Abstract
Phyto-medicine is used to treat human illness since ancient times, due to their less and non-toxic nature. Medicinal uses of Jaman seed in Ayurveda and Unani medications can be traced back to be more than a century. As, Jaman seed powder consists of saponins, tannins, phenolic compounds, amino acids, alkaloids, phytosterols, and flavonoids. Phyto-chemicals contains antioxidant, antibacterial, anti-histamine, anti-inflammatory, hepatoprotective, antipyretic, anorexigenic, chemo-protective, inotropic and chronotropic, gastroprotective, CNS stimulant, hypolipidemic and hypoglycemic properties. However, more scientific validation is needed, for the standardization and safety evaluation.

Keywords: Phytomedicines; Syzygium cumini; Inotropic; Chronotropic; Chemo Protective; Mycaminose

Introduction
Mother Nature blessed us with healthful plants from an earlier period for the betterment of mankind, which is a rare and unique way to cure diseases. Herbal remedies have become a major component of health care as they have no or fewer side effects. The complication in the production of pharmaceuticals and in addition to their health based reactions and increased cost has led to global village researchers to get focus on herbal remedies.

Mother nature blessed Pakistan with more than 6,000 different species of higher vascular plants. Due to this blessing, Pakistan has 300 - 350 homeopathic and herbal units that processing homeopathic and herbal medicine for the community. There are 1,30,000 homeopathic experts, hakeem’s are 39,584 in number and 455 vaides officially working in-country. Pakistan act as a major country in exporting herbal medicines and plants all over the global village. In Pakistan 457 Tibbi clinics and polyclinics serving the nation. Evidence shows that folks used plants for remedies to prevent themselves from chronic illness. Among the Chinese emperor (2800 BC), the Kangxi emperor and Qin Shi Huang emperor included in the use of herbal medicine before the advent of modern science. Muslims and Hindus of Arab and sub-continent had been written in their work approximately 1400 AD about the use of Herbs in there time as well. The old civilization of Pakistan Harpanin (2000 BC) also uses plants as an herbal cure.
Role of Phyto-Medicinal Properties of *Syzygium cumini* Seeds on Human Health

### Materials and Methods

Related material with present study was collected from different journals, reports and review papers of national and international status through key words of Phytomedicines, *Syzygium cumini*, herbal medicine, in ISI web of knowledge. We also used Google Scholar (Google Inc., Mountain View, CA, USA) for the comprehensive search of the peer-reviewed articles published before March 2019.

For the each selected study, we collected the information on medicinal properties of Jamun. we also do collected the information on experimental treatment type and size, their techniques of treatment manipulation. The material so collected has been reviewed and categorized into different sections i.e. impact productivity, gross primary productivity, net primary productivity, Major findings from previous studies, emerged to bring out the present manuscript.

### Composition of seed

Seeds are cream in color, coriaceous covering, and smooth, oval or roundish. Each fruit contains a single seed 1 - 2 cm long. On microscopy study transverse section of *Syzygium cumini* seed showed following features:

- Epidermis: Three to four layered epidermis.
- Mesophyll: It is composed of isodiametric thin walled parenchymatous cells which are fully packed with simple starch grains.
- Few schizogenous cavities are found which contain oil drops and Polygonal cells of testa.

### Table 1: Botanical profile of subject tree.

<table>
<thead>
<tr>
<th>Botanical name</th>
<th><em>Syzygium cumini</em> (Jaman)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common name</td>
<td>Jambolan, Java plum or Jaman,</td>
</tr>
<tr>
<td>Plant type</td>
<td>Ever green tree</td>
</tr>
<tr>
<td>Approximate tree height</td>
<td>80ft</td>
</tr>
<tr>
<td>Bark characteristics</td>
<td>Young stems: gray-white Lower bark: rough and discolored</td>
</tr>
<tr>
<td>Leaves</td>
<td>Shape: Simple, elliptic - broadly elongated pointed at tip Color: Texture: glossy smooth- leathery Orientation: Opposite Leaf length: 5 - 10 cm Petioles: Up to 3 cm Leaf venation: Parallel with prominent yellowish midrib</td>
</tr>
<tr>
<td>Flower</td>
<td>Color: Pinkish white orientation: Branched clusters Characteristics calyx: Cuplike with 4 petals, fused to form a cap with numerous stamens.</td>
</tr>
<tr>
<td>Fruit</td>
<td>Type: One seeded berry Size: Approximately 2 cm long Color: Glossy purplish red with white -lavender flesh [2].</td>
</tr>
</tbody>
</table>

**Citation:** Dr. Ayesha Mushtaq., et al. “Role of Phyto-Medicinal Properties of *Syzygium cumini* Seeds on Human Health”. EC Nutrition SI.02 (2020): 01-09.
Powder study of *Syzygium cumini*:
- Color: Brown
- Parenchymatous cell: Oval shape parenchymatous cells are present
- Starch grain: Round starch grains are present
- Fiber length: 168.19 µm.

*Syzygium cumini* seed on microscopy and macroscopic study shows the presence of saponins, tannins and phenolic, amino acid, alkaloids, phytosterols, and flavonoids and absence of carbohydrate and anthraquinone in the seed [3].

**Figure 1:** Various parts of Jaman, a: tree, b: leaves, c: fruits d: cross-sectional fruit, e: seed powder.

**Phytochemical and active components**

Organic extracts of Jaman seed contains flavonoids, alkaloids, glycosides, triterpenoids, steroids, saponins, and tannins. Ethanolic seed extracts shows that, they are rich in alkaloids, tannins and saponins, while, also contain flavonoids and phenols, as well as small quantity of cardiac glycosides, terpenoids, phytosterols, steroids and amino acids was also reported.

In addition it is reported that, Jaman seeds contain 7-hydroxy-calamenene, methyl-β-orsellinate, and β-sitosterol, along with oleanolic acid, and 3-hydroxy androstane [16,17-C][6′-methyl, 2′-1-hydroxy – isopropene-1-yl] 4,5,6 H pyran.

<table>
<thead>
<tr>
<th>Seed Extract</th>
<th>Phytochemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methanolic seed extract</td>
<td>Tetradecanoic acid, octadienol, a-caryophyllene, 5,10-dichloro-5-β caryophyllenc, 10-dimethyltricyclo[7.1.0.0(4,6)] decane, oxirane 2,3-dimethyl cadinene, 2-furancarboxaldehyde 5-(hydroxymethyl), 4-dodecen-1-ol acetate and 1,10-decandiol, bicyclo(4.4.0)decane,</td>
</tr>
<tr>
<td>Ethanol seed extract</td>
<td>Thujanol and 10-undecyn-1-ol, bicyclo(7.2.0) undec-4-ene, 5-(hydroxymethyl)-2-furaldehyde, 4,11,11-trimethyl-8-methylene, isogeraniol, 3(2H)-furanone dihydroxy-2-methyl, 2-methyl-3-isobutenyl-4-pent-en-2-ol, 3-methyl-4-hexyn-3-ol, 12-methyl-E,E-2,13-octadecadien-1-ol, decahydro-4A-methyl-1-methylene-7-(1-methylene), , nondecanoic acid, caryophyllene oxide, and guaiol, limonene oxide [7]</td>
</tr>
</tbody>
</table>

**Table 2:** Chemical profiling of organic seed extracts.
Traditional medicinal uses

In Ayurvedic 1 - 3g of JSP is consumed by humans orally to treat diabetes and complications related to diabetes. JSP is given to aid in clearance of skin marks caused due to blackheads and acne. In Indo-china Jaman seed is used to cure diarrhea, dysentery, diabetes and catarrh. In North east Bharat Jaman seed juice is being applied to cure external abscesses, lesions and carbuncles. Powdered seeds of Jaman added with juice of sugarcane and given to cure dysentery, opium poisoning, centipede bite and for sores and ulcers. In Malayalis in Bharat, puree of seeds is made along with the blend of leaves of Momordica charantia and flowers seen once a day to slow overwhelming impacts of diabetes. Traditional medical healers in Madagascar of Jaman are taken orally for production of Herbal remedy for curing vast diabetes. In Unani, JSP are used as constringent, for diuresis, stop polyuria and home based remedy for diabetes [11]. Local population in Bharat, use JSP taken orally thrice for cure of diabetes.

Antioxidant and antibacterial activity

Abstract of Jaman seed in ethyl alcohol hinder production of DPPH and ABTS free radicals and also shows iron chelating activity. Jaman seed extract have shown a dose needy rise in free radical hunting action of nitric oxide (NO) based ions to act as antioxidant. Antioxidant activity of Jaman seed compared to ascorbic acid in antioxidant assay shows that seed of Syzygium cumini has a significant source of antioxidant.

Antibacterial agents are those substances which help to interfere growth and reproduction of bacteria which leads to many diseases. Antibacterial activity of various extracts of Jaman seed. The technique of disk diffusion method were used to analyze of various extracts, Petroleum ether and Ethanol was used. The various gram-positive and gram-negative bacteria inhibited by the solvent extracts which had a broad spectrum of bacteriostatic action. The ethanol extract had maximum antibacterial activity against E. coli. In documented at future, the high therapeutic value of the seed extract against pathogenic bacteria. Gangadhar A. Meshram., et al. examined antibacterial activity of Jaman seeds of ethanolic extract of isolated at various temperature. In vitro technique of inhibitory effect on gluco-amylase and antibacterial activity against microbes such as Bacillus subtilis, Escherichia coli, Pseudomonas aeruginosa and Staphylococcus aureus were studied by the ethanolic extract. Antibacterial activity was observed moderate to good in all 4 strains. The maximum inhibition (50%) of gluco-amylase activity had ethanolic extract isolated at 20°C. The antibacterial activity and potent inhibitor of gluco-amylase were existing in the ethanolic extract of Syzygium cumini seeds.

Figure 2: Health benefits of Syzygium cumini seed on human health.

Citation: Dr. Ayesha Mushtaq., et al. “Role of Phyto-Medicinal Properties of Syzygium cumini Seeds on Human Health”. EC Nutrition S1.02 (2020): 01-09.
Anti-inflammatory and antihistamine activity

Anti-inflammatory means that a substance which has the ability to reduce localized redness, swollen and decreased pain and temperature of that area. Jaman seed has the ability to reduce acute and chronic inflammation. The chloroform Jaman seed extract had been testified to inhibit feet edemas in rats due to carrageenins and kaolin carrageenins which used to induce arthritis and as well as decrease amino acids based serum effusion, dye used is leaked in inflammation of peritoneal cavity and white blood cells migrated. The aqueous JSP abstract have an anti-inflammatory activity in humans. JSP have various effectiveness for inflamation and depend on dose given. The alcoholic extract at the amount of 400 mg/kg JSP alcoholic extract presented prominent anti-inflammation in 4 hours, where it causes 62.6% inhibition of inflammation, in comparison to that of 5 mg per kilogram of diclofenac sodium. Jaman aqueous seed extract in diabetic rats decrease the activity of ectonucleotidase, adenosine deaminase, dipeptidyl peptidase, nitric oxide and acetyl cholinesterase.

Antihistamine means to treat allergy symptoms. Syzygium cumini dried seed powder was administered to rats intraperitoneally against histamine induced pedal edema. The results show Jaman seed powder have ability to decrease the allergic symptoms.

Hepatoprotective and CNS activity

Hepatoprotective activity stands for ability to protect liver from damage. K Hussain., et al. evaluated from experiment which they did on male rats. Through biochemical analysis and histopathology they concluded that Jaman seed extract treated rats group illustrated that there is increase in serum protein and decrease level of in serum enzyme level which concluded that the extract of Syzygium cumini seed have hepatoprotective effect.

Central nervous system consist of brain and spinal cord. A Kumar., et al. reported the activity of Jaman seeds. The work is based on the investigation of acute toxicity and central nervous system action. Solvent for extraction are ethyl acetate and methanol. Seeds extract given at 200 and 400mg per kilogram and both exhibit central nervous system protection activity.

Antipyretic and anorexigenic activity

There are many reason to have pyrexia while antipyretic activity means ability to decrease fever. Extracts of JSP in chloroform exhibited antipyretic activity [18] and methanol extracts of JSP given to rats at doses of 50 mg per kilogram were active against yeast induced pyrexia.

Amphetamine is a drug which is used to stimulate central nervous system attention deficit hyperactivity disorder, narcolepsy and obesity. Seed powder 1 - 3 g/day will act as anorexigenic.

Inotropic and chronotropic effects

Inotropic means changing the speed of muscle contraction while chronotropic means ability to change heart rate. According to Archana, given (936.55 µg/ml) of the ethanol having extract of JSP relaxed half of the rats myometrium having smooth muscles. Also, the inotropic and chronotropic effects of the extract of JSP rise the contraction rate of hear and changes heart beat.

Chemo preventive and gastro protective

Syzygium cumini seed extract is chemopreventive for the free oxygen radical based stress and also prevent genes from getting damage. Both alcoholic and aqueous and extract of JSP shows safe and protective effects against OH- induced strands breaks in “pBR322DNA”. The in-vivo experiments with aqueous JSP shows protection of genetic material against genotoxic compounds like “URE” and “DMBA”. Detailed biochemical observations shows that noteworthy inhibition of liver lipid peroxidation and increase in “GSH” level and activity of “GST”, “SOD” and “CAT”.

JSP shows preventive action of gastric cells from getting ulcerative and it is preventive against “pylorus ligation-ethanol” and “aspirin” induced gastric ulcers in rats. JSP anti-ulcerative property is due to its aggressive and cautious factors. JSP antioxidant properties is an important role in preventive stomach from ulcers. Ethanolic JSP extract noted to lower the “indomethacin” and “ethanol” caused peptic ulcers and also lowered the increased pepsin output in the “streptozotocin” induced diabetic rats.

Citation: Dr. Ayesha Mushtaq., et al. “Role of Phyto-Medicinal Properties of Syzygium cumini Seeds on Human Health”. EC Nutrition S1.02 (2020): 01-09.
Anti-hyperlipidemia

Hyperlipidemia means increased blood lipid level which will ultimately leads towards heart issue. The seed extract of Jaman has been reported to decrease blood lipid profile, and to decrease the working of "HMG-CoA" reductase in alloxan based induction of diabetes in rabbits. Jaman has capability to decrease increased blood glucose level and also the raised blood lipid levels. JSP decrease alloxan based induction of diabetes in rats; while, high density lipoproteins cholesterol was raised, showing that JSP holds anti-hyperlipidemic activity. Aqueous JSP extract decrease blood lipid profile on alloxan based induction of diabetes in mice because diabetes will result in increase lipid profile [32]. The ethanol abstracts of JSP shows to normal the blood lipid profile in rats which are also on feed with increased HDL based diet.

Antidiabetic effect

Diabetes mellitus is most dangerous disease and ranked third in number in the world affecting human health. According to World Health Organization, it is seventh leading cause of mortality worldwide. Almost 347 million folks suffers from diabetes worldwide [34]. Whereas in Pakistan the current occurrence of type 2 diabetes in Pakistan is almost 11.7%. While in gender male the prevalence is 11.20% and in gender females 9.19% [35]. Herbal remedies had become an important part of human health because it has fewer or no side effects. Syzygium cumini is used for more than 125 years in Ayurveda as anti-diabetic [36]. Syzygium cumini was broadly considered in previous 125 years, almost 100 case had been testified by this time already before the finding of insulin [36]. The active ingredient in Jaman seed is mycaminose. The mechanism of action of mycaminose is similar to glibenclamide (a standard drug used for many years as antidiabetic) [37]. It will decrease glycosylated hemoglobin in diabetic rabbits. Jaman seed will survive pancreatic cells produce insulin. This will increase Glucose-6-phosphate improve in homeostasis [38]. Jaman will alter the carbohydrate metabolism in type 2 diabetics by increasing the amount of insulin, glycogen level both in muscle and liver, enzymes for glycolysis and decreasing the fasting blood glucose level, glycated hemoglobin, peak blood glucose level and enzymes of gluconeogenesis. This will ultimately improve overall weight of person also [39].

Figure 3: Shows the mechanism of Syzygium cumini to control blood glucose level in diabetics.
**Conclusion**

This review concluded on the basis of historical and current majority opinion *Syzygium cumini* seed has many health benefits and can be used for the treatment of both acute and chronic diseases. It will act as hypoglycemic and hypolipidemic agent also due to presence of antioxidant property. Jaman will improve the functioning of β-cells of islets of Langerhans's in type 2 diabetics. The whole study express the breadth of our current knowledge and concludes about the gaps of this proposes many clinical trials are required to determine perfect dose of Jaman seed for various diseases and how to utilize the data to reduce the total global burden of different diseases.

**Bibliography**

2. Kundu S., et al. "Comparative *in-vitro* anti-microbiological study of *Syzygium Cumini* new and old leaves against various types of enteric microorganism for diarrhoea and dysentery".

**Citation:** Dr. Ayesha Mushtaq., et al. “Role of Phyto-Medicinal Properties of *Syzygium cumini* Seeds on Human Health”. EC Nutrition S1.02 (2020): 01-09.
Role of Phyto-Medicinal Properties of *Syzygium cumini* Seeds on Human Health


Citation: Dr. Ayesha Mushtaq., et al. “Role of Phyto-Medicinal Properties of *Syzygium cumini* Seeds on Human Health”. *EC Nutrition* 51.02 (2020): 01-09.
Role of Phyto-Medicinal Properties of *Syzygium cumini* Seeds on Human Health


© All rights reserved by Dr. Ayesha Mushtaq., *et al.*

**Citation:** Dr. Ayesha Mushtaq., *et al.* “Role of Phyto-Medicinal Properties of *Syzygium cumini* Seeds on Human Health”. *EC Nutrition* S1.02 (2020): 01-09.