stevia incorporated chocolate ice cream when compared to control sample. Protein, fat, vitamin C and fibre of the test sample have maximum value when compared to control.

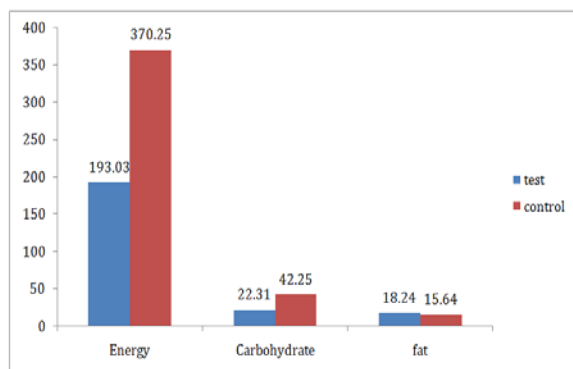


Fig. 2: Nutrient analysis of stevia incorporated chocolate

## CONCLUSION

Stevia is a natural sweetener derived from the leaves of the Stevia plant. It is a calorie free and does not have any side effects like some artificial sweeteners. Stevia has a very concentrated sweetness so only a small amount is required. Stevia is incorporated with various values, added products like mixed fruit jam, chocolate cake, chocolate and chocolate ice cream.

The sensory attributes like appearance, colour, flavour, texture, taste and overall acceptability of Stevia incorporated mixed fruit jam got scored less when compared to the control sample. Stevia incorporated chocolate cake got score maximum when compared to the control sample. Stevia incorporated chocolate got less score when compared to the control sample. The energy and the carbohydrate was very low for the stevia incorporated mixed fruit jam, Chocolate Cake, Chocolate and Chocolate Ice Cream when compared to the control sample. Protein and fat of Stevia incorporated mixed fruit jam, Chocolate Cake, Chocolate and Chocolate Ice Cream have maximum value when compared to the control. Hence the stevia incorporated value added products were recommended for diabetics patients because it was not increased their blood sugar levels and very safe for use.

## CONFLICT OF INTERESTS

Declared None.

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