



# FORMULATION AND STANDARDIZATION OF D-FIGHT HERBAL TEA

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**Abstract:** Diabetes mellitus is a chronic metabolic disorder that prevents the body to utilize glucose completely or partially. This condition can be due to failure in the formation of insulin or liberation or action. Hence proper production of insulin hormone and maintenance of blood glucose level are very important. This project focuses on some of the Indian herbal drugs with proven antidiabetic properties and related beneficial effects can be used in treatment of diabetes. These herbs regulate the proper secretion of insulin hormone and maintains the blood glucose level. D-Fight herbal tea is made of Hibiscus rosa sinensis, Cassia auriculata, Catharanthus roseus, Black jamun seeds, Dried ginger which are enriched with antidiabetic, antioxidant and antibacterial properties were used to treat diabetes mellitus and Cinnamon, Lemon mint and Orange peel are the three ingredients added for the enrichment of flavours. As all the ingredients are naturally sun dried, the nutrient loss is also less.

**Index Terms** – Diabetes Mellitus, Antidiabetic, Hibiscus rosa sinensis, Catharanthus roseus, Cassia auriculata, Black jamun seeds, Lemon peel, Mint, Orange peel, Cinnamon.

## I. INTRODUCTION

Diabetes mellitus is a chronic metabolic disorder and is one of the fast growing global problem with the huge social health and economic consequences. Increasing population and Obesity are two major reasons for the increase in diabetes. Diabetes occurs when the pancreas not able to produce enough insulin or when the body cannot use the insulin effectively it produces. Hyperglycaemia, also called raised blood sugar, is a common effect of uncontrolled diabetes and it can lead to serious damage to many organs of the system of the body, especially the nerves and blood vessels.

Diabetes Mellitus is leading cause of death globally (WHO, 2015). In 2014, 8.5% of adults who were aged 18 years and older had diabetes. In 2019, diabetes was the direct cause of 1.5 million deaths due to diabetes occurred before the age of 70 years. Another 4,60,000 kidney disease deaths were caused due to diabetes, and raised blood glucose causes around 20% of cardiovascular deaths have been proved. Between 2000 and 2019, due to diabetes there was a 3% increase in age-standardized mortality rates.

Indian Herbal drugs that have been used and provide a list of medicinal herbs used in ayurveda as an antidiabetic medicine used for the prevention of diabetes mellitus, especially in India. Some of herbal drugs with proven antidiabetic and related beneficial effects have been used in treatment of diabetes for centuries. D-Fight herbal tea is naturally high in antidiabetic properties. D-Fight stands for Fight against diabetes. In D-Fight herbal tea, powerful medicinal flowers were added that are well known for antidiabetic properties like, Hibiscus rosa sinensis, Cassia auriculata, Catharanthus roseus, Black jamun seeds, Dried ginger were processed into a herbal tea powder and Cinnamon, Mint, Lemon and Orange peel were added for flavours.

Hibiscus rosa sinensis is a plant belongs to the Family of Malvaceae which is widely distributed throughout the world. Various research and studies were proved that the different parts of Hibiscus rosa sinensis plants is filled with Antidiabetic, Antimicrobial, Antiulcer, Hepatoprotective, Antifertility, Antigenotoxic and Anti-inflammatory properties, which helps in the treatment of various diseases. Hibiscus rosa sinensis extract is a good source of many potentially active antioxidants and anticancer constituents such as, glycosides, riboflavin, niacin, carotene, malvalic acid and lauric acid (Badreldin H. Ali 2005).

*Cassia auriculata* L. (Caesalpinaceae) is a shrub that has attractive yellow flowers, commonly used for the treatment of skin disorders and body odour. It present in different parts of India. Indigenous people use various parts of the plant for the treatment of diabetes mellitus. It is used in Ayurvedic medicine in the name of “Kalpa drug” which contains five parts of the shrub (roots, leaves, flowers, bark and unripe fruits) each ingredient are taken in equal quantity, at first they are dried and then powdered to give “Avarai Panchaga Choornam”, for the control of glucose levels and also reduction of symptoms such as polyuria and thirst in diabetes (Brahmachari & Augusti, 1961; Shrotri et al., 1963).

*Catharanthus roseus* belongs to the Apocynaceae family; this plant is a dicotyledonous angiosperm and synthesizes two terpene indole alkaloids; vinblastine and vincristine that are used to fight cancer. The flowers of *catharanthus roseus* is a medicine has antidiabetic effect used to treat diabetic mellitus. The aqueous extract was found to lower the blood glucose of about 20% in diabetic rats when compared to that of the dichloromethane and methanol extracts which lowered the blood glucose level to 49-58%. The hypoglycemic effect has appeared due to the result of the increased glucose utilization in the liver (Jai Narayan Mishra, et al., 2017)

Black jamun seed (*Syzygium cumini*) has been used in folk medicine for long ago to treat diabetes. The bioactive properties of black jamun acts as a therapeutic agent for treating diabetes (Erny Ishartati et al., 2022).

Dried ginger and cinnamon also have an antidiabetic effect that helps to get rid of diabetes. Cinnamon, Lemon peel, Mint, and Orange peel are added for the variation of flavours also has enormous health benefits.

## **OBJECTIVES:**

- To formulate the D-Fight herbal tea incorporated with antidiabetic properties.
- To evaluate the acceptability of D-Fight herbal tea through sensory evaluation.
- To estimate the nutrient content of the developed D-Fight herbal tea by standard method and give awareness.
- To decide the suitable packaging material.

## **MATERIALS AND METHOD: -**

### **PROCUREMENTS OF RAW MATERIALS:**

The raw materials such as *Hibiscus rosa sinensis*, *Catharanthus roseus*, *Cassia auriculata*, Black jamun seed, Dried ginger, Mint, Lemon peel, Orange peel, Cinnamon.

### **CHEMICALS:**

The chemicals and reagents used for study where Laboratory reagents (LR), Analytical reagent (AR) or Guarantee reagent (GR) grades.

### **UTENSILS:**

Stainless steel vessels, plates, spoons, spatula, and tea cups were used for preparing and serving the developed products.

### **ENERGY SOURCE:**

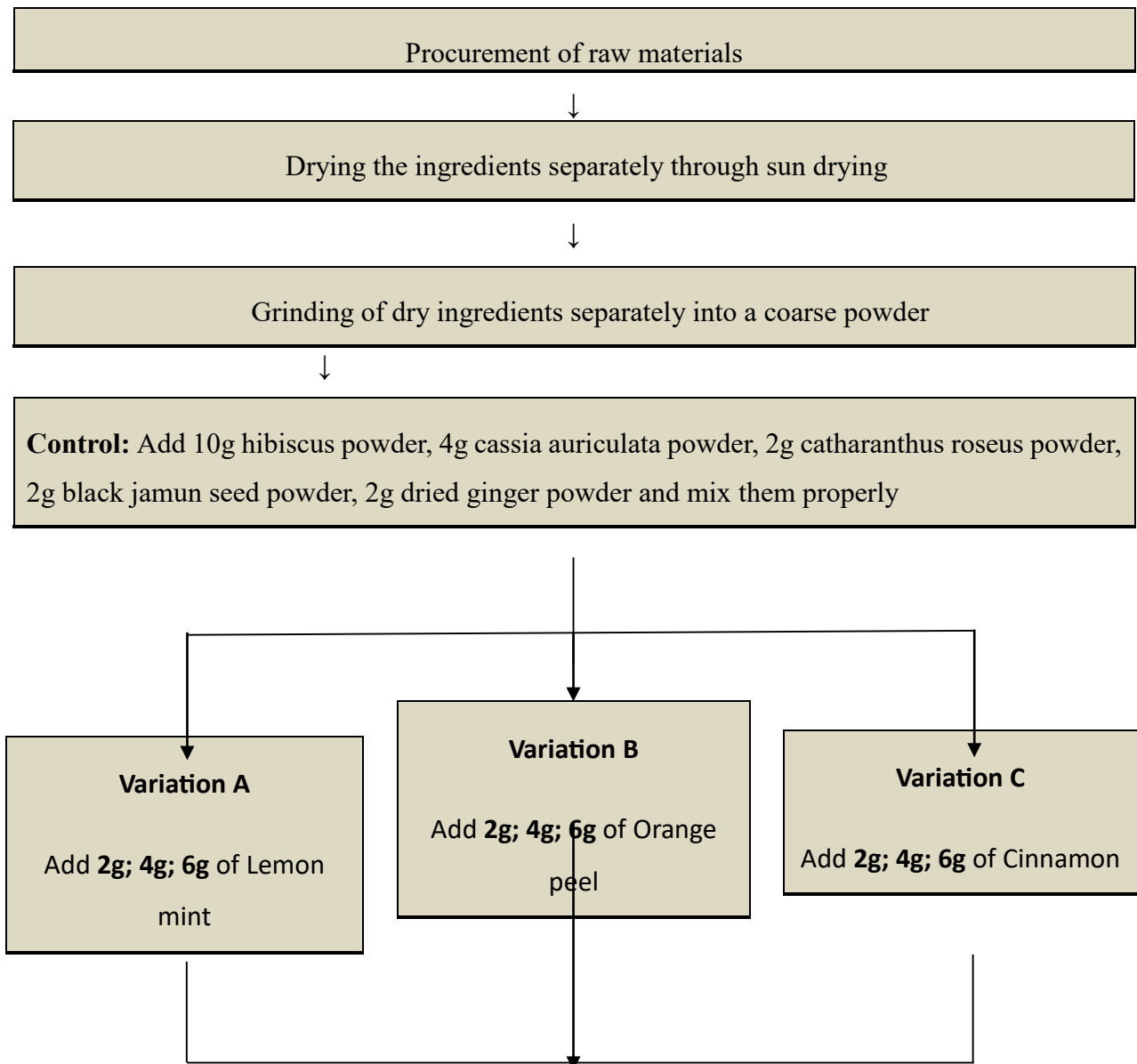
Electric current and Liquid Petroleum gas were used as heat source

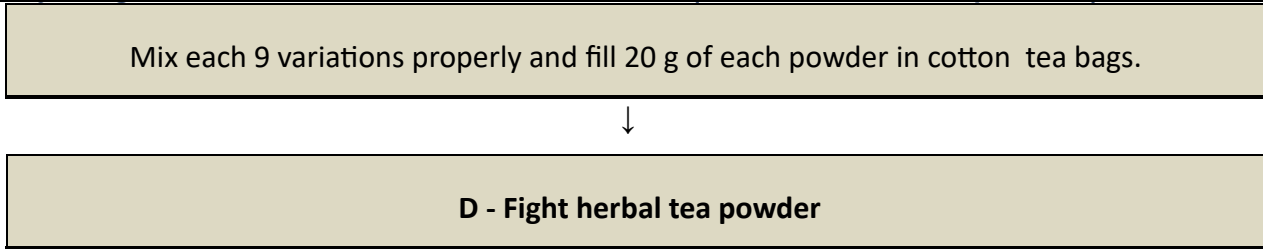
**EQUIPMENTS USED:**

- Weighing balance
- Electronic balance
- Hot plate
- Mixer
- Hot air oven
- Infrared moisture analyzer
- Magnetic stirrer
- Muffle furnace
- Kel plus-Digestion & Distillation
- Socs Plus apparatus
- Fibro plus apparatus

**PREPARATION OF D-FIGHT HERBAL TEA:**

**OUTLINE PROCEDURE OF D-FIGHT HERBAL TEA IS DEPICTED IN FIGURE 1**





*Figure - 1:* Procedure of D-Fight herbal tea

#### **FORMULATION OF D-FIGHT HERBAL TEA:**

##### **PRELIMINARY PREPARATION OF SELECTIVE INGREDIENTS: -**

- The procured raw materials such as hibiscus rosa sinensis, cassia auriculata, catharanthus roseus, black jamun seeds, dried ginger, lemon peel, mint, orange peel, cinnamon are cleaned to remove dirt, dust, stones and other foreign materials.
- Procured fresh raw materials are sun dried for 2 days. Then each ingredients are taken separately and grinded into a coarse powder.
- Dried ginger and cinnamon are taken separately and grinded into a coarse powder.

##### **VARIATIONS OF D-FIGHT HERBAL TEA:-**

- Hibiscus rosa sinensis, cassia auriculata, catharanthus roseus, black jamun seeds, dried ginger, lemon peel, mint, orange peel, cinnamon have high efficiency to control diabetes and have enormous health benefits.
- The prepared products were made into three different flavours lemon mint, orange peel, and cinnamon and each flavour carries three variations. So totally they were made into nine variations.
- Standardized procedures was followed for all formulated recipes.

**DEVELOPMENT OF D-FIGHT HERBAL TEA:-****Table –1:** Proportions and variations of ingredients in DFHT.

- The proportion of ingredients used to prepare D-Fight herbal tea and its variations are given in table no: 1
- First all the fresh ingredients are sun dried and grinded separately into coarse powder and the dried ingredients such as dried ginger and cinnamon also grinded separately into coarse powder.
- Here D-Fight herbal tea powder without added flavours act as a control. Other than flavours quantity of each ingredient will change according to their variations. D - Fight herbal tea is processed in the form of tea bags each tea bags carries 20 g of tea powder. Each flavours are named, Lemon mint as variation A, Orange peel as variation B and Cinnamon as variation C were incorporated in the ratio of 14:6, 16:4, 18:2, totally nine variations are made as AA, AB, AC, BA, BB, BC, CA, CB, CC are incorporated and developed into D - Fight herbal tea respectively and evaluated for the acceptability.

**\*DFHT – D-Fight Herbal Tea**

S.No	Ingredients	Quantity(g)			
		Control	DFHT A	DFHT B	DFHT C
1.	Hibiscus rosa sinensis powder	10g	8.5g	9g	9.5g
2.	Cassia auriculata powder	4g	2.5g	3.25g	3.75g
3.	Catharanthus roseus powder	2g	1g	1.25g	1.75g
4.	Black jamun seed powder	2g	1g	1.25g	1.75g
5.	Dried ginger powder	2g	1g	1.25g	1.75g
6. A	Lemon peel and mint powder	-	(3+3) 6g	(2+2) 4g	(1+1) 2g
7. B	Orange peel powder	-	6g	4g	2g
8. C	Cinnamon powder	-	6g	4g	2g



**Plate – 1:** Fresh ingredients  
Fight herbal tea



**Plate – 2:** Preparation of tea powder



**Plate – 3:** D-

### ORGANOLEPTIC OR SENSORY EVALUATION: -

The Institute of Food Technologies (IFT) defines sensory evaluation as, “The Scientific discipline used to evoke measure, analysis and interpret those reaction to characteristics of food and materials as perceived through the senses of light, smell taste, touch and hearing (Murana and Siva Lingam, 2005)

The sensory evaluation was conducted to analyze the acceptability of the developed products. The developed D-Fight herbal tea was assessed by 25 panel members.

The developed food product along with its 9 variations was evaluated by the panel members using score card with 5 points Hedonic scale rating by mentioning the product variations as Sample AA, Sample AB, Sample AC, Sample BA, Sample BB, Sample BC, Sample CA, Sample CB, Sample CC and Sample D. Sensory evaluation is depicted in Picture.1



**Picture – 1:** Sensory evaluation

Overall mean score of the sensory evaluation is depicted in Table 2

S.NO	Variations	Sensory attributes					Overall mean score
		Appearance	Colour	Flavour	Aroma	Taste	
1	DFHT AA	4.2	4.2	4	4.3	3.75	4.09
2	DFHT AB	4.4	4.2	4.1	4.2	3.8	4.14
3	DFHT AC	4.4	4.15	4.15	4.15	3.75	4.12
4	DFHT BA	4.35	4.2	4.05	4.35	3.85	4.16
5	DFHT BB	4.2	4.2	4	4.25	4	4.14
6	DFHT BC	4.2	4	3.8	4.3	3.65	3.99
7	DFHT CA	4.5	4.15	4.2	4.3	3.5	4.13
8	DFHT CB	4.4	3.95	3.65	4.35	3.85	4.04
9	DFHT CC	4.7	4.2	3.75	4.35	3.85	4.17

**Table – 2:** Overall mean score of sensory evaluation

\*DFHT – D-Fight Herbal Tea

Among the developed products, the overall mean score in all the three flavours DFHT AC, DFHT BA and DFHT CC was highly acceptable. The result revealed that the variation DFHT AC, DFHT BA, & DFHT CC secured highest score and the sensory attributes this samples got more preference than other developed products.

### NUTRIENT ANALYSIS:-

- Nutritional quality can be assessed by chemical or instrumental analysis for specific nutrients (Norman et al., 2005)
- Nutrient analysis refers to the process of determining the nutrient content of food and food products
- The formulated D-Fight herbal tea were subjected to nutrient analysis of Energy, Carbohydrates, Protein, Fat, Crude fiber, Moisture, Calcium, Iron, Phosphorous.
- Results of nutrient analysis is depicted in Table 3

S.NO	NUTRIENT	VALUE
1.	MOISTURE	2.375 g
2.	PROTEIN	6.561 g
3.	FAT	3.459 g
4.	FIBER	4.265 g
5.	CALCIUM	29.06 mg
6.	PHOSPHOROUS	13.36 mg
7.	IRON	1.05 mg
8.	CARBOHYDRATES	61.437 g
9.	ENERGY	75.492 kcal

**Table – 3:** Result of nutrient analysis

### SHELF-LIFE ANALYSIS:-

The standardized D-Fight herbal tea are subjected to shelf-life study by placing it in room temperature from the day of development till the physical and chemical composition of product changes. The product is coarse texture, good aroma, slightly bitter and astringent taste. The nature of the product is observed in daily basis. As per observation after 6 weeks change in nature is observed. It is stored in air tight container exactly 45 days the product can sustain its composition.

### PACKAGING AND LABELLING:-

A product whether it is factory made or farm produce has to reach its destination, the ultimate consumer in the same condition without any deviations from the original characteristics, one requires packaging.

As the product is sun dried and in the form of dry powder, the packaging material should be moisture resistant and airtight. Most of the tea bags are produced using high quality stretch polyvinyl chloride material along with diethylhexyl phthalate as a softening agent making the tea bag stretchable. Packaging and Labelling pictures were depicted in plate 4 and 5.



**Plate – 4:** Packaging of D-fight herbal tea

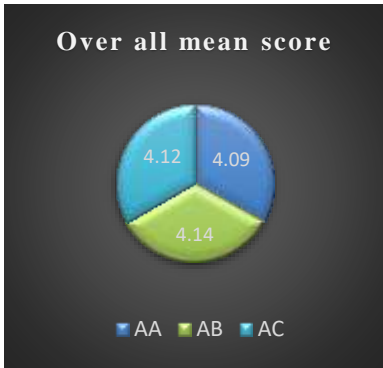


**Plate – 5:** Labelling of D-Fight herbal tea

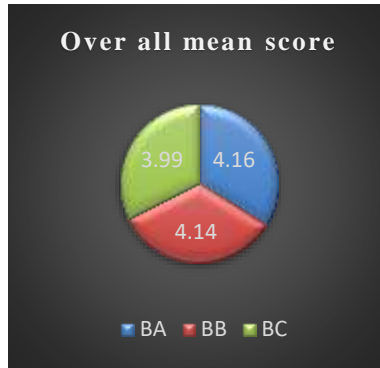
**RESULTS AND DISCUSSION:**

**SENSORY EVALUATION:**

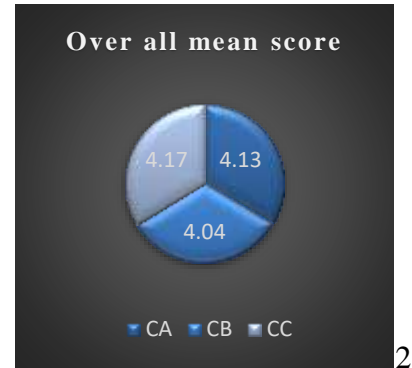
Among the developed products, the overall mean score in all the three flavours DFHT AC, DFHT BA and DFHT CC was highly acceptable. The result revealed that the variation DFHT AB, DFHT BA, & DFHT CC secured highest score and the sensory attributes this samples got more preference than other developed products. Result of sensory evaluation is depicted in figure 2, 3 and 4.



**Figure - 2:** Overall mean score of mean score of Sample A

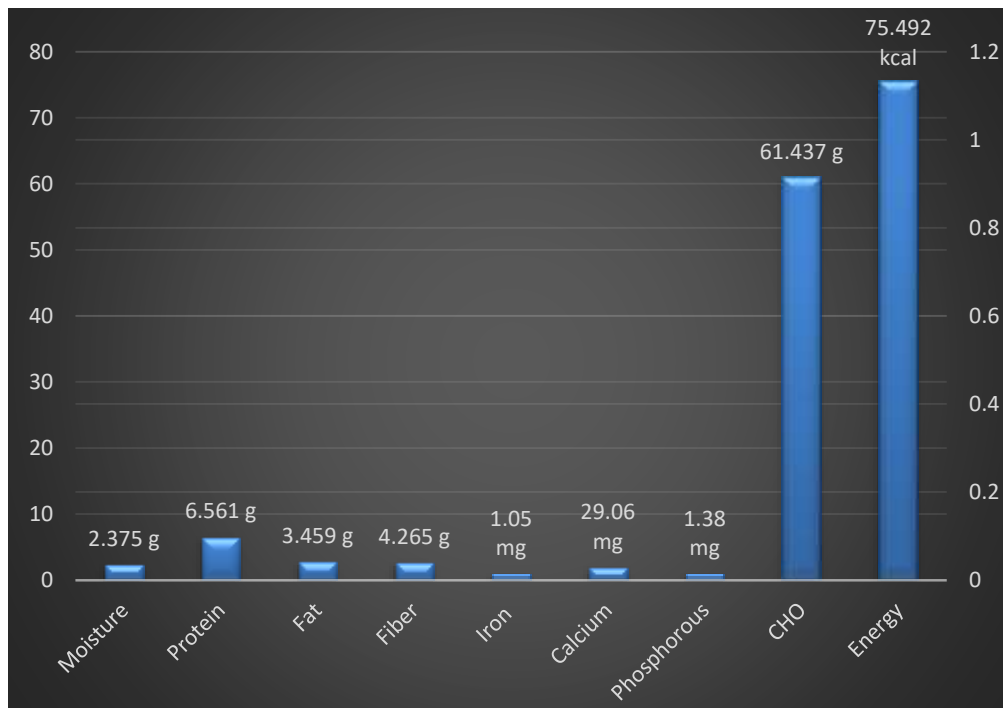


**Figure - 3:** Overall mean score of Sample B



**Figure - 4:** Overall mean score of Sample C

**NUTRIENT ANALYSIS: Result of nutrient analysis is depicted in figure – 5**



**Figure – 5:** Result of nutrient analysis

**SUMMARY AND CONCLUSION:**

The brief summary of the result of the study carried out to analyse D - Fight herbal tea are deal in this chapter, the data in sensory attributes, nutritive value, cost analysis of the standardized product have been summarized and conclude value.

Three different variations of products with different proportions of Hibiscus rosa sinensis, Cassia auriculata, Catharanthus roseus, Black jamun seeds, Dried ginger, Cinnamon, Mint, Lemon and Orange peel were prepared. The sensory outcome relived that among the developed products the overall mean score in DFHT AB, DFHT BA, DFHT CC was highly acceptable. Nutrient analysis result showed the developed product is rich in fiber and D-Fight herbal tea is specilly made for people affected by diabetes. So, it can be



recommended to them. Shelf life of product is BEST BEFORE 47 days from packing. Packaging material for commercial marketing, the tea bags used were made of high quality polyvinyl chloride material along with diethylhexyl phthalate as a softening agent making the tea bag stretchable.

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