



Application of *Cajanus Cajan* in treatment of jaundice.

¹Gaurav Sandip Jadhav, ²Darshana Vasant Pawar, ³Pradnya Y. Patil, Rajnikant t. Kakade

¹Reseach scholar, ²Research scholar, ³Asst. professor

¹Siddhi institute of pharmacy, Murbad, India

Abstract: *Cajanus Cajan* (L) is also known as pigeon pea, Arhar, Tur belongs to family Fabaceae. It is the important grain legume crop & widely cultivated in tropical and sub-tropical areas of the world especially in India (contributing 90% of the world). *Cajanus Cajan* is the best source of protein, vitamin B, amino acid like methionine, lysine, tryptophan. It shows many pharmacological properties such as anti-bacterial, anti-microbial, anti-inflammatory, hypocholesterolemic, anti-diabetic, anti-cancer, neuro active properties, anti-oxidant, hepatoprotective and many more. The leaf part of this plant contains chemical constituent like cajanol, cajaninstilbene acid, flavanoids which is helpful in the treatment of jaundice. The particular review is focused on the activity of *Cajanus Cajan* (L) against jaundice.

Index Terms – *Cajanus Cajan*, Hepatoprotective

I. INTRODUCTION

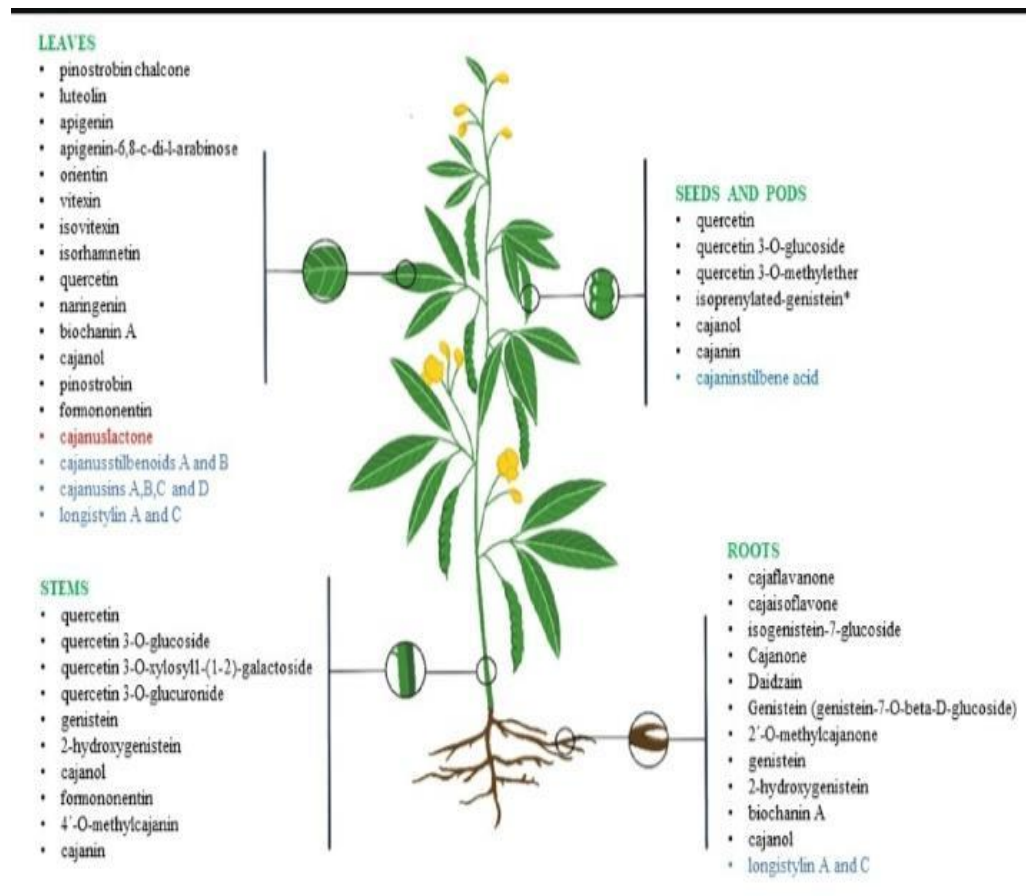
Jaundice is a disease condition in which yellowish of skin, mucous membrane, and sclera (whites of the eyes) occur due to deposition of yellow orange bile pigment known as bilirubin. Bilirubin is an endogenously synthesized waste product which is synthesized during the normal break down of hemoglobin. Jaundice mainly occurs in newborn children termed as neonatal jaundice. Jaundice indicate that hyper bilirubinemia and it appears when bilirubin level exceeds 2 mg/dL. The drug which are widely used in the treatment of jaundice are phenobarbital, rifampicin, naltrexone. Above drugs are life threatening.



Epidemiological studies have provided convincing evidence that natural dietary compounds, which humans consume as food, possess many biological activities. One Plant food that has been shown to be therapeutic against a number of diseases is pigeon pea, *Cajanus Cajan* L. (Fabaceae), an important grain legume crop in the tropics and subtropics. The extracts of pigeon pea are commonly Used to treat diabetes, fever, dysentery, hepatitis, and measles Worldwide. The drug which are widely used to treat the jaundice is phenobarbital. Phenobarbital has many sides effect and over dosing may cause death Jaundice mainly occur in new born babies so phenobarbital is not suitable for treatment to new born babies.

Morphological characteristics-

The Synonym of *Cajanus Cajan* is Adhaki(Sanskrit), Arhar(Hindi), Pigeon pea (English), Tur(Bengali), Red gram, Congo pea, Gungo pea. It is an erect, branched, hairy shrub, 1-2 meters high. Leaves are oblong-lanceolate to oblanceolate with three leaflets. Flowers are yellow, in sparse peduncled racemes, about 1.5-cm long. Pod is hairy, 4-7 cm long, 1 cm wide, containing two to seven seeds. India is a principal pigeon pea-growing country contributing nearly 90% of the total world production.



Geographical source-

It has been cultivated in ancient Egypt, Africa and Asia since prehistoric times, and was later introduced to America. Now it acclimatizes in several tropical countries. The major producer is India contributing about 90% of world production. Its altitude range is 1250 m in Hawaii, 0-3000 m in India and Columbia. It is essentially a plant of the semi-dry lowlands but has wide adaptability.

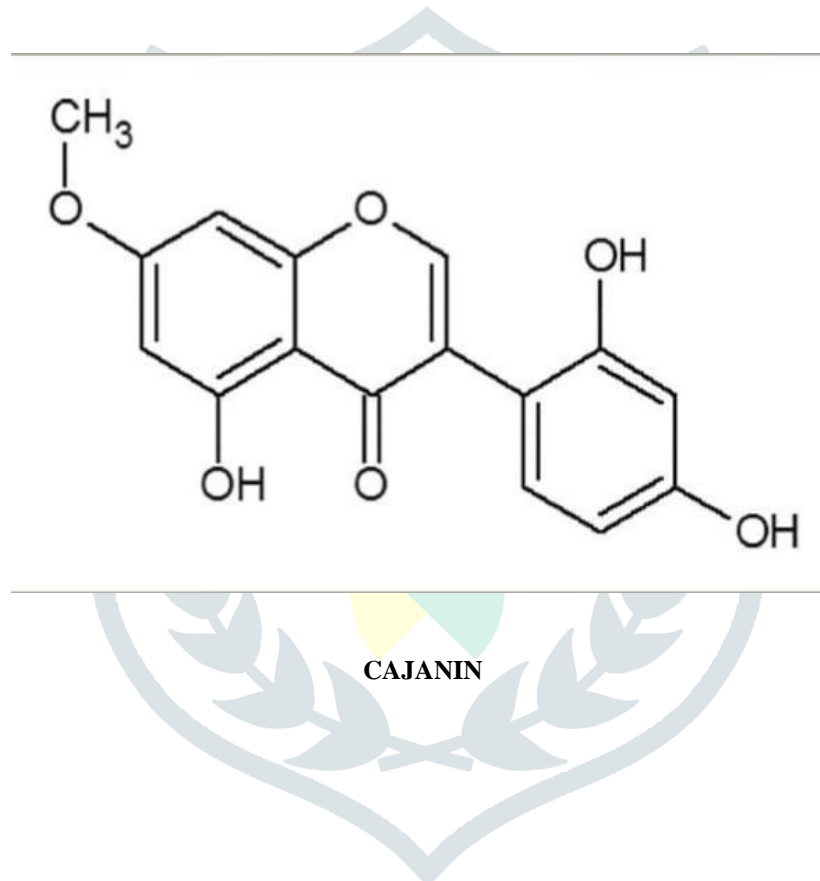
Ethnopharmacological importance-

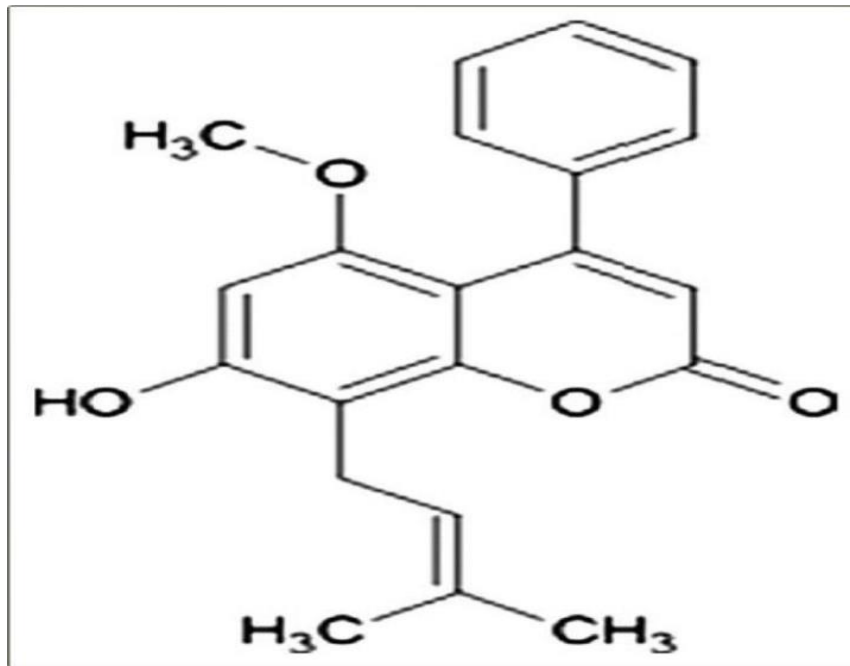
Part of plant	Chemical constituent	Pharmacological activity
Leaf	Cajanus lactone	Antibacterial
Leaf	Cajanin, longistylin C, longistylin A	Hypocholesterolemic
Roots, Leaf	Betulinic acid, longistylin C, Longistylin A	Antiplasmodial
Leaf	Pinostorbin	Anti-inflammatory, Nueroactive
Roots	Genistein	Antioxidant

Root	Cajanol	Anti-cancer
Leaf, Aerial part	Flavonoids, Tannins	hepatoprotective
Seeds	Energy stimulant	Tannins

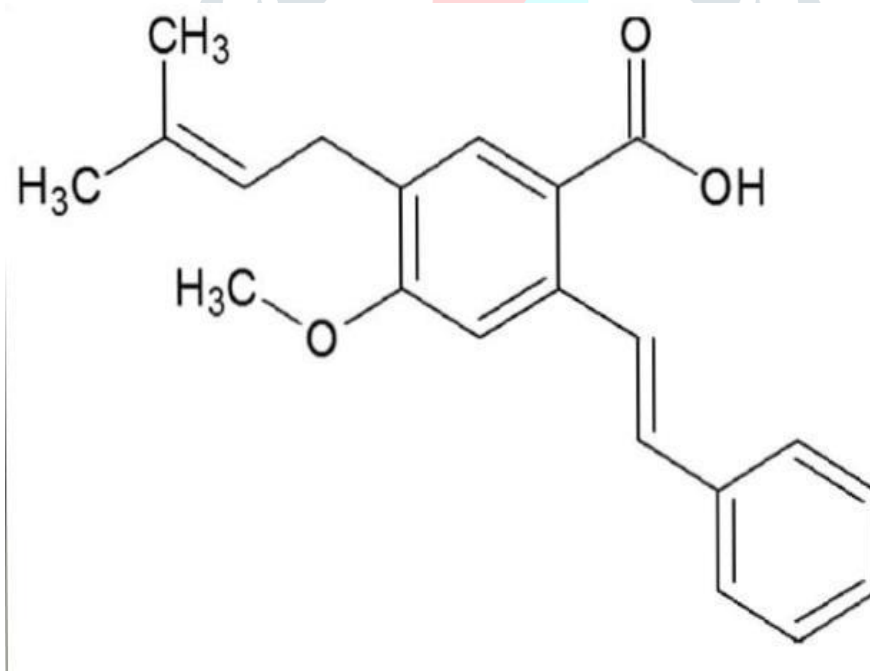
Chemical constituents-

Chemical constituent investigations have indicated that *C. Cajan* leaves are rich in flavonoids and stilbenes. They also contain saponins, conspicuous number of tannins, and moderate quantities of reducing sugars, resins and terpenoids. The leaf contains cajanuslactone (coumarin), Cajanin, longistylin c, longistylin A, Pinostorbin, vitexin, flavonoids, tannin. The root contains Betulinic acid, genistein, cajanol (isoflavanoids) etc. Cajanol and protein fraction of flavonoids and tannins plays an important role in treatment of jaundice





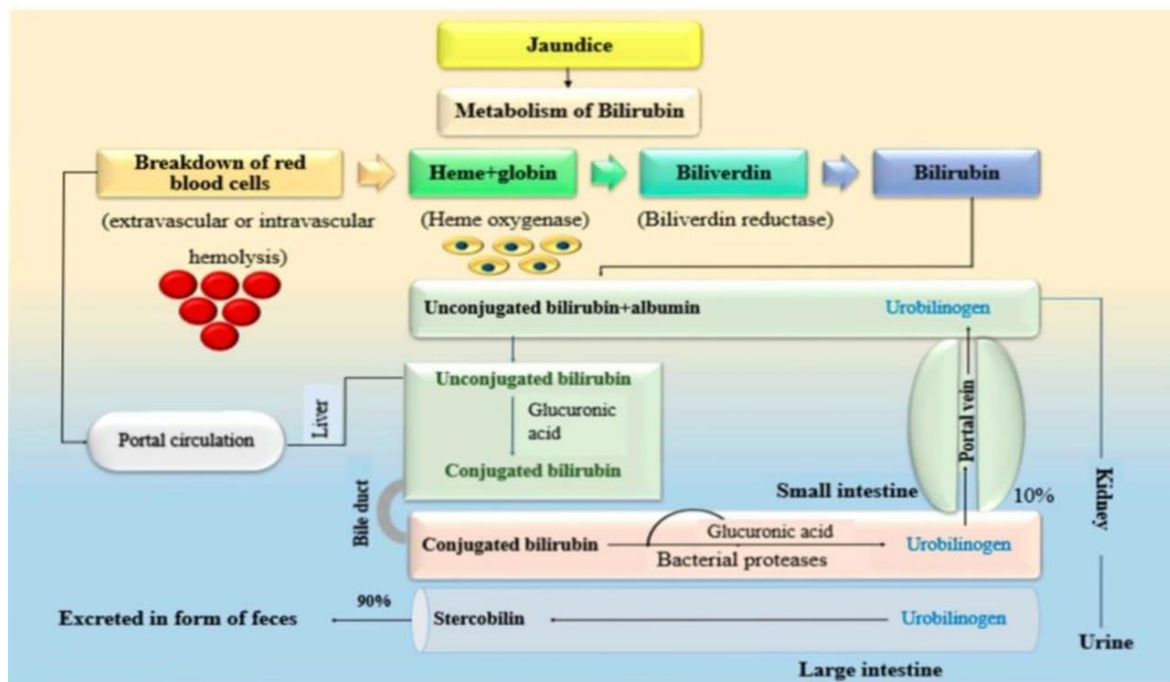
CAJANUSLACTONE



Cajaninstilbene acid

Jaundice-

Jaundice is the disease condition in which yellowish of skin is occurred due to deposition of bile. Bilirubin is responsible for disease causing. Bilirubin is formed due to breakdown of red blood cells. Hemoglobin is converted into biliverdin and biliverdin is converted into unconjugated bilirubin. Unconjugated bilirubin is converted into the conjugated bilirubin by the help of glucuronic acid. Conjugated acid is excreted throughout the body by feces. When unconjugated acid is not converted into the conjugated bilirubin the unconjugated form of bilirubin is deposited in the blood.



Cycle of excretion of bilirubin

Pharmacological activity-

An experiment is done on damaged liver Swiss albino mice induced by carbon tetrachloride (CCl₄) to see the Hepatoprotective activity of the methanol extracts of Cajan. It was found that the same extract showed a little protective effect by decreasing the serum levels of alanine Aminotransferase (ALT) or serum glutamate pyruvate Transaminase (SGPT), aspartate aminotransferase (AST) or Serum glutamate oxaloacetate transaminase (SGOT), and Cholesterol to a significant extent.

Alcohol induced liver Damage of rat can prevented by the methanol-aqueous fraction (MAF2) of the leaf extract. After co-administration of MAF2, it decreases the activity of liver maker enzymes and augmented antioxidant enzyme activities. Thus, it shows a promise in therapeutic use in alcohol-induced liver dysfunction. Glutamic oxaloacetic transaminase and Glutamic pyruvic transaminase indicates liver functioning status that is if the activity of these two enzymes is low, the better the liver functionality.

In the study conducted by Das (2018), extracted from Cajan greatly reduced bilirubin Content in cells and rats and this shows a clear indication of Hepatoprotective properties. Methanol-aqueous fraction of Cajanus Cajan leaf extract prevented chronically alcohol Induced rat with chronic liver damage It has been observed that alcohol induced liver damage is mainly due to the result of oxidative stress and UGT (UDP glucuronosyl Transferase) gene expression is an important cytoprotectant. Prolonged intake of alcohol causes the down-regulation of UGT expression where Methanol-aqueous fraction Cajan Leaf extraction prevents this down regulation- thus, permitting Cytoprotection and treating alcohol induced liver dysfunction

Extraction process-

Soxhlet extraction is only required where the desired compound has a limited solubility in a solvent (water, Ethanol, benzene), and the impurity is insoluble in that solvent. If the desired compound has a high solubility in a solvent, then a simple filtration can be used to separate the compound from the insoluble substance. Normally a solid material containing some of the desired compound is placed inside a thimble made from thick filter paper, which is loaded into the main chamber of the Soxhlet extractor.

The Soxhlet extractor is placed onto a flask containing the extraction solvent. The Soxhlet is then equipped with a condenser. The solvent is heated (550C) to reflux. The solvent vapour travels up a distillation arm and loads into the chamber housing the thimble of solid. The condenser ensures that any solvent vapour cools, and drips back down into the chamber housing the solid material. The chamber containing the solid material slowly fills with warm solvent. Some of the desired compound will then dissolve in the warm solvent. When the Soxhlet chamber is almost full, the chamber is automatically emptied by a siphon side arm, with the solvent running back down the distillation flask. This cycle may be allowed to repeat many times two days during each cycle; a portion of the non-volatile compound dissolves in the solvent. After many cycles the desired compound is concentrated in the distillation flask. The advantage of this system is that instead of many portions of warm solvent being passed through the sample, just one batch of solvent is recycled. After extraction the solvent is removed, typically by means of a rotary evaporator, yielding the extract compound. The non soluble portion of the extracted solid remains in the thimble, and is usually discarded.

Conclusion-

Cajanus Cajan is a common food and medicinal plant. From the present study it can be concluded that it is effective drug in the treatment of jaundice. Cajanus Cajan contains flavonoids and Tannins which provide therapeutic action against jaundice. Cajanus Cajan also shows wide range of therapeutic action also due to their rich amount of protein content. The leaf extract shows effective action against jaundice.

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