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A REVIEW ON *ACACIA NILOTICA LINN.* PLANT :- VARIOUS MEDICINAL ACTIVITY AND IT'S PHARMACOLOGICAL ACTION

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Abstract: The medicinal plants used in traditional medicine still plays an important role in emerging and developing countries since they are inexpensive, effective and have natural origin. Acacia arabica commonly known as babul belongs to the family Fabaceae is widely distributed throughout the tropical and subtropical plains all over India, Sri Lanka, and Sudan, this plant is native to Egypt. Almost all its parts such as root, bark, leaves, flower, gum, pods etc are used in medication. on Medicinal plants are frequently used for the treatment of various infectious diseases.The objective of this study was to evaluate the antibacterial activity and mode of action of Acacia nilotica and the antibiogram patterns of foodborne and clinical strains of Escherichia coli and Salmonella. The mechanism of action of acacia extracts against E. coli and Salmonella was elucidated by observing morphological damages including cell integrity and cell membrane permeability, as well as changes in cell structures and growth patterns in kill-time experiments

Key Words :- Acacia nilotica Linn., Antibacterial And Antifungal, Antioxidant, Chemopreventive And Cytotoxic , Anti-inflammatory, Antifertility , Antidiabetic Activity.

I. Introduction

Medicinal plants have a long history of use for the benefit for population. According to the report of the World Health Organization (W. H. O), about 80% of the world's population depends chiefly on ayurveda. Acacia nilotica Linn commonly known as Babul and Kikar has been used in Unani and other Indian System of Medicine for hundreds of years for the prevention and treatment . It was first described by Linnaeus in 1773. A. nilotica L belongs to the kingdom Plantae and family Fabaceae. It is the second-largest genus of the family Fabaceae, with about . It is distributed throughout tropical and warm temperate areas of the world like Asia, Australia, and America. A. nilotica has various complex phytoconstituents including alkaloids, volatile essential oils, phenols, phenolic glycosides , and terpenes. These types of phytoconstituents play a role in the therapeutic actions of A. nilotica. Earlier traditional description confirmed that A. nilotica has a rich amount of nutrients and contains a high therapeutic value which is capable of prevention, and treatment of various infectious diseases conditions. The studies based on the animal model established that A. nilotica and its chief phytoconstituents play a pivotal role in anti-bacterial, anti-inflammatory, anti-diabetic, anticancer, and anti-hypertensive management. It is considered a safe medicinal plant and helps in the numerous therapeutic actions without any adverse effect.

Acacia nilotica is also known as Babool in India. The Acacia nilotica tree is used in the treatment of many diseases and disorders such as skin diseases, sexual diseases, stomach problems, tooth problems etc. in human beings and animals. The Acacia nilotic tree has been recognised all over the world as a multi-purpose tree. It can be found all over the world in dry or semi-dry regions including India.

Babbul have contains different active principles like alkaloids, volatile essential oils, glycosides, resins, oleoresins, steroids, tannins, terpenes and phenols . In the last recent years there is an large growth in the field of herbal medicine because of their natural origin, easy availability, efficacy, safety and less side effects with efficient to cure age-related disorders like memory loss, osteoporosis, immune disorders, etc. for which no modern medicine is available.

The main aim of this review, to study **various medicinal activities** of acacia nilotica (babool) plant.

II. PLANT PROFILE

DESCRIPTION:-

Taxonomy:
Kingdom: Plantae
Subkingdom: Tracheobionta
Super division: Spermatophyta
Division: Magnoliophyta
Class: Magnoliopsida
Subclass: Rosidae
Order: Fabales
Family: Fabaceae
Genus: Acacia
Species: Nilotica

COMMON NAMES:

Acacia Gomifera, Acacia De Cayenne,Acacia À Gomme, ArabischeGummiakazie, Babul, Babul Acacia, Black Piquant, Casha, Cassie, Egyptian Acacia, Goma Arabica, Gommier Rouge, Gum Arabic Tree, Indian Gum-Arabic-Tree, Gum Arabic Tree, Thorn-Mimosa, Thorny Acacia.

INDIAN NAMES:

Bengali: Babla, Babul.
Gujrathi: Babaria, baval, Kaloabaval.
Hindi: Babul, Kikar.
Kannad: Gobbli, Karijali.
Malyalam: Karivelan, Karuvelum.
Marathi: Babhul, Vedibabul.
Orisa: Bambuda, Baubra.
Punjabi: Sak.
Tamil: Kaluvelamaram, Karuvelam.
Telgu: Nallatumma, Tuma.

DISTRIBUTION:

The Acacia nilotica tree found in all over the world lifeIndia, Algeria, Angola, Botswana, Egypt, Ethiopia, Gambia, Ghana, Kenya, Libya, Mali, Nigeria, Senegal, Somalia, in South Africa-Sudan, Tanzania, Uganda, Zambia, Zimbabwe, Oman, Saudi Arabia, Yemen, Iran, Iraq, Israel, Syria, Nepal, Pakistan etc.

PLANT DESCRIPTION

Acacia nilotica is a single stemmed plant, grows to 15- 18 m in height and 2-3 m in diameter.

Pods and Seeds:

Pods are 7-15 cm long, green (when immature) or greenish black (when mature), indehiscent, deeply constricted between the seed giving a necklace appearance. Seeds are 8-12 per pod, compressed andovoid.

Leaves: The leaves are bipinnate, pinnate 3-10 pairs, 1.3-3.8 cm long, leaflets 10-20 pairs, and 2-5mm long.

Flowers:

Flowers are globular heads, 1.2-1.5 cm in diameter of a bright golden yellow colour.

Stem: Stems are usually dark to black coloured, deep longitudinal fissured, green-pinkish slash, exuding a reddish gum .

Bark: The colour of bark is orange and/or green (young tree), but older trees have dark, rough bark and tend to lose their thorns.

Thorns: Thorns are thin, straight, light grey exist in axillary pairs (usually 3-12), 5-7.5 cm long in young tree .

Root: Root is brown colour in older and whitish in younger regions.

Gum: The gum varies in colour from very pale yellowish brown to dark reddish brown depending on the quantity of tannins in the sample

III. PHYTOCONSTITUTE OF ACACIA NILOTICA

Composition	Bioactive constitute
Alkaloid	Dimethyltryptamine, N-methyltryptamine, tryptamine
Tannis	Methyl gallate, Ethyl gallate-Gallic acid, Gallocatechin-5-O-gallate, Dicatechin, Polygalloytannin Egallic acid
Proteins	Cysteine, Methionine, Threonine, Lysine, Tryptophan
Polisaccharides	D-pinitol ,T-Sitosterol, Acanilol
Terpins	Lupenone, Lupeol, Niloticane
Gums/fatty acids	D-Galactose, L-Arabinose, L-Rhamnose
Acids	6-O-(β-D-glucopyranosyluronicacid)-D-galactose 4-O-(α-D-glucopyranosyluronicacid)-D-galactose Gallic acid, Tannic acid, Cresol
Flavonoids	Kaempferol kaempferol-3-glucoside, iso-quercitin, leucocyanidi, Catechin, Catechin-7-O-gallate,Quercetin, Quercetin-3-O-β-glucopyranoside, Naringenin, Naringenin-7-O-β-glucopyranoside, Chalconaringenin-4′-O-βglucopyranoside

IV. MEDICINAL USES AND PHARMACOLOGICAL EFFECT

Anti-hypertensive and anti-spasmodic activities :

A decrease in arterial blood pressure is founded by the use of methanolic extract of Acacia nilotica pods and provides an proof of anti-hypertensive activities not depends on muscarinic receptor stimulation. In the in vitro studies, Acacia nilotica has found that force and rate of spontaneous contractions in guinea-pig paired atria has been decrease. Acacia nilotica also inhibits K + induced contractions in rabbit jejunum advocating the antispasmodic action of Acacia nilotica which is mediated through ca++ channel blockade and this may also be responsible for the blood pressure lowering effect of Acacia nilotica observed in the in vivo studies .

On the isolated guinea-pig ileum, an aqueous extract of Acacia nilotica seed is also studied, revealing persistent dose-related contractile action. The extract administered intravenously results in a dose-related substantial rise of blood pressure.

Anti-diabetic activities :

Studies have confirmed anti-diabetic activities. However, pods and tender leaves are considered very beneficial in folk medicine to treat diabetes mellitus.

Antibacterial and antifungal activities :

Using the agar diffusion method, the stem bark extracts' experiments verify their antibacterial efficacy against Shigella sonnei, Bacillus subtilis, Escherichia coli, Streptococcus viridans, and Staphylococcus aureus. Antimicrobial agents may be sourced from A. nilotica.

A. nilotica demonstrates highest activity against three bacterial (E. coli, S. aureus and Salmonella typhi) and two fungal strain (Candida albicans and Aspergillus niger).

Chemopreventive, cytotoxic and anti-mutagenic activities :

According to reports, the presence of gallic acid and other polyphenols may be the cause of the acetone extract's antimutagenic and cytotoxic properties. A. nilotica leaf extract was found to have significantly more chemopreventive and antimutagenic activity than the other parts (Kalaivani and Mathew, 2010a).

A. nilotica gum, flower, and leaf aqueous extracts have been shown to have chemopreventive effects on 7,12-dimethylbenz(a) anthracene (DMBA)-induced cutaneous papillomagenesis in male Swiss albino mice. The most notable effects were produced by the chemopreventive and anti-mutagenic properties of the A. nilotica leaf extract, followed by the floral extract and gum.

Antioxidant activity :

Water extract/fractions of A. nilotica (L.) in lipid peroxidation assay possess the peroxyl radical scavenging capacity and results prove the anti-oxidant activity of plant.

Using maceration extraction, the bark powder of the plant extracts with various solvents was discovered to have scavenging activity. According to a different study, A. nilotica is a readily available source of natural antioxidants that can be taken as a supplement to help treat conditions including cancer, diabetes, inflammation, and other conditions that are mediated by free radicals (Amos et al., 1999). Furthermore, the hydroxyl groups in the phenolic compounds of A. nilotica may be responsible for their great scavenging ability against free radicals.

Antifertility :

Rats were exposed to 11.5% abortifacient activity in the flower aqueous extract. It was further examined in pregnant rats for teratological anomalies in failure cases (pregnancy not prevented). The fetuses have bone abnormalities and noticeable external morphology. In an initial screening, a 2% concentration of the stem bark extract showed semen coagulant activity.

Analgesic and antipyretic activity :

When used to treat ocular pain, A. nilotica has historically demonstrated to be a highly effective analgesic. Young leaves that have been roasted in ghee and wrapped around the eyes to cause subconjunctival hemorrhage and chronic ophthalmia.

Recent studies have also demonstrated that it possesses analgesic and antipyretic properties. In one study, Wistar Albino rat models were used to investigate the analgesic and antipyretic effects of an aqueous root extract of A. nilotica. Acetaminophen was used to compare the extract's analgesic and antipyretic properties. The findings demonstrated that at 200 and 400 mg/kg body weight, the extract significantly and dose-dependently lowers the rectal temperature of rats.

A previous study conducted on 28 patients with recurrent mouth ulcers demonstrated that using adhesive paste from the extract of Acacia roots and barks three times daily reduced the inflammatory aura of the ulcer after 48 and 72 hours of treatments. The study also found that the combination of Acacia and licorice extract prevented the rapid recurrence of mouth ulcers and had a synergistic effect compared to the Acacia extract alone .

Antiulcer (gastric and oral) activity :

According to a study by Bansal and Goel, rats that were given pylorus ligation had an antiulcer effect when exposed to an aqueous ethanolic extract of Acacia pods at 50% and 70%. Additionally, the 70% aqueous ethanolic extract demonstrated a protective effect against ulcers brought on both swimming stress and non-steroidal anti-inflammatory drug use. There was also notable analgesic action that was similar to acetaminophen.

V . Method of extraction :-

1. Collect roots, leaves, stem, then dried.
2. Take into the soxhlet apparatus.
3. Choose solvents like chloroform, ethanol, carbon tetrachloride .
4. With the help of infusion method extraction of chemical constituent occure .
5. In infusion simultaneouse agitation and shaking takes place .
6. After 7 cycle of soxhlet extraction , main sample extracted into an conical flask .
7. Then vaiouse identification test performed .

Alternate method - Acacia nilotica dried extract boiled with distilled water for 15 minute .

VI. TESTS FOR IDENTIFICATION

1. Test for Phenolic compounds and Tannins (Ferric Chloride test): The extract (50 mg) is dissolved in 5 ml of distilled water. To this few drops of neutral 5% ferric chloride solution are added. A dark green color indicates the presence of phenolic compound.

2. Mayer's test: Take a few ml of plant sample extract, two drops of Mayer's reagent was added on the sides of test tube. Appearance of white creamy precipitate indicates the presence of alkaloids.

3. Wagner's test: A few drops of Wagner's reagent are added to few ml of plant extract along the sides of test tube. A reddish- Brown precipitate confirms the test as positive.

4. Dragendorff's test: Take 2 mg of the ethanolic extract 5 ml of distilled water was added, 2M Hydrochloric acid was added until an acid reaction occurs. To this 1 ml of Dragendorff's reagent was added. Formation of orange or orange red precipitate indicates the presence of alkaloids.

5. Test for Glycosides (Borntrager's test) : Take 2 ml of filtered hydrolyte, 3 ml of chloroform is added and shaken, chloroform layer is separated and 10% ammonia solution is added to it. Pink color indicates presence of glycosides.

6. Test of flavonoids: Three ml of 1% Aluminum chloride solution were added to 5 ml of each extract. A yellow coloration was observed indicating the presence of flavonoids

7. Test for terpenoids (Salkowski test): Five ml of each extract was mixed with 2 ml of chloroform, and 3 ml concentrated H2SO4 was carefully added to form a layer. A reddish brown coloration of the interface was formed to show positive results for the presence of terpenoids.

8. Test for Saponin: The extract (50 mg) is diluted with distilled water and made up to 20 ml. The suspension is shaken in a graduated cylinder for 15 minutes. A two cm layer of foam indicates the presence of Saponin.

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