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ANTIDIABETIC ACTIVITY OF SYZYGIUM CUMINI SEEDS AND IT'S PHYTOCHEMICAL CONSTITUENTS: A REVIEW

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Abstract:

Syzygium cumini (jamun) is widely used for treatment of diabetes mellitus. Syzygium cumini is the plant found in in all over india and many other countries. It is a medium sized tropical evergreen tree. Syzygium cumini growth rate is very high so it live up to 100 years. Its hight can be reaches up to 30 meter (98 ft) In 100 years. The species of syzygium cumini was distrubuted in many countries such as Bangladesh, Shrilanka, Nepal. Syzygium cumini has widely used as medicinal plant.

These plant contain varius active chemical constituents such as essential oils which is useful in the reduce glucose level in blood. There is about 422 million people around the world suffering from diabetes. India has 77 million people around the world suffering from diabetes mellitus. One in six people in the world with diabetes is from India. The highest number of dibetic patient was found in China. Diabetes can be cured by different chemical tablet and different modern technique but that cause a many side effects. Such as large use of chemical tablet can be affecte the functioning of kidney. In ayurveda, there are various herbal treatment are available for diabetes. The hearbal treatment or Ayurvedic treatment does not have any side effects. In these present article we review the antidiabetic activity and chemical constitution of Syzygium cumini.

KEYWORDS -

Syzygium cumini, Evergreen plant, Essential oils, Glucose, Ayurveda, Growth rate.

INTRODUCTION:

Diebetes mellitus is the disorder occure in the endocrine system. The cases of diabetes mellitus was found in most of the world. The patient which is suffering from the diabetes mellitus are unable to produce insulin in there body. Due to this the glucose level in the blood were incresed. That's why the

Dibetes mellitus disorder occur in that person. The number of patient we're incresed day to day in large rate. Diabetes become the third most dangorous disease after the Cancer and Cardiovascular disease. Diabetes is characterised by the relative insulin deficiency and hyperglycemia. Diaebetes mellitus is the disease which affect the metabolism of Carbohydrate, Fat and protein. The treatment of diabetes was based on the oral hypoglycemic agent and insulin. There are varius pharmaceutical treatment are available in the market for the treatment of Diabetes .

The large scale use of chemical medicine can be produce harmful or toxic effect on the kidney and other. But in the indian traditional medicinal system varius herabal product are used for the treatment of diabetes. Herbal medicine does not have any side effect hence it is very neccesory to search the new herbal medicine to treate the diabetes. The syzygium cumini tree belong to the family myrtaceae. This plant is also called as the jambhul Or jambhol in india and malaya. It is also called as java plum.

Fig. 1.1 (SEED)

The plant syzygium cumini is rich in phytochemical constituents. The leaves of plant contain alkanoids, lignins along with different phenolic acids. The seed of syzygium cumini contain varius phytochemical contents which is antidiabetic in nature. The seed of syzgium cumini are rich in alkaloid, jambosine, glycoside which act as antidiabetic.

The powder of seed of syzygium cumini is highly beneficial in reducing the blood sugar level. Jamun seed contain alkaloids, which converet starch into the energy and help in the reduce the symptoms of diabetes. It help in the reducing the thirsty feeling and frequent urination. Jamun seed in powdered form can reduce the blood sugar level.

Botonical discription:

Comman name - java plum, malabar plum, jamun, jambhul.
Kingdom - Plantae
Division - Angiosperm
Subdivision - Eudicots
Family - Myrtle family (Bottle brush family)
Genus - Syzygium
Species - S cumini

It is medium sized tropical evergreen trees. The growth rate of S. Cumini is high hence It lives up to 100 years. It's height reches to 30 meters in his 100 years period. The species of S.cumini are distrubuted in many countries such as Bangladesh, Nepal, India, Srilanka. It mainly found in tropical subtropical forest.

Chemical Constitution of syzygium cumini seeds:

The phytochemical constituents of syzygium cumini extract were shown in table 1.1 the biochemical test for alkaloids, flavonoids, glycocides, phenols, steroids, cardiac glycocides saponins, resisns, tannins, terpanoids were present in seed extract

Sr. No.	Phytochemical Constituents	Methanolic extract of S.cumini seeds
1.	Alkaloids	Moderately present
2.	Flavonoids	Appreciable amount
3.	Glycocides	Moderately present
4.	Steroids	Appreciable amount
5.	Cardiac glycocides	Present
6.	Saponins	Present
7.	Resins	Present
8.	Phenols	Moderately present
9.	Tannins	Present
10.	Terpanoids	Present

Table 1.1 : phytochemical constituents of S.cumini seed extract

Material and Styles:

Sample collection:

The seed of syzygiun cumini was collected. The collected sample was taxonomically linked by factory biologist. These seeds were dried at room temperature. Also dried seeds were pulvarised into small greasepaint by using blender.

Solvent extraction:

The dried seed powder was taken in the conical beaker contaning methanol and wrapped with aluminium antipode for 72 hours with occasional shaking. After 72 hours extract were filtered with sludge paper. The remaining amount of solvent were removed from extract by using vacum distillation. The concentrated S.cumini extract were dried and stored at 4°C for farther study.

Alkaloids:

Mayer's test: Mayers test was used for the discovery of alkaloids in the given sample. Take 1.36gm of mercuric chloride mixed in 60ml and 5gm of potassium iodide were dissolved in 10 ml of purified water independently. These two detergents were mixed and diluted to 100ml using distilled water . To 1ml of acidic waterless solution of samples few drops of reagent was added. Conformation of white or pale precipitate showed the presence of alkaloids.

Flavonoids:

In a test tube containing 0.5ml of alcoholic extract of the Samples, 5 to 10 drops of adulterated HCl and small amount of Zn or Mg were added and the result was boiled for many twinkles. Appearance of sanguine pink or dirty brown colour Indicated the presence of flavonoids.

Glycosides:

A small quantum of alcoholic extract of samples was Dissolved in 1ml water and also waterless sodium hydroxide Was added.
Appearance of glycosides was detected by fomation of yellow colour

Steroids :

Salkowski's test: About 100mg of dried extract was Dissolved in 2ml of chloroform. Sulphuric acid was precisely added to form a lower layer. A reddish brown Colour at the interface was an indicative of the presence of Steroidal ring

Cardiac glycocides:

Keller killiani's test: About 100mg of extract was Dissolved in 1ml of glacial acetic acid containing one drop Of ferric chloride solution and 1ml of concentrated Sulphuric acid was added. the presence of a deoxy sugar Characteristic of cardenolides is indicated by brown ring attained at the interface.

Saponins:

A drop of sodium bicarbonate was added in a test tube Containing about 50ml of an aqueous extract of sample. The mixture was contineusly shaken and placed for 3 min. Presence of saponins is indicated by formation of honey comb like froth.

Resins

To 2ml of chloroform or ethanolic extract 5 to 10ml of Acetic anhydrite was added and dissolved by gentle Heating. After cooling, 0.5ml of H2SO4 was added. Bright Purple colour was produced. It indicated the presence of Resins.

Phenols

Ferric Chloride Test: To 1ml of alcoholic solution of Sample, 2ml of purified water followed by a few drops of 10% waterless ferric chloride solution were added. Presence of pphenol is indicated by formation of blue Or green colur

Tannins

Lead acetate test: In a test tube containing about 5ml of an Aqueous extract, a few drops of 1% solution of lead acetate Was mixed. Formation of a red precipitate Indicated the appearance of tannins.

Terpenoid

2ml of chloroform and 1ml of conc.H2SO4 was mixed to 1mg of extract and observed for reddish brown colour that Indicated the appearance of terpenoid.

Isolation and identification of the active compound:

Pure SC seed methanol extract(5ml) was admixed with 10 g of silica gel (60 - 120 mesh), dried for invarient mixing and the amalgamation was loaded in a column (5 cm diameter X 50 cm height) added with silica gel (150 g) using hexane as the solvent. The column was eluted with increasing order of polarity gradually from 100% hexane, 100% chloroform and methanol in ethyl acetate (0 -100%). The fraction eluted at 100% methanol, yield of 350 mg attained. The compound was obtained as pale brown semi solid.The fraction was characterized by spectroscopy techniques like 1H NMR,13 C NMR and Mass Spectrum.

Antidiabetic evaluation:

Induction of diabetis to rat:

Take 60 rats fasting for 18 hours, these rata were injected by streptozotocin after dissolving it in freshly prepared ice cold citrate buffer. 5% glucose solution were given to drink to rat for overnight after injection. The development of diabetes was confirmed after 48 hours. The rat whose blood glucose level is more than 200 mg/dL at fasting were selected for

experiment. Out of these 60 animal 6 were died and 5 get ommited from the study. Remaining 49 diabetic animal were devided into 7 groups each having 7 animals.

Blood sample collection and glucose level determination:

Blood sample were collected by end tail method cutting method and blood glucose level were determined by using glucometer.

Experimental protocol:

Each group contain 7 streptozotocin induced diaebetic rats. Group 1 normal control animal received 1 % SCMC 10 ml/kg oraly for 15 days. Grouo 2 STZ induced diaebetic animal received 1%SCMC 10 ml/kg oraly for 15 days. Group 3 and 4 STZ induced diaebetic rats received ethyl acetate extract at the dose of 200 and 400 mg/kg oraly for 15 days. Group 5 and 6 STZ induced diaebetic rats received methanolic extract at the dose of 200 and 400 mg/kg oraly for 15 days. Group 7 STZ induced diaebetic rats received mycaminose 50 mg/kg oraly for 15 days. Grouo 8 STZ induced diaebetic rats received standard drugsdrugs, glibanclamide 1.25 mg/kg oraly for 15 day

Blood sample were collected one hour after drug Administration on the day 1, 5, 10, 15th day to determine the glucose level of blood.

Result:

Blood sugar level mesured in normal and experimemtal rat on a day 1, 5, 10, 15th is noted in table no 1.2.from this reading we see that sugar level of STZ induced group were decresed day to day. The group induced by mycaminose and glibanclamide have very great result. The sugar level in this two group were decrese in more amount. Oral administration of ethyl acetate and methanol extracts shows significant result.

Table 1.2: Antidiabetic activity of syzygium cumini extract and isolated compunds against streptozotocin-induced diaebetic rats.

Group (15 days)	Blood sugar level in mg/dL (mean ± SD)				
	Initial	Day 1	Day 5	Day 10	Day 15
Group – I (n=6)	70.78 ± 7.03	65.05 ± 9.33	66.70 ± 9.85	67.00 ± 7.41	65.48 ± 5.88
Group – II (n=5)	249.76 ± 8.85	262.28 ± 14.75	285.85 ± 4.78	309.20 ± 8.09	313.28 ± 4.73
Group – III (n=6)	250.85 ± 8.40	252.49 ± 5.57a^{NS}	239.23 ± 8.42$a^{NS}b^{*}$	204.38 ± 5.84$a^{*}b^{*}$	192.03 ±5.80$a^{*}b^{*}$
Group – IV (n=7)	249.04 ± 3.89	249.65 ± 7.85a^{NS}	221.24 ± 5.41$a^{*}b^{*}$	189.10 ± 8.22$a^{*}b^{*}$	178.14 ± 9.30$a^{*}b^{*}$
Group – V (n=6)	248.70 ± 8.85	256.08 ± 4.98a^{NS}	239.88 ± 8.84$a^{NS}b^{*}$	214.23 ± 3.33$a^{*}b^{*}$	182.85 ± 4.58$a^{*}b^{*}$
Group – VI (n=7)	251.84 ± 4.90	256.57 ± 5.57a^{NS}	233.45 ± 6.30$a^{*}b^{*}$	192.77 ± 4.89$a^{*}b^{*}$	154.85 ± 10.24$a^{*}b^{*}$
Group – VII (n=7)	248.38 ± 3.50	251.17 ± 8.14a^{NS}	217.97 ± 4.52$a^{*}b^{*}$	190.10 ± 7.91$a^{*}b^{*}$	180.21 ± 8.68$a^{*}b^{*}$
Group – VIII (n=7)	249.62 ± 8.53	247.51 ± 8.11a^{NS}	190.07 ± 11.04$a^{*}b^{*}$	167.84 ± 9.37$a^{*}b^{*}$	123.93 ± 5.89$a^{*}b^{*}$

Conclusion:

These result conclude that the use of syzygium cumini can be done as antidiabetic. The standard drug glibenclamide has used for many years to treate diabetes by stimulating secretion of insuline from beta cell. These results confirmed the use of S. cumini seed Traditional system of medicine to treat diabetes in India.Further comprehensive chemical and pharmacological Investigations are needed to elucidate the exact Mechanism of the hypoglycemic effect of SC seed.

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