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EFFECTIVENESS OF WHITE GOURD HERBAL JUICE FOR THE TREATMENT OF TYPE 2 *DIABETES MELLITUS* - A REVIEW

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ABSTRACT

The mortality and morbidity rate of diabetes patients is increasing worldwide which requires an ideal treatment to prevent the disease worsening. Traditional medicine is gaining more attention in diabetes due to its efficacy and safety. Type II Diabetes Mellitus is a complex, chronic metabolic disease that is expected to increase in prevalence in the coming decades. The prevalence of Type II Diabetes Mellitus (T2DM) is predicted to rise from 171 million in 2000 to 366 million in 2030 worldwide. India has the second largest number (>61 million) of individuals with Type II Diabetes Mellitus in the world and this is expected to increase nearly double by 2030. The effect of diabetes has increased because of worsening obesity, global population aging, and decrease in physical activity. Complications are still common and it leads to cause retinopathy (loss of vision), nephropathy (end stage of renal disease), neuropathy (degeneration of nerves). In additional 50% people died in cardiovascular complications such as hypertension, stroke are the leading cause of morbidity, mortality and expenditures in Type II Diabetes Mellitus. We, therefore performed a systematic review study of clinical trials to assess the comparative effect of polyherbal formulations in type 2 *Diabetes mellitus*.

KEYWORDS: Type 2 diabetes mellitus, White gourd juice, Polyherbal formulation, Ayurvedic formulation.

INTRODUCTION

Diabetes mellitus (DM) is commonest endocrine disorder that affects more than 100 million people worldwide (6% population). It is caused by deficiency or ineffective production of insulin by pancreas which results in increase or decrease in concentrations of glucose in the blood. It is found to damage many of body systems particularly blood vessels, eyes, kidney, heart and nerves. Diabetes mellitus has been classified into two types i.e. insulin dependent diabetes mellitus (IDDM, Type I) and non-insulin dependent diabetes mellitus (NIDDM, Type II). Type I diabetes is an autoimmune disease characterized by a local inflammatory reaction in and around islets that is followed by selective destruction of insulin secreting cells whereas Type II diabetes is characterized by peripheral insulin resistance and impaired insulin secretion. The presence of DM shows increased risk of many complications such as cardiovascular diseases, peripheral vascular diseases, stroke, neuropathy, renal failure, retinopathy, blindness, amputations etc. Drugs are used primarily to save life and alleviate symptoms. Secondary aims are to prevent long-term diabetic complications and, by eliminating various risk factors, to increase longevity. Insulin replacement therapy is the mainstay for patients with type 1 DM while diet and lifestyle modifications are considered the cornerstone for the treatment and management of type 2 DM. Various types of hypoglycemic agents such as biguanides and sulfonylureas are also available for treatment of diabetes. However, none of these medications is ideal due to their toxic side effects and diminution of responses is observed sometimes in their prolonged use. The main disadvantage of currently available drugs is that they have to be given throughout the life and produce side effects. Medicinal plants and their bioactive constituents can be used for treatment of DM throughout the world especially in countries where access to the conventional anti-DM agents is inadequate. Various experimental models are also available to screen antidiabetic activity of plant. The present review therefore is an attempt to know more precisely about diabetes mellitus, its clinical presentation, epidemiological data, complications and current available treatment of diabetes.

The therapeutic approach of an anti-diabetic medicine should not only focus on glycaemic control but also be able to prevent the progression of diabetic complications. The standard allopathic management proved to be effective in managing Diabetes mellitus, but the success

of such therapy is sometimes limited. Recently alternative therapies for diabetes have become increasingly popular because of their effectiveness in lowering blood glucose levels and the least side effects. The phytochemical component in the herbs such as alkaloids, flavonoids, saponins, led to the desired healing effect in Diabetes mellitus. A single plant may even contain more than one component of phytochemical and thus the combination of several such plants or herbs work symbiotically with each other giving out effective pharmacological action. This holistic approach, if shown effective, could prove safer and better tolerated. Additionally, the lack of supporting studies would focus on the break-in our understanding of the importance of Ayurvedic medicine and may lead to the initiation to conduct more qualitative randomized controlled trials.

Types of Diabetes Mellitus

Type 1 Diabetes Mellitus – It is one of the Diabetes where the pancreas fails to produce enough insulin in the body. It is called insulin-dependent diabetes. This process involves injecting insulin through the skin.

Type 2 Diabetes Mellitus – Also called insulin-independent diabetes, this type of diabetes is a condition where the pancreas produces some insulin in the body. But the produced insulin is not sufficient as per the body's requirements, and the cells are resistant to it. This condition is called Type 2 Diabetes Mellitus.

Gestational diabetes – It is a type of diabetes which usually occurs when a pregnant woman develops high blood sugar levels without a previous history of diabetes.

Symptoms of Diabetes Mellitus

- Increased thirst
- Weight loss
- Increased urination
- Hunger due to starvation of cells
- Fatigue
- Slow healing of wounds
- Yeast infections
- Tingling sensation in the feet or the toes

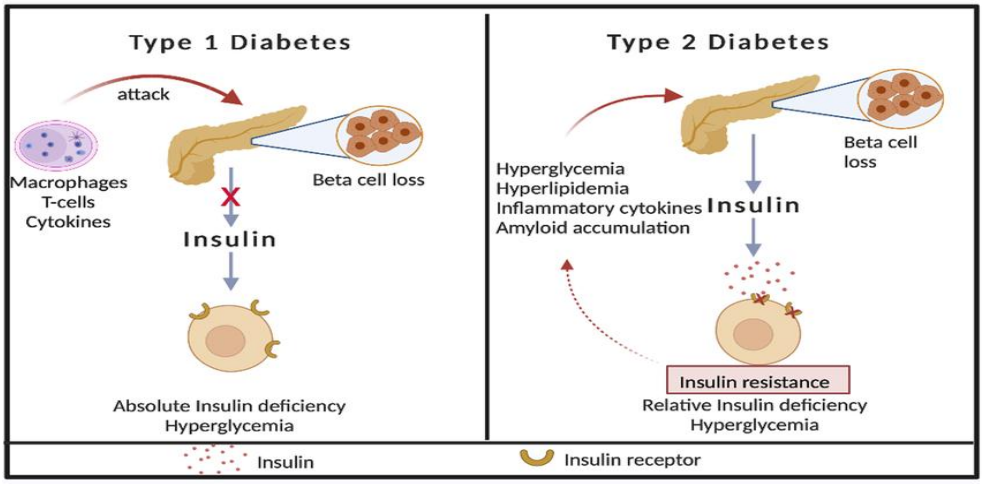

Fig: 1. Type I & Type II Diabetes Mellitus.

Plant Description

Benincasa hispida (Thunb.) Cogn. is a large trailing gourd climbing by means of tendrils; stem is stout, angular and hispid. The leaves have a reniformorbicular shape with 5-7 lobes and are 4-6 inches length. The hairy lobes are ovate-triangular in shape. Flowers are yellow, unisexual, male peduncle 7.5- 10cm long, female peduncle shorter. The fruits are broadly cylindrical, 30-45cm long, hairy throughout, ultimately covered with a waxy bloom. This waxy bloom disappeared when the fruit is fully mature.

Fig. 2: White gourd fruit.

Flowering & Fruiting: June-October. Harvesting of the mature fruits starts in 90-100 days after sowing and may continue up to 150 days after sowing.

Parts used: Fruit, Seeds, seed oil, leaves.

Synonyms: Kushmanda, Pushpaphala, Pitaphushpa, Karkaru, Aaru.

Vernacular Names
Hindi - Kumhra, Pani kumhra, Petha
Kannada - Bood kumbala kayi
Malayalam - Elavan, Kumbalam, Neyakumbalam
Marathi - Kohla
Punjab - Petha
Sanskrit - Kushmanda
Tamil - Kalyana pooshni, Pushanikai
Telugu - Budida-gummadi

Chemical Constituents
The major constituents of Benincasa hispida fruits were volatile oils, flavonoids, glycosides, sacchrides, proteins, carotenes, vitamins, minerals, ß-sitosterin and uronic acid (2,9-11) Chemical analysis showed that the main sugars in the Benincasa hispida peels were galactose, glucose, xylose and sorbose. The antioxidant activity and total phenolic content (TPC) of Benincasa hispida seeds extract was investigated using conventional Soxhlet extraction (CSE), and DPPH and ABTS scavenging activity tests. The ethanolic extract gave the highest total phenolic content 11.34±1.3 mg GAE/g and antioxidant activity followed by ethyl acetate and n-hexane extract. Benincasa hispida seeds contained high amount of fatty acids 24.3%, saturated fatty acids represented 75.38% and unsaturated fatty acids (75.38%), it was apparent that linoleic and oleic are the principal fatty acid components in the seed's extracts. The seeds revealed that the total dietary fibre was 58.43% of the seed. The seed crude fat and crude protein were found to be 20.70 and 11.63% respectively. It appeared that the extracted seed oil was mainly consisted of linoleic acid accounting for 67.37% of the total fatty acids. However, palmitic, oleic, and stearic acids represented 17.11, 10.21 and 4.83% respectively.

Fig.3 White gourd fruit.

Formulation of White Gourd Juice
Ingredients
- 1 Cup chopped ash gourd
- 1 Cup chopped cucumber
- Lemon juice- 1 tsp
- Rock salt 1 pinch
- Black pepper 1 pinch

METHODS
Put all the ingredients in a blender, add some water if required and blend until it forms a smooth mixture. Strain the mixture in a glass and serve with ice cubes if required.

Fig.3 White gourd juice.

Therapeutic Uses
1) **Digestive Health:** The juice may also help clean your gut and kick start an easy digestion process.
2) **Hair Health:** Its juice may help in healing scalp and hair issues such as bald patches and dandruff.
3) **Diabetes:** It may help to maintain the sugar level in the body as it does not spike the blood sugar levels.
4) **Depression:** The seeds of this vegetable contain L-tryptophan.
5) **Skin Health:** Its juice and roots are considered significant for skin health and give your skin a healthy glow.
6) **Immunity & Metabolism:** It has many curative properties that may helps in conditions such as jaundice, fever and diabetes.
7) **Weight Management:** It is high in fibre and low in calories, making it an ideal choice for people looking for weight loss.
8) **Cooling Effect:** This vegetable is very similar to cucumbers and contains a lot of water contents.

Side Effects
Ash gourd juice contains some compounds such as oxalates, phytates etc, which hinder the absorption of nutrients within the body. Hence, excess intake of ash gourd juice may result in nutritional deficiency.

Consuming excess ash gourd juice might result in calcium deposition thereby resulting in kidney stones. Hence, people with kidney stones should restrict the consumption of ash gourd juice.

Marketed Preparation
Mountain Glen Ash Gourd is made from real Ash Gourd pumpkins. We do not use any preservatives. Our new formulation contains no natural sugars, it containers sweetener instead of sugar so it is suitable for diabetics. This product from the house of Mountain Glen comes with a shelf life of 12 months.

CONCLUSION

The study on the development of ash gourd and basil juice, along with investigations into its processing and storage stability, highlights several key findings and implications. Firstly, ash gourd (Benincasa hispida) is an underutilized vegetable with significant nutritional and medicinal properties. It is rich in vitamins, minerals, dietary fibre, and antioxidants, making it an excellent candidate for health promoting beverages. However, its bland taste and high pH pose challenges in consumer acceptance and preservation. The incorporation of basil (Ocimum basilicum), known for its aromatic compounds and numerous health benefits, enhances the flavor and nutritional profile of ash gourd juice. Basil contributes essential oils, vitamins, and antioxidants, which improve the sensory qualities and potential health benefits of the beverage. Processing techniques such as heat treatment and blending with other fruit juices have been shown to improve the stability, flavor, and shelf life of ash gourd juice. Studies indicate that these methods can maintain the juice's microbiological safety and nutritional quality over extended storage periods. Overall, the combination of ash gourd and basil presents a promising avenue for the development of a nutritious, appealing, and stable vegetable-based beverage. This research not only contributes to the understanding of the functional properties and preservation of such juices but also opens up possibilities for innovative dietary interventions and therapeutic applications.

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