Research Article

FORMULATION AND EVALUATION OF ANTIDIABETIC HERBAL MORINGA TEA BAGS

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ABSTRACT

This report provides an overview of Moringa tea bags in the treatments of diabetes as an Antidiabetic green tea. The API used in this formulation is Moringa belonging to family Moringaceae which is commonly used to treat diabetes, skin infection, anemia, anxiety, asthma, blackheads, worms, bronchitis, and cholera. Extracts of MoringaOleifera Leaves contains antioxidants, tissue protectants, analgesic, antiulcer agents and anti-hypertensive agents. Moringa helps to decrease the elevated blood glucose levels. It also reduces insulin resistance. Hence, in this present study the Antidiabetic Tea bags have formulated using MoringaOleifera and Bitter Gourd as an Antidiabetic agent; Guduchi as an immunomodulator in the powder form. Other ingredients like Isabgol as a stool softener and Stevia sugar as sweetening agent has been used. The formulation has been evaluated by performing various evaluation test such as LOD test, water and alcohol soluble extract value, ash value, pH etc. Dipping tea bag containing the mixture of ingredients in the hot or Luke water where the extract will be formed for the administration. Dosage form shows the Antidiabetic effect in few weeks or month as it is an herbal formulation.

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Keywords- MoringaOleifera, Guduchi, Bitter Gourd, Antidiabetic, Antioxidant, Asthma.

INTRODUCTION

Diabetes is a type of disease that is characterized by the increased amount of sugar in blood i.e. High blood glucose.Diabetes can be either due to the pancreas does not produce sufficient insulin or the body does not utilize the insulin in proper manner. Our body breakdowns the food into sugar i.e. glucose and it releases it into the bloodstream. When there is increase in the sugar level in the blood it's the signal for pancreas to release the insulin .This insulin helps in the producing the energy form the sugar present in the blood. More than 80% of overall population in the world is suffering from the diabetes.

Diabetes can be differentiated into main three types-

1) Type 1 diabetes
2) Type 2 diabetes
3) Gestational diabetes (diabetes occurs during pregnancy)

Symptoms of diabetes are:

1. Increased thirst
2. Frequent urination
3. Blurred vision
4. Hunger
5. Fatigue

1.1 Moringaoleifera:

Moringaoleifera, commonly known as moringa, drumstick tree, horseradish tree, bene oil tree, or benzoin tree, is the only genus in the Moringaceae family. . All parts of the moringa tree are edible and have long been consumed by humans. Moringa is commonly used to treat skin infections. , anemia, anxiety, asthma, blackheads, wounds, bronchitis, catarrh, chest congestion, cholera. It is used worldwide as a medicine. In many parts of Africa, it is commonly used for self- medication by people with diabetes, hypertension, or HIV/AIDS[1] . According to phytochemical analysis, M. oleifera is a rich source of potassium, calcium, phosphorus, iron, vitamins A and D, essential amino acids, and known antioxidants such as beta-carotene, vitamin C, and flavonoids. One of the foods that areknown

to control blood sugar levels is moringa and its leaves[3][4].

BITTER GOURD:

Momordicacharantia (*M. charantia*), also known as bitter melon, karela, balsam pear, or bitter gourd, is a popular plant used for the treating of diabetes-related conditions amongst the indigenous populations of Asia, South America, India, the Caribbean and East Africa. Its fruit has a distinguishing bitter taste, which is more pronounced as it ripens, hence the name bitter melon or bitter gourd. Biochemical and animal model experiments have produced abundant data and hypotheses accounting for the anti-diabetic effects of *M. charantia*. In comparison, clinical studies with human subjects are sparse and low quality in design.

STOOL SOFTENERS:

ISABGOL: Isabgol - Isabgol also known as psyllium husk is a dietary fiber that helps to increase stool and promote laxation.Isabgol is good for weight loss as it gives a feeling of fullness and helps prevent overeating. It is also good for diabetic patients as it helps to manage blood glucose levels. Isabgol also increases the absorption of other antidiabetic drugs like metformin and enhances their glucose lowering property[11]. It is one of the most commonly used home remedies for constipation.

IMMUNOMODULATOR:

GILOY (GUDUCHI) : - Giloy, also known as Amrita or Guduchi in Hindi, that helps improve digestion and boost immunity. Giloy is Titka (bitter) in taste and Ushna (hot) in potency. Regular use of Giloy can boost energy and immunity because of its Balya (strength provider) and Rasayana (rejuvenating) qualities. The bitter taste of Giloy may help manage blood glucose levels in diabetic patients. It also increase platelet count and might help in dengue as well as in the fever condition. Giloy powder, Kadha (tea) or tablets can also br used for various skin problems as it helps to remove toxins from the body. You can apply Giloy leaf paste on the skin to fasten the wound healing[12].

SWEETNER:

STEVIA: The leaves contain a number of sweet-tasting chemicals known as steviol glycosides, which can be used fresh or dried to sweeten beverages or desserts and can be commercially processed into powdered noncaloric sweeteners. Steviol glycosides, particularly the chemicals stevioside and rebaudioside A, can be more than 300 times sweeter than table sugar and are nonglycemic (i.e., they do not affect blood glucose levels) [13]. All this ingredients were used to prepare the anti diabetic tea bag, were Moringa is used as the main constituent. While giloy is used as a immunomodulator and isabgaol is used as the stool softener .Other anti diabetic agent used is Bitter gourd which also helps in reducing the blood glucose. Stevia is used as a sweetener.

Material and Equipment:

Ingredients used in formulation areas follows:

INGREDIENTS	QUNATITY TAKEN	USES
Moringa Olifera(powder)	3-4gm	Anti diabetic Anti inflammatory
Bitter gourd (powder)	1.5-2.5gm	Anti diabetic Weight loss
Guduchi (powder)	0.20-0.30gm	Immunomodulator Anti diabetic
Isabgol (powder)	Q.S	Stool softner
Stevia (sugar)	Q.S	Sweetening agent

METHODOLOGY IDENTIFIED:

1) Collect all the required ingredients from the local distributor.
2) Ingreients were seperately seived using the sieve of the mesh size 80.
3) All the ingredeints were properly weighed using electrical weighing balance.
4) All the sieve ingredients are mixed together.
5) Powder characteristics of formulation was evaluated.
6) Then the powder formulation was filled in the cotton tea bag.
7) Further evaluation of tea bags was done by using evaluation of tea bags.

Evaluation Parameter:

1) Loss on drying (LOD TEST): Weigh the empty petridish take 2gm of powder sample into it place this petridish in hot air oven for 1hr and calculate weight of petridish frequently. Repeat this procedure until the weight of petridish becomes equal note down constant reading of loss on drying of herbal formulation.

2) Water soluble exttract value:
Take 5mg of powder sample of herbal drug in a conical flask add 90ml of water and add 10ml of chloroform keep it for magnetic stirring for 6 hours then place it for 18 hours filter it and take 25ml of filtrate from that evaporate it.

3) Alcohol soluble extractive value:
Take 5mg of powder sample of herbal drug mixture in a conical flask add 100ml of alcohol into it keep it for magnetic stirring for 6 hours then place it for 18 hours filter it and take 25ml of filtrate form that evaporate it.

4) Ash value:
Weight the empty crucible add 2gm of herbal formulation weigh the crucible place the crucible in a muffle furnace at 1000 degree Celsius. The sample is allow to cool and calculate the weight of crucible subtract the weight of crucible with powder Ash from empty weight of crucible.

5) pH=5.4:
Take few grams of sample in a beaker add few ml of water in it calculate pH of sample by using pH meter or pH paper.

6) Bulk density:

Bulk density is defined as the mass of powder divided by bulk volume. The bulk density of powder depends upon particles size distribution, particle shape, and the nature of particle to adhere to each other .

LBD =WEIGHT OF POWDER/VOLUME OF PACKING

TBD = WEIGHT OF POWDER/TAPPED VOLUME OF A PACKING

7) Tapped Density: Is is calculated by tapping bulk volume of powder for 15min.

Tapped density = Weight of sample/tapped volume

ASSAY OF AMYLASE ENZYME BY COLORIMETRY:

Solubility testing was done of the formulation using distilled water, DMSO (*Di Methyl Sulf Oxide*) and 20% alcohol. Since, the formulation was not completely soluble it was filtered and extract was separated by using the various volumes and concentrations:

% of formulation	Distilled water(10ml)	DMSO(10ml)
0.1% (0.01gm)	10ml	10ml
0.5% (0.05gm)	10ml	10ml
1.0% (0.1gm)	10ml	10ml

Further tests to get standard graph was done, in which 6 test tubes were prepare:

1 .Glucose which is the product of amylase was used to prepare the standard graph, which will help us to know the enzyme activity of the extract that was extracted from the formulation.

2. This will show us how much our formulation will perform its activity.

3. To perform this tests, Sample tubes were taken and then given quantity of Glucose, Distilled water, and DNSA (*Di nitro salicylic Acid*) were added to each sample tubes and then kept in water bath for 10min. until the color of solution becomes darker to its original color.

4.Then Colorimeter was used to get the readings of the samples tubes.

Final readings after examining all the test tubes through the colorimeter

Concentration(200µg/ml)	Absorbance
Blank	-
200	0.01
400	0.06
600	0.07
800	0.10
1000	0.13

5. Further substrate is prepared, which contains 1% Starch.

6. Then 2.5gm of amylase is mixed with 50ml of distilled water and enzyme solution is prepared.

7. Then take 5 test tubes and in each test tube Substrate, Enzyme and Inhibitor is added according to the given quantity. Then the test tubes are kept at the optimal temperature in incubator for 30min. at 37°C.

8. After incubation 1ml DNSA was added in each test tubes and then kept in water bath up to 10min.

9. After cooling the test tubes add 6ml of Distilled water to each test tube to make up the volume up to 10ml, before taking the reading on the colorimeter.

10. Then the intensity is measured at 530nm. On colorimeter.

Observation table

Test tubes	Readings
Test tube 1	0.01
Test tube 2	0.03
Test tube 3	0.01
Test tube 4	0.02

6. RESULT & DISCUSSION

The herbal tea bags prepared shows the extraction in the hot or Luke hot water. It can be use in treatment of diabetic as a anti diabetic green tea. The dosage form (tea bag containing anti diabetic drug) was prepared and evaluated. The drug having the anti diabetic effects were used for preparation of tea bags. The dosage form shows the effects in few week or month as it is herbal formulation.

Other required parameter like Water soluble extractive index, Alcohol soluble extractive index, Tapped density, Bulk density, Ash value, Loss on drying, pH, etc ere studied and also assay of alpha amylase for it's antidiabetic activity found to be in prescribed range.

As the diabetic condition and the patients after the Covid pandemic increased at all the ages of people .Considering that this formulation was decided to be prepared so that the patient can receive the cure without consuming the allopathic medicine that cause allergic condition in some patients . So to ensure that patient receives the proper dose of medicine in the daily routine with any side effect this Moringa anti diabetic tea bags were prepared. Firstly the selection of the ingredients was done and after that there evaluation testes were performed. After doing the various evaluation tests and assay of alpha amylase which showing antidiabetic activity were performed and the herbal moringa antidiabetic tea bag was prepared.

As most of the people are growing towards the Ayurvedic medicine this can be the best option for the diabetic patients to replace the normal tea with this tea so that they will be able to see the effect after few weeks or months.

So this can also be use as a best alternative for the diabetic patients and can help in boosting the immunity of the patients.

CONCLUSION

The dosage form (tea bag containing anti diabetic drug) was prepared and evaluated. The drug having the anti diabetic effects were used for preparation of tea bags. The dosage form shows the effects in few week or month as it is herbal formulation. Other required parameter like Water soluble extractive index, Alcohol soluble extractive index, Tapped density, Bulk density, Ash value, Loss on drying, pH, etc ere studied and assay of alpha amylase for it's antidiabetic activity found to be in prescribed range.

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