Formulation and evaluation of antidiabetic herbal decoction

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Abstract: **carbohydrates, lipids and proteins. It is a condition that impairs the body's ability to process blood glucose as result of this increased blood glucose level occurs in our body, which causes a diabetes mellitus. The present study reveals to develop an Polyherbal anti-diabetic herbal syrup by using an extract of a leaves of Gymnemasylvestre and dried seeds of Syzygiumcumini. Three formulation of herbal syrup were formulated (F1, F2, F3) Herbals plants used in the formulations shows an potent anti-diabetic action over synthetic ones.F1, F2, F3 formulation were prepared and evaluated. Evaluation parameters of these formulation was found to be within the standard limits and invitro studies were performed for detection of anti-diabetic activity**

Keywords: **Decoction, formulation, Diabetes mellitus, Gymnemasylvestre, Syzygiumcumini.**

INTRODUCTION

Traditional Medicines derived from medicinal plants are used by about 60% of the world's population. Indian Herbal drugs and plants used in the treatment of diabetes, especially in India. Diabetes is an important human ailment afflicting many from various walks of life in different countries. In India it is proving to be a major health problem, especially in the urban areas. Though there are various approaches to reduce the ill effects of diabetes and its secondary complications, herbal formulations are preferred due to lesser side effects and low cost. A list of medicinal plants with proven antidiabetic and related beneficial effects and of herbal drugs used in treatment of diabetes. Various herbal drug and plants are available in nature.[10] Diabetes is the most common disease. Firstly the presence of Sugar in the urine of Diabetes was demonstrated by Dabson in 1755. In 1989 von Mering and Minkowski that pancreatectomised dose become diabetic in addition to developing degestive disturbances. It is a group of metabolic disorder characterized by high blood sugar level. In the last few years there has been an exponential growth in the field of herbal medicine and these drugs are gaining popularity both in developing and developed countries because of their natural origin and less side effects. Many traditional medicines in use are derived from medicinal plants, minerals and organic matter. A number of medicinal plants, traditionally used for over 1000 years named rasayana are present in herbal preparations of Indian traditional health care systems. In Indian systems of medicine most practitioners formulate and dispense their own recipes. The World Health Organization (WHO) has listed 21,000 plants, which are used for medicinal purposes around the world. Among these 2500 secies are in India, out of which 150 species are used commercially on a fairly large scale. India is the largest producer of medicinal herbs and is called as botanical garden of the world. The current review focuses on herbal drug preparations and plants used in the treatment of diabetes mellitus, a major crippling disease in the world leading to huge economic losses

Diabetes is a chronic disorder of carbohydrate, fat and protein metabolism characterized by increased fasting and post prandial blood sugar levels. The global prevalence of diabetes is estimated to increase, from 4% in 1995 to 5.4% by the year 2025. WHO has predicted that the major burden will occur in developing countries. Studies conducted in India in the last decade have highlighted that not only is the prevalence of diabetes high but also that it is increasing rapidly in the urban population. It is estimated that there are approximately 33 million adults with diabetes in India. This number is likely to increase to 57.2 million by the year 2025. Diabetes mellitus is a complex metabolic disorder resulting from either insulin insufficiency or insulin dysfunction. Type I diabetes (insulin dependent) is caused due to insulin insufficiency because of lack of functional beta cells. Patients suffering from this are

therefore totally dependent on exogenous source of insulin while patients suffering from Type II diabetes (insulin independent) are unable to respond to insulin and can be treated with dietary changes, exercise and medication. Type II diabetes is the more common form of diabetes constituting 90% of the diabetic population.

Though pathophysiology of diabetes remains to be fully understood, experimental evidences suggest the involvement of free radicals in the pathogenesis of diabetes and more importantly in the development of diabetic complications. Free radicals are capable of damaging cellular molecules, DNA, proteins and lipids leading to altered cellular functions. Many recent studies reveal that antioxidants capable of neutralizing free radicals are effective in preventing experimentally induced diabetes in animal models as well as reducing the severity of diabetic complications. For the development of diabetic complications, the abnormalities produced in lipids and proteins are the major etiologic factors. In diabetic patients, extra-cellular and long-lived proteins.

AIM AND OBJECTIVE

Aim: To Formulation and evaluation of Antidiabetic herbal decoction.

Objective of the study

1. To formulate herbal decoction that has antidiabetic activity.
2. To formulate the decoction that will maintain blood glucose levels.
3. To formulate decoction using cinnamon that has antidiabetic, antihyperglycemic activity.
4. To formulate herbal decoction that has less side effect.
5. To formulate herbal decoction that is inexpensive

PLAN OF WORK

1. Literature Survey.
2. Selection of herbal ingredient for preparation of herbal antidiabetic herbal decoction
3. Selection of herbs Beetroot, Bitter Melon, Cinnamon, Ginger, Java plum, Guava.
4. Selection method
5. Extraction of Beet Root, Bitter melon, Cinnamon, Ginger, Java plum, Guava.
6. Formulation of Decoction.
7. Evaluation of Decoction.
8. Determination of pH
9. Physical Appearance
10. Determination of Viscosity
11. Taste
12. Odor
13. Result and Discussion

DRUG PROFILE

1 Beetroot

• Synonym -Beta vulgaris
• Biological source- It consists of fresh root of Beta vulgaris
• Scientific classification
a) Kingdom- Plante
b) Family- Amaranthaceous
c) Order- Caryophyllales
d) Genus- Beta
• Common name- beetroot, common beet, garden beet.
• Antidiabetic constituent- Betanin.
Antidiabetic properties of beetroot- Increased insulin release (in T1DM), decreased glucose absorptions, stimulated insulin sensitivity

2 Bitter Melon

Synonym- Balsam apple, balsam pear, Bitter guard.
• Biological source- Momordica charantia is grow for its fruit, young shoot and edible flower
• Scientific name- Momordica charantia
• Scientific classification
a) Kingdom- planate
b) Division – magnoliopsid
c) Order – cucubitales
d) Family – Cucurbitaceae
e) Genus- momoridica
f) Species- charantia
• Common name- Karla, Bitter guard.
• Antidiabetic constituent- Polypeptide-p
Antidiabetic properties of Bitter melon - Bitter melon is one of the most commonly used vegetable that contains polypeptide-p and is used to control diabetes. Polypeptide-p or p-insulin is an insulin-like hypoglycemic protein, shown to lower blood glucose levels

3 Ginger

Synonym- Zingiber, Zingiberis
•Biological source- ginger herbaceous perennial plant probably native to southeaster Asia, or its pungent aromatic rhizome (underground stem) used as a spice, flavouring, food, and medicine.
•Scientific Name-Zingiber officinale
•Scientific classification
a. Kingdom- plantae
b. Division- magnoliophyte
c. Class – liliopsida
d. Order -zingiberales
e. Family-zingiberaceae
f. Gene -zingiber g. Species -zingiber officinale.

•Common Name- Ginger, Adrak.
•Antidiabetic constituent- Alpha- zingiberene
Antidiabetic properties of Ginger- Anti-diabetic effects through restorative effects on pancreatic β-cells, increasing insulin sensitivity, insulin-like action and peripheral utilization of glucose

4 Cinnamon –

Synonym- Cinnamon bark, Kalmi, Dalchini.
• Scientific name- Cinnamomum verum.
• Biological Source- Cinnamon is the dried inner bark of the coppiced shoots of Cinnamomum zeylanicum
• Scientific Classification
a. Kingdom- Plante
b. Division- Magnoliophyta
c. Class -magnoliposida
d. Order –magnoliales
e. Family -lauraceae.
f. Genus – cinnamo schaeff
g. Species- cinnom tamala
• Antidiabetic constituent - cinnamaldehyde
Antidiabetic properties of Cinnamon- Antidiabetic effects through inhibiting gastro-intestinal enzymes, modulating insulin response and sensitivity, improving glucose uptake, inhibiting gluconeogenesis and increasing glycogen synthesis

5 uava –

• Synonym- Guajava pyrifera
• Scientific Name- Psidium guajaval
• Biological Source- Guava trees are native to tropical America and are grown in tropical and subtropical

areas worldwide. Guava fruits are processed into jams, jellies, and preserves and are common pastry fillings.

• Scientific classification

a. Kingdom- Plantae

b. Order – myrtales

c. Family- myrtalecae

d. Genus -Psidium

e. Species- P.guajava.

• Antidiabetic constituent- Polyphenol compound.

Antidiabetic properties of Guava leaves - Reduced blood glucose level, increased plasma insulin level in an oral glucose tolerance test, and stimulated activities of some glucose metabolic enzymes

MATERIAL AND METHODS

INGREDIENT TABLE

Sr.no.	Ingredient	Quantity
1	Beetroot	110g
2	Bitter Melon	100g
3	Ginger	10g
4	Cinnamon	5g
5	Guavas leaves	10g
6	Vinegar	5ml
7	Water	QS

Apparatus Table-

Sr.no	Equipment	Brand
1	Heating mantle	Acclab Lab. Instruments
2	Grinder	Chromagrinder500W

Equipment Table-

SR.NO	EXTRACT	QUANTITY
1	Beetroot	25ml
2	Bittermelon	25ml
3	Ginger	10ml
4	cinnamon	10ml
5	Guavaleaves	20ml
6	vinegar	10ml

Formulation table

Sr No.	Apparatus	Materials
1	Water Bath	Stainless steel
2	Stirrer	Borosilicate glass
3	Measuring cylinder	Borosilicte glass
4	Beaker	Borosilicate glass
5	Funnel	Borosilicate glass

Formulation of Decoction

1. Take 5 beakers. Wash all beakers.
2. Collect the prepared extract as per quantities given in table no 6.
3. Take another 500ml beaker clean the beaker.
4. Add the prepared extarcts in 500ml beaker.
5. Mix all the extracts well.
6. Add 50 ml distilled water to above extarcts.
7. Boil the extracts in 500ml beaker at 100 degree for 10 minutes.
8. After 10 minutes cool the prepared decoction.
9. Add 10 ml vinegar to prepared decoction after cooling down.
10. Mix it well.
11. Pour the herbal decoction in a container.

RESULTS AND DISCUSSION

The prepared herbal decoction shows antidiabetic activity by reducing blood glucose levels, increase production of insulin, maintain glucose level in blood and it is effective against type 1 and type 2 diabetes mellitus. It is cost effective, herbal and has no side effects.

Result of Determination of pH –

The pH of herbal decoction is determined by using digital pH meter. The pH of decoction was found to be 5.4.

Result of Physical Appearance-

The formulated Decoction is Reddish brown.

Result of Viscosity-

Viscosity was measured by Brookfield viscometer and it was found to be 1.33 Pa.s Viscosity determinations were performed at room temperature

Result of odor of Decoction-

Odor of decoction was found to be Aromatic

Result of Taste of Decoction

Taste of decoction was found to be Pungent

SUMMARY AND CONCLUSION

The present study focusses on formulation and evaluation of herbal antidiabetic decoction containing beetroot, bitter melon, garlic, cinnamon, guava. All

these herbs have ability to maintain blood glucose levels in blood. Extraction of all the herbs is done by boiling method and extract is collected and mixed. This decoction help to increase the production of insulin, lower blood glucose levels, and is effective against type 1 and type 2 diabetes mellitus.

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