



ANTI-DIABETES HERBAL SYRUP USING MEDICINAL PLANTS: NEEM, TULSI, JAMUN AND KARELA

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ABSTRACT

Diabetes is a metabolic disorder characterized by persistent hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The global prevalence of **Diabetes mellitus** is increasing rapidly, creating an urgent need for safe and effective treatments. Traditional herbal medicines used in **Ayurveda** offer promising therapeutic options. Medicinal plants such as **Azadirachta indica** (Neem), **Ocimum tenuiflorum** (Tulsi), **Syzygium cumini** (Jamun), and **Momordica charantia** (Karela) possess significant antihyperglycemic and antioxidant properties. These plants contain bioactive compounds that help regulate blood glucose levels and improve insulin activity. This review summarizes their phytochemical constituents, pharmacological effects, and the potential formulation of a polyherbal anti-diabetic syrup.

1. INTRODUCTION

Diabetes mellitus is a chronic disease affecting millions of people worldwide. It is mainly classified into Type 1 diabetes and Type 2 diabetes, with Type 2 being the most prevalent. Long-term uncontrolled diabetes can cause serious complications including neuropathy, nephropathy, retinopathy, and cardiovascular diseases.

Although synthetic antidiabetic drugs such as **Metformin** and **Glibenclamide** are widely used, they may cause adverse effects such as hypoglycemia, weight gain, and gastrointestinal

disturbances. Therefore, natural products from medicinal plants have gained attention as alternative therapies for diabetes management.

Herbal plants such as neem, tulsi, jamun, and karela have been widely studied for their hypoglycemic properties and are commonly used in traditional medicine systems.

2. Medicinal Plants Used in Anti-Diabetic Herbal Syrup

2.1 Neem (*Azadirachta indica*)

Neem is an important medicinal tree widely used in traditional medicine for treating various diseases.

Phytochemical Constituents

- Azadirachtin
- Nimbin
- Nimbidin
- Quercetin
- Limonoids

Pharmacological Activities

Neem exhibits several pharmacological effects including:

- Antidiabetic activity
- Antioxidant activity
- Anti-inflammatory effects

Studies have shown that neem leaf extract significantly reduces blood glucose levels in diabetic animal models and improves pancreatic function.

2.2 Tulsi (*Ocimum tenuiflorum*)

Tulsi, also called Holy Basil, is known for its medicinal and spiritual significance in India.

Phytochemical Constituents

- Eugenol
- Ursolic acid
- Rosmarinic acid
- Apigenin

Pharmacological Activities

Tulsi has been reported to

- Lower fasting blood glucose levels
- Improve lipid profile
- Enhance insulin secretion

Clinical studies have shown that tulsi supplementation may reduce blood glucose and cholesterol levels in diabetic patients.

2.3 Jamun (*Syzygium cumini*)

Jamun fruit and seeds are commonly used in traditional medicine for diabetes treatment.

Phytochemical Constituents

- Jamboline
- Ellagic acid
- Gallic acid
- Anthocyanins

Pharmacological Activities

Jamun seed powder has demonstrated

- Antihyperglycemic activity
- Improved glucose tolerance
- Reduction of glycosylated hemoglobin levels

The active compound jamboline slows the conversion of starch into glucose.

2.4 Karela (*Momordica charantia*)

Karela, commonly known as bitter melon, is one of the most effective plants used for diabetes treatment.

Phytochemical Constituents

- Charantin
- Polypeptide-P
- Vicine
- Momordicin

Pharmacological Activities

Karela has been shown to

- Reduce blood glucose levels
- Mimic insulin action
- Improve glucose uptake in peripheral tissues

Experimental studies suggest that karela extract enhances insulin secretion and improves glucose metabolism.

3. Polyherbal Formulation of Anti-Diabetic Syrup

Ingredients

- Neem leaf extract
- Tulsi leaf extract
- Jamun seed extract
- Karela fruit extract
- Purified water
- Natural sweetener (stevia or honey)
- Preservative (citric acid)

Preparation Method

1. Collect fresh plant materials and wash thoroughly.
2. Dry and grind the plant materials into powder.
3. Prepare aqueous extracts by boiling the powdered plant materials in water.
4. Filter the extracts using muslin cloth.
5. Mix all extracts in suitable proportions.
6. Add sweetener and preservative.
7. Stir thoroughly and store in sterilized amber bottles.

4. Mechanism of Action

The polyherbal formulation may exert antidiabetic effects through several mechanisms:

- Enhancement of insulin secretion from pancreatic β -cells
- Improvement of insulin sensitivity
- Reduction of glucose absorption in the intestine
- Increase in peripheral glucose utilization
- Antioxidant protection of pancreatic cells

- ☐ Stimulating insulin secretion from pancreatic β -cells
- ☐ Enhancing insulin sensitivity
- ☐ Reducing intestinal glucose absorption
- ☐ Increasing peripheral glucose uptake
- ☐ Providing antioxidant protection against oxidative stress

5. Advantages of Herbal Syrup

- Natural and safe therapy
- Reduced risk of side effects
- Cost-effective treatment option
- Synergistic action of multiple medicinal plants
- Suitable for long-term use
- Natural and plant-based treatment
- Lower risk of adverse effects
- Cost-effective therapy
- Synergistic action of multiple herbs
- Suitable for long-term management

6. CONCLUSION

Medicinal plants such as neem, tulsi, jamun, and karela possess significant antihyperglycemic properties supported by traditional knowledge and modern scientific research. A polyherbal syrup formulated from these plants may provide an effective complementary therapy for diabetes management. However, further clinical studies are required to standardize dosage, safety, and efficacy for therapeutic use.

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