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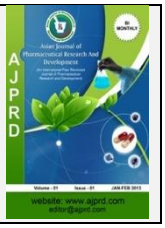

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Research Article

A Novel Research on Anti- Diabetic Syrup Using Plants Seeds *Abelmoschus Esculents* and *Punica Granatum*

Chitransh Saxena*, Manmohan Sharma, Hariom Sharma, Anil Sharma, Girish Vyas

School of Pharmaceutical Studies, Faculty of Health Sciences, Dr. K. N. Modi University, Newai, 304021, Rajasthan, India

A B S T R A C T

Abelmoschus Esculents plant is a vegetable and itsgeneral name is lady finger is most of the famous vegetable in India and other countries because of all the medical advantages it has. And *Punica Granatum* is also known as pomegranate this name is commonly used in India.This is a fruit also large scale of production in country. They both have (lady finger and Pomegranate) an excellent source of Nutrition and control the human blood sugar level. The focus of this review is on Abelmoschus esculents (okra) and pomegranates as anti-oxidants, agents for reducing tiredness, and most importantly, diabetes therapeutics. Pomegranate and lady finger (also known as okra) fibres and minerals have also long been recognised as sources of energy and biotherapeutics from which essential medications can be manufactured. The analysis examines how well okra and pomegranates can transform the majority of medications used to treat various disorders. Additionally, it expresses hope that pomegranate and okra would succeed in the various stages of clinical testing.

Key words- Abelmoschus Esculents, Punica Granatum, Anti- Diabetic, Therapeutic, Sugar level, Insulin

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*Address for Correspondence:
Chitransh Saxena, School of Pharmaceutical Studies, Faculty of Health Sciences, Dr. K. N. Modi University, Newai, 304021, Rajasthan, India

INTRODUCTION

Diabetes mellitus (DM) is one of the veryrecurrent metabolic diseases in every countries that the results from imperfection in autogenous insulin excretionand through gives to the disablement of sugar distribution (high blood glucose) [1]. Persistent high blood sugar activatesserious diabetic difficulty such as dyes reason of insulin-restorative synthesis and enlarge sugar production [2].Pomegranate (Punica granatum L.) is fruit materialize to be native to specific parts of different countries (Iran, Malesia, and India), America (USA, Peru), Africa (Equatorial region), and Europe (Turkey). The fruits are gobbled mostly firm and in the form of extract productions like juice, paste, jam [3]. Fresh pomegranate extract has a high polyphenolic compound such as punicalagin (the most abundant component), anthocyanin, phenolic acids, non-phenolic acids, tannins, and glutenin's [4].

Antidiabetic consequence of pomegranate are most of because of its phenolic compounds and their possiblecapability to act as most productive agents in restrict the risk component for diabetes. Studies have look intothe activity of pomegranate extracts in prohibitingheaviness [(and] high levels of fat particle in blood [6]. However, the underlying low blood sugar mechanism of the polyphenolic compound of pomegranate has not been fully elucidated yet. The current study look into the molecular and biochemical consequence of pomegranate fruits aqueous extract on yeast cell.

Introduction of plants

Abelmoschus Esculents(Okra)-

Okra, often called ladies' fingers or ochro, is a flowering plant in the malvacea family. Its scientific name is Abelmoschus esculentus. Its tasty seed pods have a greenish yellow colour. Okra's geographical origin is under dispute, with proponents claiming Ethiopian, South Asian, Southeast Asian, and West African ancestry. Okra is utilised in many cuisines across the world because it grows well in tropical, subtropical, and temperate climates.[2]

Kingdom: Plantae

Clade: Tracheophytes
Clade: Angiosperms
Clade: Eudicots
Clade: Rosids
Order: Malvales
Family: Malvaceae
Genus: Abelmoschus
Species: A. esculentus

Origin and distribution-

Unknown allopolyploid okra is. The putative parents have been suggested to be Abelmoschus ficulneus, A. tuberculatus, and a "diploid" variety of okra.[10] there is uncertainty regarding the existence of wild populations as opposed to naturalised populations, and the West African variety has been called a cultigen.[11]

Figure 1: Okra

Supporters of Southeast Asian, South Asian, Ethiopian, and West African origins for okra disagree on its geographic origin.[12] The Arabic name for the plant, bamya, was used by the Egyptians and Moors in the 12th and 13th centuries to suggest that it had arrived in Egypt from Arabia, but it was probably brought there from Ethiopia earlier. Instead of coming from India or north through the Sahara, the plant may have entered southwest Asia via the Bab-el-Mandeb strait or the Red Sea. One of the earliest European accounts comes from a Spanish Moor who went to Egypt in 1216 and told how the locals were growing the plant and eating the young, tender pods with food.[13] From Arabia, the plant spread eastward along the shores of the Mediterranean Sea.[14] By 1658, ships trading in slaves across the Atlantic brought the plant to the Americas. In 1686, it was further documented in Suriname. In the early 1800s, okra may have been brought from Africa to the southeast of North America. It was being grown as far north as Philadelphia by 1748, according to Thomas Jefferson.[16] By 1781, it was well established in Virginia. By 1800, it was commonplace all over the Southern United States, and different cultivars were first mentioned in 1806[13].

Anti- diabetic activity in okra-

When administered orally, okra whole fruit supplementation appears to have a promising anti-hyperglycaemic effect in patients with type 2 diabetes. Okra adjuvant therapy in conjunction with other medications may be beneficial to diabetic patients.

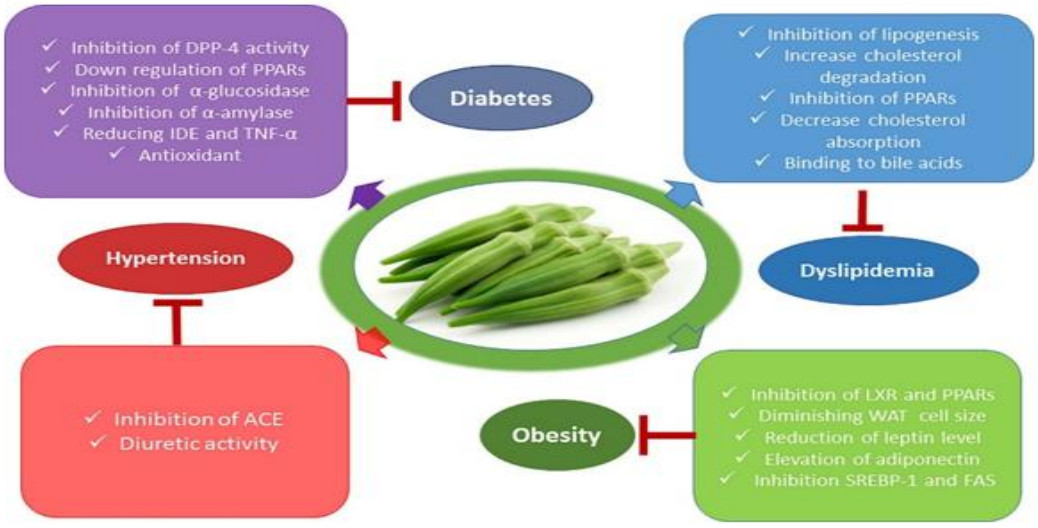

Figure 2: Activities for okra in diabetes

Etymology- The word "abelmoschus" comes from the New Latin "ab l-misk," which means "father of musk,"[3] while "esculentus" means "fit for human consumption" in Latin.

okro or ochro) showed up in 1679 in the Province of Virginia, getting from the Igbo word ọ́kụ̀rụ̀ [5]. The word gumbo was first utilized in American vernacular around 1805, getting from Louisiana Creole,[6] yet begins from either the Umbundu word ochinggômbo [7] or the Kimbundu word ki-ngombo[8]. Regardless of the way that in most of the US the word gumbo frequently alludes to the dish, gumbo, many spots in the Profound South might have utilized it to allude to the units and plant as well as numerous different variations of the word tracked down across the African diaspora in the Americas[9].

Punica Granatum (Pomegranate)

The pomegranate (Punica granatum) is a deciduous shrub that bears fruit and belongs to the subfamily Punicoideae of the Lythracea family. Its height ranges from 5 to 10 m (16 to 33 ft).

Scientific Classification
Kingdom:Plantae
Clade:Tracheophytes
Clade:Angiosperms
Clade:Eudicots
Clade:Rosids
Order: Myrtales
Family:Lythraceae
Genus:Punica
Species: P. granatum

Figure 3: Pomegranate

The pomegranate was first mentioned in the Mediterranean area Pomegranates are used as intact sarcotestas or juice in alcoholic drinks including cocktails and wine as well as in baking, cooking, juice mixes, meal garnishes, and smoothies. It was brought by Spanish immigrants to California in 1769 and into Spanish America in the late 16th century.[4] In the Southern Hemisphere, the fruit is normally in season from March through May.[5-6]

In the Middle East and Caucasus, north and tropical Africa, Iran, the Indian subcontinent, Central Asia, the drier parts of Southeast Asia, and the Mediterranean Basin, pomegranates are widely grown.[4]

Etymology-

The name pomegranate comes from the medieval Latin words pomum, which means "apple," and grntum, which means "seeded."[7] The term "apple of Grenada" was used to describe the pomegranate in early English, but it is now only used in heraldic blazons. This is a common etymology that makes the Latin word "granatus" sound like the Arabic name for the Spanish city of Granada.[8]

Garnet comes from the metathesis of the Old French word "grenat" and the Medieval Latin word "granatum," which means "of a deep red color." This name could have come from pomum granatum, which means "red dye, cochineal," or from granum, which means "pomegranate pulp."[9]

The modern French word for pomegranate is "grenade," and the military grenade is named after it.[10]

The edible fraction of a raw pomegranate (table) is made up of 78% water, 19% carbs, 2% protein, and 1% fat. A 100 g (3.5 oz) portion of pomegranate sarcotesta contains 12% of the Daily Value (DV) for vitamin C, 16% of the DV for vitamin K, and 10% of the DV for folate (table). The whole daily value (DV), or 20%, of dietary fibre, is present in the pomegranate's edible seeds.

Anti- diabetic activity in pomegranate-

Pomegranate's phenolic compounds, which have the potential to limit diabetes risk factors in a highly effective manner, are particularly responsible for its anti-diabetic effects. Studies have analyzed the activity of pomegranate extricates in forestalling stoutness [28] and hyperlipidaemia [29]. However, the underlying hypoglycemic mechanism of pomegranate's polyphenolic content has not yet been fully understood. Pomegranate is an excellent food for controlling blood sugar levels because it contains antioxidants, such as polyphenols, anti-diabetic compounds, and dietary fiber. Additionally, the fruit has a low GI and GL, which is advantageous for individuals with elevated sugar levels.

PLAN OF WORK

Identification and Authentication of Plant Lady finger and Pomegranate Material-

The plant Okra (Abelmoschus Esculentus L.) and Punica granatum was collected frombotanical garden at Agriculture field of Dr. K. N. Modi University Newai (Raj.) and plant authentication from the Rajasthan University Jaipur

Required Material- Di-methyl Sulfoxide, Erythritol, Lady Finger seed extract, Pomegranate seed extract, Distilled water (Purchased from R. S. Enterprise Jaipur, Rajasthan) Electric mixer, Soxhlet apparatus, Beakers, Weighing machine, Water bath etc among the equipment's used.

Preparation of Abelmoschus esculentus and Punica granatum Extract-

The plant Abelmoschus esculentus and Punica granatum seeds should be dry. Then seeds convert into powder form with the help of grinder. Then start the extraction process with help of ethanol The mixture was filtered using a filter paper with help of Soxhlet assembly and the final product was concentrated using freeze drier.

Final extract was obtained for both plants using hot water bath.

Figure: 4

Figure: 5

Figure: 6 Pomegranate

Figure:7 Lady Finger

Herbal Anti-diabetic syrup-

Figure: 8

PRE-FORMULATION:

Table 1: Pre-formulation study was performed in powder of drug-

SR/No	Parameters	Result	
		Okra seeds Powder	Pomegranate seeds Powder
1.	Particle size	900 – 1000 µm	350-400µm
2.	Angle of repose	24.24^0	21.34 to 29.41^0
3.	Bulk density	$0.77gm/cm^3$	0.75gm/ml
4.	pH	6.41 to 6.48	4.55

Method:

Table: 2 Prepared by W/V method.

S/N	Ingredients	Category			
1.	Herbal Drug	Herb extract	Okra and Pomegranate extract		
Water Phase			**F1**	**F2**	**F3**
	Water	Diluent	50ml	50ml	50ml
	Di-methyl Sulfoxide	Thickening agent	1.25 gm	1.25 gm	1.25 gm
	Erythritol	Sweetening agent	0.05gm	0.05gm	0.05gm
	Glycerine	Humectant	1.5 ml	1.5 ml	1.5 ml
	Sodium Chloride Sodium Benzoate	Neutralized Antimicrobial	0.45gm	0.45gm	0.45gm

Preparation of simple sugar free syrup-

Use the Erythritol (200 gm) and add (480 ml) of water and mix well till the erythritol was dissolved after that the solution heat 1 to 2 min. solution was boiled than it takes some for cool than simple sugar free syrup was ready. Store in dry and cool place

Antioxidant activity-

2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging activity of the test samples was determined using the method as described by

Evaluation parameter of syrup-

Physical stability- The syrup should be clear and no solid particle present in the final syrup.

Viscosity Test- It is very important quality control test and viscosity is property of liquid that is directly related to resistance to flow.

pH Determination-The range of 3 to 6. This is because general medicaments (drugs) are stable in acidic pH. Hence to ensure the stability of drugs in syrup up to the defined shelf life (expiry period) the pH of medicated syrups is adjusted.

Solubility Test-Solubility is defined as syrup should be soluble in water.

ANTI-DIABETIC TEST BY IN-VIVO STUDY-

Determination of Glucose Uptake Capacity by Yeast Cells-

The established Cirillo technique [13] was used to conduct this experiment. To make a 1% suspension, commercial baker's yeast was dissolved in distilled water. The suspension was held overnight at 25 degrees Celsius ambient temperature. The next day, a suspension of yeast cells was centrifuged at 4200 rpm for 5 minutes (Microfuge 16 Centrifuge, FX241.5P Rotor, 50/60 Hz and 220-240 V). Until a clear supernatant was achieved, the procedure was repeated with the addition of distilled water to the pallet. To create a 10% v/v suspension of the yeast cells, exactly 10 parts of the clear supernatant fluids were combined with 90 parts of distilled water. Dimethyl sulfoxide (DMSO) and a plant extract containing 1 to 5 mg w/v were combined until dissolved. The mixture was then supplemented with various concentrations (5, 10, and 25 Mm) of 1 mL of glucose solution and incubated for 10 min at 37∘ C. To initiate the reaction, 100 μL of yeast suspension was poured in the mixture of glucose and extract, vortexed, and incubated for another 60 minutes at 37∘ C. After incubation, the tubes were centrifuged for 5 minutes at 3800 rpm and glucose was estimated by using a spectrophotometer (UV 5100B) at 520 nm. Absorbance for the respective control was also recorded on the same wavelength.

The percent increase in uptake was calculated by the formula:

$$\% \text{ Increase in glucose uptake} = \frac{(\text{Abs. of control} - \text{Abs. of sample}) \times 100}{\text{Abs. of control}}$$

RESULT AND DISCUSSION-

Dried fruits seeds (50 gram) were placed in a muslin bag and treated to Soxhlet extraction using ethanol (90 percent), and the yield were obtained in table.

Table 3: Yield Obtained from extracts

Sr. No.	Crude drug quantity	Yield Obtained
Abelmoschus esculentus	50 (grams)	4gm
Punica granatum	50 (grams)	5gm

Phytochemical screening:

The phytochemical screening of drug extracts was carried out according to standard method (Treasa & Evans 1989).

Table: 4

S/N	Phytochemical Chemical Test	Ethanolic Extract of	Ethanolic Extract of
1.	Alkaloids	Present	Present
2.	Glycosides	Present	Present
3.	Carbohydrates	Present	Present
4.	Saponin	Present	Present
5.	Flavonoids	Present	Present

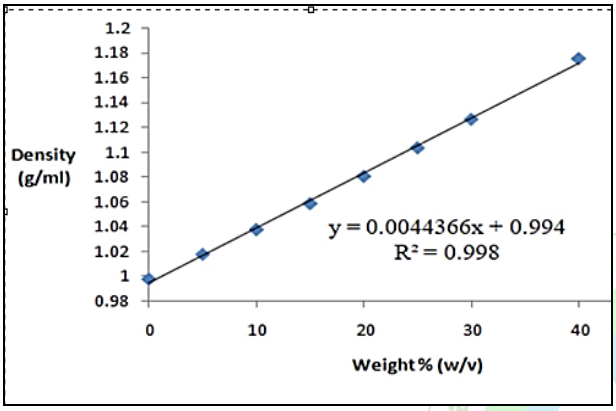

Figure 9: Density v/s weight plotting for antidiabetic syrup

Table 5: Evaluation Parameter of herbal syrup

S/	Parameter	Observation		
		F1	F2	F3
1.	Appearance	Yellowish-brown	Yellowish-brown	Yellowish Light brown
2.	Odour	Characteristics	Characteristics	Characteristics
3.	pH	pH 6.0	pH 6.3	pH 6.5
4.	Viscosity	Viscosity 500-800cps.	Viscosity 1000-1200cps.	Viscosity 1200-1500cps.

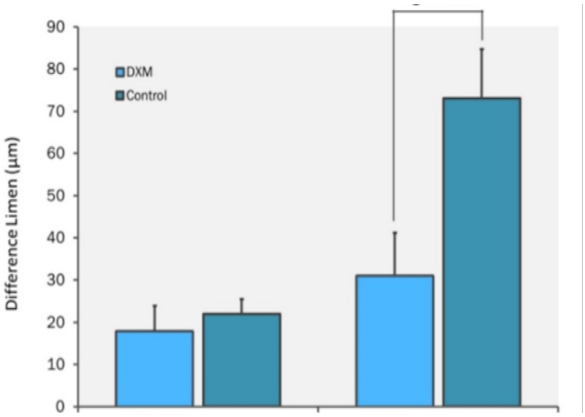

Figure 10: Difference Limen by plot for viscosity of different formulations

Stability test:

To assess the formulation stability, was performed in the lab. Each formulation was stored at room temperature and 40°C temperature for 2-3 month and observed for physical stability.

Table 6: General evaluations and stability

Admissibility Conditions (Initial)		Admissibility Conditions (30
Appearance	Homogeneous syrup	Concordant
Odour	Characteristic	Concordant
Colour	Yellowish brown	Concordant
pH	6.0-6.5	6.0-6.5
Viscosity	15.000 mPas	20.000 mPas

CONCLUSION

The present study suggests that extraction of Abelmoschus Esculentus and Punica Granatum is required in order to generate better, safer, and more cost-effective anti-diabetic syrup to treat Diabetes. This study shows that the active compound in Abelmoschus Esculentus is Qucertin and Punica Granatum have Phenolic compound which create good anti-diabetes activity and have a great potential as an antibacterial agent. Other researchers have already found some information.

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