



Research Article

Polyherbal Churn For Treatment Of Diabetes

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ABSTRACT

Diabetes mellitus is a chronic metabolic disorder characterized by elevated blood sugar levels, necessitating effective management strategies. While pharmaceutical interventions are widely employed, there is growing interest in exploring the potential benefits of herbal formulations, such as churn (powder), in diabetes management. These abstract reviews key herbal ingredients commonly associated with anti-diabetic properties and their traditional uses in various cultures. Bitter melon, fenugreek, cinnamon, *Gymnema Sylvestre*, aloe vera, turmeric, and Indian gooseberry (amla) are among the herbs recognized for their potential in regulating blood sugar levels.[1 Studies suggest that these herbs may influence insulin sensitivity, reduce sugar absorption, and exhibit antioxidant and anti-inflammatory effects. However, it is crucial to emphasize that herbal remedies should complement, not replace, conventional medical treatments. Regular consultation with healthcare professionals is essential to ensure the safety and compatibility of herbal interventions with existing medications.[1]

INTRODUCTION

Diabetes mellitus, a chronic metabolic disorder characterized by hyperglycaemia, poses a significant global health challenge. Conventional pharmacological approaches, although effective, often come with side effects and limitations. In recent years, there has been a growing interest in exploring alternative and complementary therapies, particularly herbal formulations, for the management of diabetes. Herbal churn, or

powdered herbal formulations, has emerged as a traditional and culturally rooted approach to address this metabolic imbalance. This introduction provides an overview of key herbal ingredients recognized for their potential anti-diabetic properties, with a focus on their historical uses and contemporary scientific evidence. The integration of herbal remedies into diabetes management not only reflects a holistic approach

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but also underscores the importance of cultural and traditional knowledge in healthcare practices.[2]

Objectives

1. To Evaluate the Blood Sugar-Regulating Potential:

Conduct a systematic review of herbal ingredients to assess their impact on blood glucose levels. Investigate the mechanisms through which these herbs may influence glucose homeostasis.

2. To Assess Insulin Sensitivity Improvement:

Examine the effects of herbal churn on insulin sensitivity in individuals with diabetes. Identify specific compounds within the herbs that may contribute to enhanced insulin action.

3. To Investigate Antioxidant and Anti-inflammatory Effects:

Explore the antioxidant and anti-inflammatory properties of herbal churn.

Correlate these properties with potential improvements in diabetic complications.

4. To Examine Long-Term Safety and Tolerability:

Investigate the long-term safety profile of herbal churn in individuals with diabetes. Monitor for potential adverse effects and interactions with conventional medications.

5. To Explore Traditional Knowledge and Cultural Significance:

Document traditional uses of herbal ingredients in various cultures for diabetes management. Investigate the cultural significance of herbal churn in diabetes care.[3] Creating an herbal churn for diabetes involves combining various herbs with potential anti-diabetic properties. Here are some commonly used ingredients supporting their potential benefits:

Ingredients:

Ingredients	Scientific Names	Taken In Grams
Tulsi Leaf	Osmium Sanctum	5gm
Karela	Momordica Charantia	10gm
Neem	Azadirachta Indica	5gm
Turmeric	Curcuma Longa	10gm
Moringa	Moringa Oleifera	5gm

Materials and Methods:[4]

1. Selection of Herbs:

Choose herbs with anti-diabetic properties, such as bitter melon, fenugreek, cinnamon, neem, turmeric, and moringa, etc

2. Quality Sourcing:

Obtain herbs from reputable sources to ensure purity and potency. Use organic or pesticide-free herbs whenever possible.

3. Cleaning and Drying:

Wash and clean the herbs thoroughly. Allow them to air-dry or use a dehydrator (hot air oven) to remove moisture.

4. Grinding:

Grind the dried herbs into a fine powder using a clean and dry grinder. Ensure consistency in particle size for even distribution.

5. Proportion Mixing:

Determine the desired ratio of each herb based on their traditional uses and scientific evidence. Mix the powdered herbs thoroughly to achieve a homogeneous blend.

6. Storage:

Store the herbal churn in airtight, opaque containers to protect from light and moisture.

a. Keep the churn in a cool, dry place.

7. Dosage Recommendations:

Consult with a healthcare professional to determine appropriate dosage based on individual health conditions.



Start with a small amount and monitor responses before adjusting the dosage.

8. Administration:

Herbal churn can be consumed with water, honey, or as directed by a healthcare practitioner. Consider dividing the dosage throughout the day for optimal efficacy.

9. Monitoring:

Regularly monitor blood sugar levels and consult with a healthcare professional to adjust treatment plans accordingly.

INGREDIENTS

1. Tulsi Leaf (osmium sanctum)[5] :-



Tulsi, also known as holy basil (*Osmium tenuiflorum*), is a herb that is commonly used in traditional Ayurvedic medicine for various health benefits. While it is renowned for its medicinal properties, including its ability to help manage diabetes, it's essential to note that it is not a cure for diabetes. Tulsi leaves are believed to help regulate blood sugar levels in people with diabetes. They contain essential oils and antioxidants that may help in reducing blood glucose levels. Additionally, tulsi is known for its anti-inflammatory and antioxidant properties, which can contribute to overall health benefits for individuals with diabetes. Here are a few ways in which tulsi leaves may be used to potentially help in managing diabetes:

1. Consumption:

Tulsi leaves can be consumed fresh, dried, or as a tea. Drinking tulsi tea regularly may help in regulating blood sugar levels.

2. Antioxidant Properties:

The antioxidants present in tulsi leaves can help reduce oxidative stress and inflammation, which are factors in diabetes management.

3. Herbal Supplements:

Tulsi extracts are available in supplement form, which some people use as an adjunct to their diabetes management plan. It's crucial to emphasize that while including tulsi leaves in your diet may have health benefits, including potentially helping in managing diabetes, it should never replace prescribed medical treatments or lifestyle modifications recommended by healthcare professionals.

2. Bitter melon (karela)[6] :-



Bitter melon, also known as bitter gourd or *Momordica charantia*, is a fruit that is commonly used in traditional medicine for its potential health benefits, particularly in managing diabetes. Bitter melon is believed to help in controlling blood sugar levels due to its active substances like charantin, vicine, and polypeptide-p, which may have antidiabetic properties. Here are some ways in which bitter melon can be used in diabetes treatment:

1. Blood Sugar Regulation:

Bitter melon contains compounds that mimic insulin and help in lowering blood sugar levels. It may also improve the cells' ability to absorb glucose, thus aiding in diabetes management.

2. Antioxidant Properties:

Bitter melon is rich in antioxidants such as vitamin C, which can help reduce oxidative stress and inflammation associated with diabetes.

3. Dietary Inclusion:

Bitter melon can be consumed in various forms, such as raw fruit juice, cooked vegetable dishes, or as a supplement. Some people incorporate bitter melon into their diet to help manage their blood sugar levels.

4. Supplements:

Bitter melon supplements are also available in the form of capsules or extracts for those who prefer a more concentrated form of the fruit. It is important to note that while bitter melon shows promise in managing diabetes, it is not a replacement for prescribed medical treatments.

3. Neem (Azadirachta indica)[7] :



Neem, scientifically known as *Azadirachta indica*, has been traditionally used in Ayurvedic medicine for various health purposes, including its potential role in managing diabetes. Here are some ways in which neem may be beneficial in the treatment of diabetes:

1. Blood Sugar Regulation:

Neem leaves contain compounds that may help lower blood sugar levels. Some studies suggest that neem may have hypoglycaemic effects, aiding in the regulation of blood glucose levels.

2. Antioxidant and Anti-inflammatory Properties:

Neem is rich in antioxidants and anti-inflammatory compounds that can help reduce oxidative stress and inflammation, which are often elevated in individuals with diabetes.

3. Improving Insulin Sensitivity:

Neem may help improve insulin sensitivity in the body, allowing better utilization of insulin and regulation of blood sugar levels.

4. Liver Support:

Neem is known to have hepatoprotective properties, which can benefit individuals with diabetes as the liver plays a crucial role in glucose metabolism.

5. Antibacterial and Antifungal Effects:

Neem also exhibits antibacterial and antifungal properties, which can help prevent infections and promote overall health in individuals with diabetes, who are more susceptible to infections.

While neem shows promise in diabetes management, it's essential to consult with a healthcare provider before using it as a treatment for diabetes. Neem supplements or extracts may interact with medications or have side effects, especially when taken in large amounts. Monitoring blood sugar levels regularly and working closely with a healthcare professional is essential to ensure the safe and effective use of neem in the context of diabetes management.

4. Turmeric (Curcuma longa)[8] :-

Turmeric, with its active compound curcumin, has garnered attention for its potential benefits in managing diabetes and its associated complications. Here are some ways in which turmeric may be useful in diabetes management:

1. Blood Sugar Control:

Curcumin in turmeric has been studied for its potential to help regulate blood sugar levels by improving insulin sensitivity, enhancing pancreatic beta cell function, and reducing inflammation in the body.

2. Anti-inflammatory Properties:

Chronic inflammation is linked to insulin resistance and the development of diabetes complications. Curcumin's anti-inflammatory properties may help mitigate inflammation, potentially benefiting individuals with diabetes.

3. Antioxidant Effects:

Oxidative stress plays a role in the progression of diabetes and its complications. Curcumin's potent antioxidant properties can help combat oxidative stress, protecting cells from damage.

4. Heart Health:

Diabetes increases the risk of cardiovascular complications. Curcumin may support heart health by improving cardiovascular function and reducing the risk of heart-related issues in individuals with diabetes.

5. Neuropathy and Nephropathy:

Some studies suggest that curcumin might help in the management of diabetic neuropathy and nephropathy, common complications of diabetes affecting the nerves and kidneys, respectively. While preliminary studies show promise, it's important to note that more research is needed to establish the full extent of turmeric's benefits in diabetes management. As with any supplement or natural remedy, it is crucial to consult with a healthcare provider before incorporating turmeric or curcumin supplements into your diabetes management plan, especially if you are already taking medications for diabetes or other conditions. Monitoring blood sugar levels and working with a healthcare team will help ensure a safe and effective approach to managing diabetes with turmeric.

6. Moringa (*Moringa oleifera*)[9] :-

Moringa, scientifically known as *Moringa oleifera*, has gained attention for its potential role in managing diabetes due to its nutritional content and medicinal properties. Here are some ways in which moringa may be beneficial in diabetes treatment:

1. Blood Sugar Regulation:

Moringa leaves contain compounds that may help lower blood glucose levels. Some studies suggest that moringa may have hypoglycaemic effects, aiding in the regulation of blood sugar levels.

2. Antioxidant and Anti-inflammatory Properties:

Moringa is rich in antioxidants and anti-inflammatory compounds, such as quercetin and chlorogenic acid, which can help reduce oxidative

stress and inflammation, commonly elevated in individuals with diabetes.

3. Improved Lipid Profile:

Moringa has been shown to improve lipid profiles by reducing cholesterol levels and maintaining healthy triglyceride levels, which is beneficial for individuals with diabetes who are at a higher risk of cardiovascular complications.

4. Nutrient Density:

Moringa is rich in vitamins, minerals, and protein, making it a nutritious addition to the diet of individuals with diabetes, supporting overall health and well-being.

5. Potential for Weight Management

Incorporating moringa into the diet may support weight management efforts, as obesity and excess weight are risk factors for developing and managing diabetes. While moringa shows promise in diabetes management, it is important to remember that it is not a substitute for prescribed medical treatments. Individuals with diabetes should consult their healthcare provider before adding moringa or any other natural remedy to their diabetes management plan. Monitoring blood sugar levels regularly and working with healthcare professionals is crucial to ensure the safe and effective use of moringa in the context of diabetes treatment.

EVALUATION TESTS :

1. Water soluble extractives[10]: -

Five grams of coarsely powdered air-dried drug was macerated with 100 ml of water in closed conical flask for 24 hours, shaken frequently for the first 6 hours and allowed to stand for 18 hours. This was filtered through Whatman filter paper grade no.100. Twenty-five millilitres of the filtrate were evaporated to dryness in petri dish, dried at 105 °C, and weighed. Percentage of water-soluble extractive with reference to air-dried material was calculated.

2. Alcohol soluble extractives[11]: -



Five grams of air-dried and coarsely powdered drug was macerated with 100 ml of 70% ethanol in a closed conical flask for 24 hours, shaken frequently during the first 6 hours, and allowed to stand for 18 hours. This was filtered rapidly taking precaution against loss of ethanol. Twenty-five millilitres of the filtrate were evaporated to dryness in a petri dish, dried at 105° C, and weighed. Percentage of alcohol soluble extractive was calculated with reference to air-dried drug.

4. Ether soluble extractives[12]: -

Five grams of air-dried and coarsely powdered drug were extracted with ethyl ether in a Soxhlet extractor for 20 hours. The ether extract was transferred in a petri dish and allowed to evaporate. It was dried at 105° C to constant weight. Percentage of ether soluble extractive was calculated with reference to air-dried drug.

5. Physicochemical properties[13]: -

Physical characteristics like moisture content, bulk density, tap density, angle of repose, Hausner ratio, and Carr's index were determined for different formulations.

6. Moisture Content[14]: -

The shade-dried drug was grounded in a mixer grinder. The powder passed through #40 and retained on #120. Accurately weighed 10 g of # 40/120 drug powder was kept in a tared evaporating dish. This was dried at 105°C for 5 hours in tray drier and weighed. The drying was continued, and weighing was done at one-hour interval until difference between two successive weighing's corresponds to not more than 0.25 percent. Drying was continued until a constant weight was reached with two successive weighing's after drying for 30 minutes and cooling for 30 minutes in a desiccator was showing not more than 0.01 g difference.

7. Carr's Index[15]: -

Carr's index has been used as an indirect method of quantifying powder flowability from bulk density; this method was developed by Carr. The

percentage compressibility of a powder is a direct measure of the potential powder arch or bridge strength and stability and is calculated according to following equation. Carr's index (% compressibility) = $100 \times (1 - Db / Dt)$ Where Db = Bulk density, Dt = Tapped density Hausner Ratio Hausner ratio has been also used as indirect method of quantifying powder flowability from bulk density. Hausner ratio = Dt / Db . Where Db = Bulk density and Dt = Tapped density.

8. pH of suspension of the drugs[16]: -

pH of freshly prepared 1% w/v suspension and 10% w/v suspension in distilled water was determined using simple glass electrode pH meter. 8. Ash values Total ash Two grams of grounded air-dried material was accurately weighed in a previously ignited and tared silica crucible. The drug was gradually ignited by raising the temperature to 450°C until it was white. The sample was cooled in a desiccator and weighed. The percentage of total ash was calculated with reference to air-dried drug.

9. Acid Insoluble ash[17]:-

The ash was boiled with 25 ml of 2 M hydrochloric acid for 5 minutes, the insoluble matter was collected on an ash less filter paper, washed with hot water, ignited, cooled in a desiccator, and weighed. The percentage of acid insoluble ash was calculated with reference to the air-dried drug.

RESULTS:

The formulation showed potential for its use in anti-diabetic Formulated in the sense that the in-house prepared formulation possesses a comparable activity when compared to that of the marketed formulation.

CONCLUSION:

In the present study it was concluded that the physicochemical parameters such as the water-soluble, alcohol soluble, and ether-soluble extractive values, moisture content, bulk density, tapped density, Carr's index, Hausner's ratio[18],



pH, water-soluble ash, acid-insoluble ash, and organoleptic characteristics can be efficiently used for standardization of herbal anti-diabetic drugs individually and in a polyherbal formulation. The results obtained from the study could be utilized as a reference for setting limits for the reference standards for the quality control and quality assurance of anti-diabetic drugs.

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