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A REVIEW ON ANTI DIABETIC TABLET OF SYZYGIUM CUMINI SEED POWDER AND PHYLLANTHUS EMBLICA POWDER.

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ABSTRACT

Diabetes mellitus is the most common endocrine disorder accompanied with many metabolic syndrome. Use of herbal medicines has been an option to treat a great number of disease such as diabetes and its complications. Aim of this study is to develop chewable tablets of Syzygium cumini seed powder and Phyllanthus emblica powder. There are numerous health benefits and nutrient properties of this seed powder, thus it can be used as a nutraceutical.All this formulation were developed with Syzigium cumini seed powder and Phyllanthus emblica as the active ingredient and sodium bicarbonate, microcrystalline cellulose, guar gum, magnesium stearate, microcrystalline cellulose, xanthum gum and stevia were used as excipients. Various evaluations tests were performed to check the stability of the chewable tablet.

KEYWORD : *Anti-diabetic tablet, Syzigium cumini and Phyllanthus emblica.*

INTRODUCTION

Diabetes Mellitus

Diabetes mellitus is an ongoing, metabolic disorder described by rays blood glucose levels that leads over the worldwide in 2017, there where above 450 million people with diabetes mellitus. Diabetes mellitus is the complex group ofdiseases with varieties of causes people or beings with diabetes having high blood glucose levels, also called as high blood sugar or hyperglycemia. Diabetes mellitus are the most common metabolic syndromes.This ways, the body use digested food for energy. The digestive track breakdown of carbohydrates, sugars and stages found in many foods into glucose form of sugar that enters the bloodstream or blood vessels. The two main types of diabetes mellitus are; type 1 diabetes and type 2 diabetes. Type 1 diabetes is caused by a lack of insulin due to destruction of insulin and it's produces beta cells in the pancreas. Type 1 diabetes is typically occurs in children's and young adults.[2] In type 2 diabetes insulin production is proper but cell does not accept insulin does due to this reason increase the level of glucose. Type 2 diabetes may developed most often in middle age and older people who are also increase body weight or obese. Herbal juice has been used sins the down of civilization to maintain health and to treat disease. The treatment of diabetes with synthetic drugs is generally not preferred because of its high cost and side effect for this reason, it is necessary to develop traditional and alternative medicine.

Pathophysiology

The primary hormone that controls the absorption of glucose from the blood into the majority of bodily cells, particularly the muscles, adipose tissue, and liver, is insulin consequently, a key factor in all types of diabetes mellitus is an insulin shortage or an insensitivity of its receptors. The body gets glucose from three primary sources: the breakdown of glycogen, which is stored as glucose in the liver, intestinal absorption of meals, and gluconeogenesis, which is the process by which the body produces glucose from non-carbohydrate components. Insulin is essential for maintaining the body's glucose balance. Insulin can promote the transport of glucose into muscle

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and fat cells, prevent the breakdown of glycogen or the process of gluconeogenesis, and promote the storage of glucose as glycogen. B-cells, located in the pancreatic islet cells of Langerhans, release insulin into the blood in response to an increase in blood glucose levels, usually following meals. About two thirds of the body's cells utilize insulin to take up glucose from the blood and use it as fuel to make other necessary molecules. Reduced insulin release from β-cells and the conversion of glycogen to glucose are the outcomes of lower blood glucose levels. This process is mainly controlled by the hormones, glucagon, which acts in the opposite manner to insulin.

1.Syzigium Cumini

Syzigiumcumini, commonly known as Java plum,black plum or jamun is evergreen tropical tree in the flowering plant family Myrtaceae.[1] This plant start flowering from February to May , plant flowers are fragrant and small about 6 milimetre in diameter. The fruits developed by April to July.[3] The jamun seed contain a glycoside name 'jamboline' which helps in the maintenance of glucose level as in the normal limits. Syzygium cumini (Jamun) contains various phytochemical components such as carbohydrate, protein, vitamin, steroid,alkaloid and phenolic compound.It shows pharmacological activities including anti-viral,Anti-diabetic, anti- pyretic and anti- diarrheal. This plant is used for treatment and in prevention of different disease in homeopathy practice from more than 150 years back in different countries.This plant is specially restoration the body weight and inhibits the excessive blood glucose levels, as well as recovery in the activities of antioxidant enzymes like catalyse, peraoxide and superoxide dismutase.[3]

Mythology

• Ramasubsisted on the fruit in the forest for 14 years during his exile from Ayodhya.[3]
• Lord krishna has been described as having skin the colour of Jamun.[3]

•Scientific Classification (*Syzygiumcumini*) :-

Kingdom :- Plantae
Order :- Myrtales
Family :- Myrtaceae
Genus :- Syzygium
Species :- Syzygiumcumini(L.)
Phylum :- Magnoliophyta
Class :- Magnliopsida
Subclass :- Rodidae

Figure:- *Syzygium Cumin I*seed Powder

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Synonyms
Java plum, Indian blackberry, Jambul, Jambolan, black plum. Ni

Family
Jamun belongs to the Myrtaceae family.

Chemical Constituents
1.Alkaloids: Jamun seeds contain alkaloids like jambosine, jamboline, and jamunine.
2.Flavonoids: The fruit, leaves, and bark of jamun contain flavonoids like quercetin, kaempferol, and myricetin.
3.Phenolic acids: Jamun is a rich source of phenolic acids like gallic acid, ellagic acid, and ferulic acid.
4.Tannins: The fruit, leaves, and bark of jamun contain tannins, which are known for their astringent and antimicrobial properties.
5.Glycosides: Jamun seeds contain glycosides like jambolin, which have been shown to have antidiabetic and antioxidant activities.
6.Terpenoids: The essential oil of jamun contains terpenoids like limonene, beta-pinene, and alpha-pinene.
7.Fatty acids: Jamun seeds contain fatty acids like oleic acid, linoleic acid, and palmitic acid.
8.Vitamins and minerals: Jamun is a good source of vitamins A and C, potassium, magnesium, and iron.

Uses
1.To treat diabetes.
2.Used to treat digestive issues like diarrhea, dysentery and stomach ulcers.
3.To treat respiratory problems like asthma, bronchitis and cough.
4.Used to treat skin condition like eczema, acne and wounds.

Pharmacological Activity
Antidiabetic Activity
Extract of *Syzygium cumini* (aqueous Suspension) were tested for its anti-diabetic Activity at the different dose levels of 1gm, 2gm, 4gm and 6gm/kg body weight. 4gm/kg Dose levelswere found exhibited maximum Hypoglycemic effects (42.64%) in rabbit It is also produced a significant decreased in the Oral administration of S. cumini bark extracts at dose of 300mg/kg body weight exhibited anti-diabetic activity by significantly lowering blood glucose in rats but in case of clinical studies, experiments showing that the tea and extracts prepared from leaves are pharmacologically inert. Patients and physician should be not relying on the putative anti hyerglycemic effects of this tea and perhaps of other folk medicines, that pretend to have such an effects. The investigation of plants with potential clinical utility could start with a clinical trial testing the effects of folk preparation in order to isolate the active principles of those products blood sugar levels (17.04%) in alloxan diabetic rats. The administration of different doses of aqueous suspension of dried seed kernels in rabbit changes blood sugar levels viz, 1 gm, 2gm, 4gm and 6gm/kg body weight indicate that the optimum dose levels are 4gm/kg. The reduction was maximum for the4gm/kg body weight dose levels being42.64% as compared to the other dosages. Oral administration of ethyl acetate and methanol extracts of S. cumini (200 and 400 mg/kg) was showed significant decreased in blood sugar levels. The isolated compound from of S. cumini mycaminose at a dose level of 50mg/kg also showed significant decreased in blood sugar levels.[2]

.2. *Phyllanthus Emblica*
Phyllanthus emblica, commonly known as Indian gooseberry/ amla, has been traditionally used in ayurvedic medicine for its potential antidiabetic properties. Amla (Indian gooseberry) is a gift of nature to mankind. *Phyllanthus emblica* fruit is one of the top selling botanicals having diverse applications in healthcare, food and cosmetic industry. *Phyllanthus emblica* or Amla (Indian gooseberry) is another medicinal plant know for its high vitamin C content and potent antioxidant properties. Amla has been traditionally used for managing diabetes due to its ability to regulate blood sugar levels, enhance insulin secretion and improve pancreatic function. The plants belonging to the genus Phyllanthus are widely distributed through out most tropical and subtropical countries. *Phyllanthus emblica*contains various phytochemical components such as phenolic, flavonoids, tannins, alkaloids, glycosides, terpenoids, vitamins and minerals, protein, fiber.

Scientific Classification (*Phyllanthus Emblica*)
Kingdom :-Plantae
Order :-Mapighiales
Family :-Phyllanthaceae
Genus :-Phyllanthus

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Species :-P. emblica
Phylum :- Magnoliophyta
Class :- Magnoliopsida
Subclass :- Rosidae

Figure.2 *Phyllanthus Emblica* Powder

Synonyms
Amla, Indian gooseberry

Family
Amla belongs to the Phyllanthaceae family, a family of flowering plants that is part of the larger order Mapighiales.

Chemical Constituents
1. Cinnamaldehyde : This is the main component of cinnamon oil, contributing to its distinct aroma and many of its health benefits.
2. Eugenol : Found in ceylon cinnamon, it has antiseptic properties.
3. Coumarin : Present in higher amounts in cassia cinnamon, this compound has anticoagulant properties but can be toxic in large quantities.
4. Tannins : These contribute to the astringent properties of cinnamon.
5. Polyphenols : Including proanthocyanidins, which have strong antioxidant properties.
6. Terpenoids : Such as linalool and beta-caryophyllene, contributing to the spices aroma and potential therapeutic effects.
7. Mucilage and starch : Found in the bark, these contribute to its texture and nutritional properties.

Uses
1. Helps in reducing oxidative stress.
2. May reduce inflammation and pain.
3. May reduce risk factors like high cholesterol and blood pressure.

Pharmacological Activity
Antidiabetic Activity
Amla has anti-diabetic properties because of its high vitamin C concentration, which helps to regulate diabetes. When taken daily for two months, one tablespoon of its juice combined with bitter gourd juice will activate the pancreas and allow it to generate insulin, lowering blood sugar levels. When using this drug, rigorous adherence to dietary restrictions is required. Additionally, it will stop diabetic eye complications. Additionally, it aids in the renewal and regeneration of beta cells, which raises the secretion and production of insulin. The blood sugar levels are significantly lowered by this technique. Tannins are promising medications for the treatment of non-insulin dependent diabetes mellitus because of their capacity to increase glucose absorption and prevent adipogenesis. The extract provided quick protection. Fresh fruit has a diuretic effect. Saffron [more likely to be Curcuma longa, or Indian saffron, than Crocus sativus, or saffron] or a paste made from the fruit alone or in conjunction with Nelumbiumspeciosum, or the Egyptian Lotus and rose water can be

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applied to the pubic area to help with bladder irritation and pee retention. It has anti-inflammatory, febrifuge, and, in a rare case, anti-diuretic properties. The urinary system benefits greatly from amla-berry, which may be useful for anyone experiencing a slight burning sensation when urinating. Instead of forcing water out of the body like diuretic pills do, it promotes the body's natural diuretic function. To put it another way, it aids in the body's waste removal while avoiding over stimulating.

3. Sodium Bicarbonate

• Chemical Formula

NaHCO3 (Sodium Hydrogen Carbonate)

• Physical Properties

1. White, crystalline powder
2. Soluble in water. 3. pH: 8.3 (1% solution)

• Pharmacological Properties

1. Antacid: Neutralizes stomach acid
2. Buffering agent: Maintains pH balance
3. Electrolyte replenisher: Replaces sodium ions

• Therapeutic Uses

1. Heartburn and indigestion
2. Gastro esophageal reflux disease (GERD)
3. Peptic ulcer disease
4. Metabolic acidosis
5. Drug overdose (eg. aspirin barbiturates)

• Contraindications

1. Severe kidney disease
2. Heart failure
3. High sodium levels
4. Metabolic alkalosis

• Side Effects

1. Nausea and vomiting
2. Diarrhea
3. Abdominal pain
4. Flatulence

• Storage and Handling

1. Store in a cool, dry place
2. Protect from moisture and light

4.Guar Gum

• Source : Guar gum is derived from the endosperm of the guar bean (Cyamopsistetragonoloba), primarily grown in India and Pakistan.

• Chemical Composition :

Guar gum is a galactomannan polysaccharide, composed of:

1. Galactose (40-50%)
2. Mannose (50-60%)
3. Protein (5-6%)
4. Fiber (10-15%)

•Properties

1. Thickening agent

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2. Emulsifier
3. Stabilizer
4. Suspending agent
5. Film-forming agent

• Side Effects

1. Gastrointestinal upset
2. Allergic reactions (rare)
3. Intestinal obstruction (rare)

• Dosage

1. Pharmaceutical applications: 0.1-5.0%
2. Food applications: 0.1-2.0%

• Storage and Handling

1. Store in a cool, dry place and Protect from moisture and light

5. Magnesium Stearate

• Chemical Formula :

$Mg(C_{18}H_{35}O_2)_2$

• Physical Properties

1. White, powdery solid
2 . Practically insoluble in water
2. Soluble in ethanol and ether

• Functions

1. Lubricant: Reduces friction between particles
2. Anti-adherent: Prevents sticking to equipment
3. Flow aid: Improves powder flow

• Side Effects

1. Gastrointestinal upset (rare)
2. Allergic reactions (rare)

• Dosage

1. Pharmaceutical applications: 0.5-5.0%
2. Food applications: 0.1-2.0%

• Storage and Handling

1. Store in a cool, dry place
2. Protect from moisture and light

6. Microcrystalline Cellulose (MCC)

• Source

MCC is derived from wood pulp or cotton linters, processed into a purified, partially depolymerized cellulose.

• Physical Properties

1. White, odorless, tasteless powder
2. Particle size: 10-50 μm
3. Density: 1.5-1.6 g/cm4. Solubility: Insoluble in water, organic solvents

• Functions

1. Filler: Increases tablet bulk, weight

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2. Binder: Enhances tablet cohesion, strength
3. Disintegrant: Helps tablet break down in gastrointestinal tract
4. Anti-caking agent: Prevents powder clumping

• Side Effects

1. Gastrointestinal upset (rare)
2. Allergic reactions (rare)

• Storage and Handling

1. Store in a cool, dry place
2. Protect from moisture and light

7. Xanthan Gum

• Source

Xanthan gum is a polysaccharide derived from the bacterium Xanthomonascampestris.

• Physical Properties

1. White or cream-colored powder
2. Soluble in hot and cold water
3. Forms a clear, viscous solution
4. pH: 6.0-7.0

• Functions

1. Thickener
2. Stabilizer
3. Emulsifier
4. Suspending agent
5. Film-forming agent

• Side Effects

1. Gastrointestinal upset (rare)
2. Allergic reactions (rare)

• Dosage

1. Pharmaceutical applications: 0.1-5.0%
2. Food applications: 0.1-2.0%

• Storage and Handling

1. Store in a cool, dry place
2. Protect from moisture and light

8. Stevia

• Source

Stevia is a natural sweetener derived from the leaves of the Stevia rebaudiana plant, native to South America.

• Physical Properties

1. White, crystalline powder
2. 200-300 times sweeter than sugar
3. Soluble in water and ethanol

• Functions

1. Natural sweetener
2. Low-calorie sweetener
3. Non-glycemic sweetener

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- **Side Effects**
  1. Gastrointestinal upset (rare)
  2. Allergic reactions (rare)

- **Dosage**
  1. Pharmaceutical applications: 0.1-5.0%
  2. Food applications: 0.1-2.0%

- **Storage and Handling**
  1. Store in a cool, dry place
  2. Protect from moisture and light

DISCUSSION

From the ancient time to till present, medicinal plants have been playing a key role in the healthcare system of mankind as an extraordinary source of natural medicine. Nowadays the use of herbal products increasing day by day for low or no side effect all over the world. Amla is an important medicinal plant of Ayurveda- an Indian indigenous system of medicine. Due to its strong antioxidant, highest vitamin C contents and essential biological properties amla used to prevent various innumerable health disorders. It can be used as a possible food additive or in nutraceuticals and pharmaceutical industries. Jamun seed powder help to manage diabetes. Due to its strong antioxidant properties and higher vitamins contents the jamun is used to treat various health disorder.

CONCLUSION

The number of people in India with diabetes mellitus is rising daily, most likely as a result of changes in lifestyle, dietary habits (from a traditional, high-fiber diet to a fast-food, post-surgery diet), and genetics. Since the condition was chromic, long-term care was required to avoid consequences from persistently elevated blood glucose levels. Nevertheless, a significant number of adverse effects are linked to these synthetic anti-diabetic medications. At the end of our study, it is concluded from the detail analysis and results that Syzygium cumini (Jamun) and Phyllanthus emblica (Amla) supplemented diet are effective in reducing blood glucose levels. Traditional healers frequently utilize jambolan to treat a variety of illnesses, particularly diabetes and its aftereffects. The majority of the plant's traits are attributed to its several significant chemicals. The pharmacological potential of the other plant components needs to be further investigated, as the majority of pharmacological studies on diabetes were conducted using seeds. Likewise, there aren't many studies on the pharmacological effects of jambolan's phytochemical components. The authors expect that this review will shed light on the role of jambolan in a variety of treatments and suggest that more phytochemical and clinical studies be conducted on this traditional medicinal plant in order to develop safer medications. Amla plant can serve as a natural source for upcoming medication development based on its historical applications in a variety of possible treatments. Therefore, expanding the use of amla for the treatment of different diseases and developing it as a recognized viable and safe dosage form must require our serious study.

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