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“Review on: Ficus Recemosa”

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Abstract: Medicinal plants plays important role in cure of diabetic mellitus of all over the world . The profile presented include it's methodology used and their bioactive agent with antidibetic activity ficus recemosa linn.(family; moraceae) popularly known as the cluster fig tree or Gular ,is famous medicinal plants in India , which is used in traditional plant system of medicine for a long time, for the treatment of various disorders like diabetes, live disorder, diarrhea, inflammatory conditions, hemorrhoids, respiratory and urinary disease. In the traditional system of medicinal various plants part such as bark ,root, leaves, fruits, latex ,used in dysentery, diarrhea, diabetes, bilious affections , stomach ache . Ficus recemosa is an important medicinal plants , found in India , Australia and southeast Asia . It is popularly known as gular . It reduces the blood glucose conc .due to presence of p - sitosterol . It is popular in indigenous system of medicine like ayurveda ,siddha , unani ,and homoeopathy . It is a scared tree of Hindus and Buddhists . A moderate sized tree found throughout India either wild or cultivated for its fruits eaten by villages . The genus ficus is very useful and significance group of trees with various therapeutic properties ficus recemosa is also known as yujnayoga udumbara , goolar , dumbar , bodda , heibong , jantuphalan , dimri , yaggadumbar , and many more names . It grows naturally near bodies of water but may also be grown artificially . The different parts of the plants have numerous phytochemical compounds (alkaloids , tannis , saponins , B - sitosterol , lupeol and other compounds) and possesses numerous therapeutic properties .

Index Terms :Ficus recemosa , diabetes mellitus, family - moraceae , Gular , liver disorder , B - sitosterol .

I. INTRODUCTION:

Ficus recemosa Linn. Syn . *ficus* Roxb. (Family- moraceae) . The plants is a large dedicious tree distributed all over India from outer Himalayan ranger , Punjab , khasia mountain , chota Nagpur , Bihar , Orissa , west bengal , rajasthan , Deccan and common in South India [1] . Umbara is considered scared to God dattaganl . All ficus species possess. Latex like material within their vasculatures that provides defense and self realing from phisical assaults [2] . This plant is universally used in traditional system of medicine for the treatment of numerous disorders. It is one of the herbs mentioned in all ancient scriptures of Ayurveda ,sidda , unani , and Homeopathy . Various plants parts such as bark , root , leaf , fruit ,and latex are used as astringent , vermifuge , carminative and anti - dysentery . It is a good medication for excessive appetite . The extract of fruits is used locally to relieve inflammation of lymphadenitis , fibrositis skin wounds and in sprains [3] . Fruit contains gluanol , hentriacontane , beta - sitosterol , gluanolacetate , glucose ,tiglic acid (E) ,ester taraxasterol , lupeol acetate (D) , friedelin (f) , higher hydrocarbons , and other phytosterol (4) . The leaves of this plant are rich in flavonoids,triterpenoids (basically lanosterol) , alkaloids and tannins . A new triterpene namely gluanol acetate and racemosic acid were isolated from the same part [5] . Their scientific study has been made possible only after the development microbiology. Natural antimicrobials can be derived from barks ,stem , leaves, flowers , fruits of plants, various animal tissues or from micro - organisms [6] . Additionally, the decoction of the bark is used pharmacologically as an astringent and in

treatment of menorrhagia , Haemoptysis , haemorrhoids and diabetic mellitus and to extract poison from wounds caused by cat [7 , 8] . The active constituent . Beta sitosterol isolated from the leaves and stem bark , has good antidibetic potential. This plant has multiple pharmacological activity that includes antidibetic, antioxidants, antidiarrhearl , anti- inflammatory , antipyretic , anti - fungal , antibacterial , hypolipedemic and anti - filarial and hepatoprotective action . [9, 10] . It is commonly known as gular fig , cluster fig in English, gular in Hindi and as udumbara in Sanskrit [11 ,12] . Ayurveda is a medical system that recorded the therapeutic properties of plants diseases can be prevented an improved by applying traditional Chinese medicine (TCM) treatment. Many incurable, chronic , and geriatric diseases can be treated [13, 14, 15] . The fruits of *ficus glomerata* or *ficus recemosa*, locally known as gular have been used since olden times the ethnomedicine for many varied medicinal purposes including as a remedy of diabetes mellitus [16] . The demands of herbal medicines are increasing because their potent pharmacological activity and economical values have been proving to be beneficial for the people. However a lot of research is necessary to standardize and validate Ayurveda medicines for their potency , safety and efficacy [17] .

Taxonomy of *ficus recemosa* :

1.1.Kingdom: plantae , planta , planter , plants .

1.2.Subkingdom : Tracheobionta , vascular plants

1.3.Division : Magnoliophyta .

1.7.Order : Urticales .

1.4.Superdivision : Spermatophyta .

1.8.Family : Moraceae .

1.5.Class : mangnoliopsida .

1.9.Genus : Ficus L.

1.6.Subclass : Hamamelididae .



Ficus recemosa tree

2. SYNONYMS :

Covellia glomerata (Roxb) miq ., Ficus glomerata Roxb , Ficus vesca F Muell . ex miq ., And Ficus semicostata F•M•Bailey [18] .

3.COMMON NAME :

Gular Fig , cluster Fig , Country Fig and redwood Fig .[19]



Ripe fruit of ficus recemosa

4.Morphological characteristics:

Ficus recemosa is a deciduous trees with a bole buttressed; bark uniform thickness, surface layer reddish -brown or yellowish -brown glossy, coarsely flaking, fibrous, blaze milky pink; latex milky; younger shoots and branches finely white fuzzy. Seeds are small, numerous and grain -like . The bark's outer Surface contains detachable transparent flakes that range in colour from grey to

rusty brown stipules are 12-18 mm long, lanceolate, linear lanceolate, pubescent,and often persistent on young shoots [20] . Ficus recemosa roots are long and brownish in colour. It has distinct odour and a slightly bitter taste. Roots have an irregular shape [21] .



unripe fruit of ficus recemosa

5. Microscopical characteristics:

5.1. cork : It is made up polygonal or ractangular-shaped cell cork is composed of polygonal as well as ractangular cell .

5.2. phelloderm : It's also lignified with simple pits and comprises dense tissue of parenchyma cells or tiny clusters of sclereids. several parenchymatus cell with a single prism of reddish calcium oxalate content .

5.3. cortex : It comprises multiple sclereids that are ractangular and or isodiametric and pitted extremely thick -walled , and the cortical cell contains a resinous substances cell contains prismatic crystals of such calcium oxalate sieve tubes, companion cells, phloem, parenchyma, sclereids, phloem fibres, medullary ray are all phloem components [22].

5.4. leaf : It has dorso-ventral characteristics and single -layered palisade cells in the top epidermis. The lower and upper epidermis revealed numerous, sometimes uniseriate unicellular, thin walled, enclosing trichomes on the upper epidermal cells.

5.5. Mesophyll: It is the intermediate layer of the leaf's epidermis, between the lower and upper epidermis, contains sclerenchymatous cells covering the vascular bundle. Collenchymatous cell can be seen in the Mesophyll between the vascular bundles and the lower epidermis [23,24] .

6. Phytochemistry :

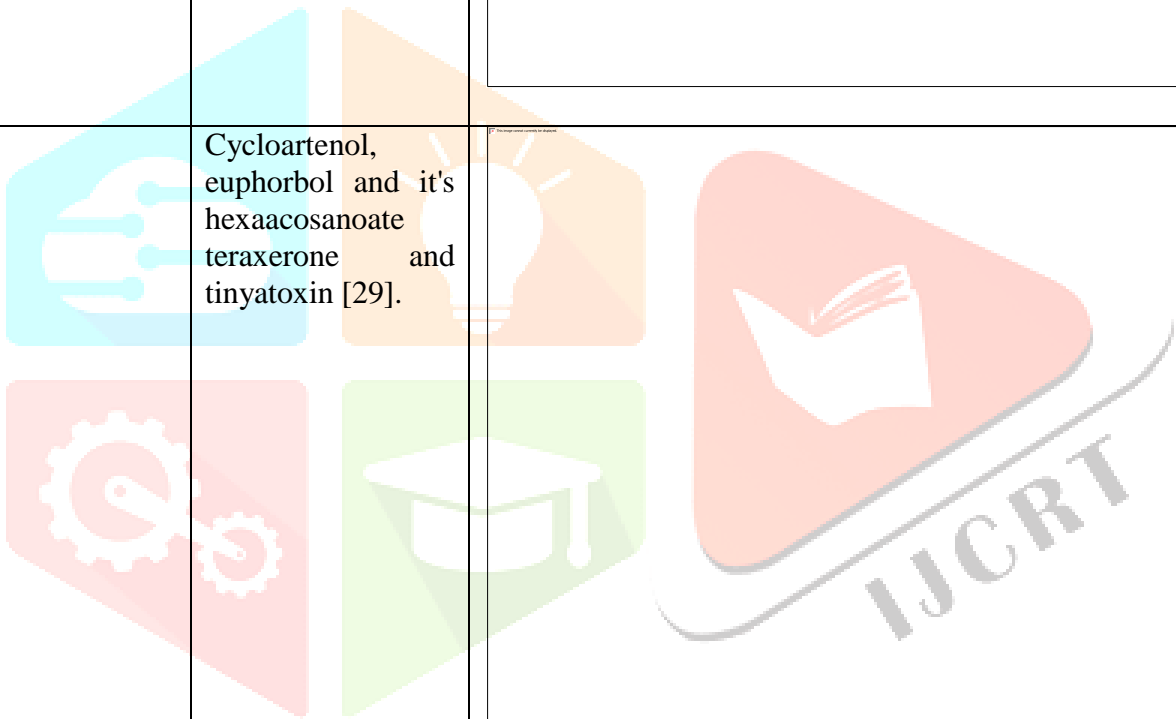


The active phytochemical constituents of *Ficus recemosa* have been described in the below ,

Part of plant	Phytochemical constituents	Image
Leaf	Sterols, triterpenoids, tetracyclic triterpeneglauanol acetate alkaloids, tannins, and flavonoids[25].	
Stem bark	Glauanol acetate, beta sitosterol leucocyanidin -3-O-D-glucopyranacoside, leucopelargonidin, alpha Amy lupenol [26] .	

<p>Trunk bark</p>	<p>Upenol sistosetrol and stigmosterol [27] .</p>	<p>,B- and</p>	

Fruit	Glauanol, glauanol acetate, hentriacontane, sitosterol, glauanol acetate, glucose, tiglic acid [28].	
Root	Cycloartenol, euphorbol and its hexacosanoate teraxerone and tinyatoxin [29].	



7. Pharmacological activities:



7.1. Anti-diuretic activity: *Ficus recemosa* bark decoction has been demonstrated to have an Antidiuretic effect at dosages of 250, 500 or 1000 mg/kg body weight. It also reduces urine Na^+ levels and the Na^+/K^+ ratio while increasing urinary osmolarity, representing several modes of action [30].

7.2. Anti-tussive activity: The methanol extract of stem bark was tested for its antitussive potential against a cough induced model by sulphur dioxide gas in mice. The extract exhibited maximum inhibition of 56.9% at a dose of 200 mg/kg 90 min after administration [31].

7.3. Antibacterial activity: The hydroalcoholic extract of leaves was found effective against *actinomyces viscosus*. The minimum inhibitory concentration was found to be 0.08 mg/ml [32].

7.4. Hypoglycemia Activity: Beta sitosterol isolated from stem bark is reported to have potent antidiabetic activity [33].

7.5. Antioxidants and radioprotective activity: In vitro radioprotective potential of the ethanol extract of *Ficus recemosa* (FRE) was studied. Micronucleus assay was used in irradiated Chinese hamster lung fibroblasts cells (V79). Pretreatment with 20 µg/ml FRE prior to 0.5, 1, 2, 3, and 4 Gy-gamma radiation was done.

Significant decrease in the percentage of the micronucleated binuclear V79 cells suggesting its role as radioprotector.

7.6.Hypoglycemic activity: In normal and perhaps alloxan induced diabetic animals, methanolic extract and ficus recemosa stem bark at doses of 200 and 400 mg/ kg reduced glucose level. The action was equivalent to that of conventional antidiabetic medication, glibenclamide (10mg/kg), demonstrating its folkloric claim as an antidiabetic agent [35,36]. Methanol extract of powdered fruits at the dose 1,2,3, and 4 g/kg reduced the blood glucose level in normal alloxan induced diabetic rabbits [37].

7.7.Hypolipidemic activity : Dietary fibre of ficus recemosa fruits induced a clear hypocholesterolemic effect in rats, as it increased faecal excretion of cholesterol and bile acids [38].

7.8.Antidiuretic activity : The decoction of stem bark was investigated for Antidiuretic potential in rats at a dose of 250, 500 and 1000mg/ kg .p.o. It had a rapid onset, peaked at 3h and lasted throughout the study period of 5h and it also caused reduction in urinary Na^+ level, Na^+/K^+ ratio and an increase in urinary osmolarity indicating multiple mechanism of action its Antidiuretic activity [39].

7.9.Anti cancer activity: A researcher proposed that the methanol extract of ficus recemosa produced cytotoxic effect on various hepatic cancerous cells lines like HL-60, HepG2, NCI-H23, and HEK - 293 T. The results obtained from their investigation suggested that the methanol extract produced higher cytotoxic effects on HL - 60 and Hep G2 cells with respect to other used

cell lines with very low (50% inhibitory concentration) IC 50 values [40].

7.10.wounds healing : The stem bark (ethanol extract) had wound healing properties in various wounds models in rats [41].

7.11.Antifertility activity : The extract shows Antifertility about 70% reduction of sperm count, motility, viability and abnormal morphology was determined reduction in weight of reproductive organ and the level of salicylic acid in epididymic and fructose in seminal vehicle the bark extract shows 80% of vaginal contraception.

7.12.Leaf : Antibacterial activity

Introduction : Ficus recemosa linn. is a large deciduous tree distributed throughout India particularly in evergreen forests and moist localities. Ficus recemosa or Ficus glomerata is a widely popular medicinal plant in India and its extracts have been also reported to possess significant various medicinal and pharmacological properties like anti - Cancer, Anti - microbial, and antioxidant activity [42]. A mixture of leaves powdered with honey is used in bacterial infection. A decoction of leaves is used as a douche in 'dysmenorrhea as a wash for wounds and ulcers [43]. Leaf juice is massaged on hair to prevent splitting. Leaf latex is used for boils and blisters and measles [44].

8.Pathophysiology : The discovery of antibiotics revolutionized modern medicine; however, as we progress into the mid -21st century, the prevalence of antibiotics - resistant bacteria is a major threat to public health. The massive and has led to the increased prevalence of multidrug - resistant bacterial strains that present treatment

challenges in the clinical setting [45]. Antibacterial as well as antiviral activity of a molecule is completely associated with the compound that provisionally kill bacteria and virus or slow down their rate of growth, without being extensively toxic to nearby tissues. Most recently discovered antimicrobials agent are modified natural compounds and this modification is done through chemical mode. It will soon be a hundred years since alexander Flemming returned to his London laboratory and discovered penicillin. Since then, antibiotics have shown in calculable mental and material value in saving lives however, along with the antibiotics era, a new threat called antimicrobials resistance emerged which currently limits the successful completion

of the centenary of the antibiotics era [46]. One of the most prevalent food borne pathogens is salmonella, which can be found in numerous food products such as poultry, sea food, and other fresh and processed meats [47]. The modification of titania particles or thin films with metal nanoparticles (first of all, with particles or of noble metals) is commonly used for the enhancement of the efficiency of photocatalysis. The metal deposits generally acts as the sink for photoinduced charge carriers thus promoting interfacial charge transfer reactions. Acne is one of the most common and chronic skin problem in most adolescent and young adults [48].



Pathophysiology of antibacterial activity

9. Sign and symptoms: The symptoms of a bacterial infection will often depend on the location of the infection in the body. However, some common general symptoms include fever, fatigue and swollen lymph nodes .

- Fever
- Chills and sweats
- Swollen lymph nodes
- Skin flushing swelling
- Gastrointestinal symptoms, such as nausea , vomiting, diarrhea, abdominal or rectal pain
- New or sudden worsening of pain
- Unexplained exhaustion
- Headache
- Soreness

10. Treatment :

Most bacterial infections require treatment with antibiotics . The type of antibiotic a doctor prescribed for a particular bacterial infection will usually depend on :

1. The type, severity and location of infection
2. Whether or not the bacterial species is resistant to certain classes of antibiotics
3. Whether or not the person has used the antibiotic before
4. Whether or not the person is allergic to antibiotics or any of their ingredient

11. Bark :

1. Anti- inflammatory activity
2. Hypolipidemic activity

11.1. Anti - inflammatory activity :

11.1.1. Introduction: inflammation is a defense mechanism that enables the body to protect itself

against infection, burn, toxic chemical allergens, or any other harmful stimuli . Inflammation is a substantial reaction to damage , disease or destruction portrayed by heat , redness, pain , swelling and disturbed physiological functions . Enzymes lose their activities since the substrate are able to no longer attach to the active site [49] . Medicinal plants are accepted to be an essential source of new chemical substance with potential therapeutic effects. In recent years, the use of herbal medicine and natural products has expanded because of minimal cost and lesser side effects [50] . Inflammation usually occurs when infections micro- organisms such as bacteria, viruses or fungi invade the body , reside in particular tissues and /or circulate in the body [51,52] . Inflammation may also happen in response to processes such as tissue injury, cell death, cancer, ischemia and degeneration. Mostly both the innate immune response as well as adaptive immune response are involved in the formation of inflammation [53] . Numerous inflammatory mediators are synthesized and secreted during inflammatory responses of different types. Inflammatory substances are usually divided to two main categories: pro- and anti - inflammatory mediators. Nevertheless, some mediators such as interleukin (IL) 12 possess both pro and anti-inflammatory properties [54].

11.1.2. Pathophysiology :

Anti - inflammatory agents are mediators that reduce the production or activities of proinflammatory cytokines and block immune cell trafficking into tissues, hence they may develop to treat inflammation. Non steroidal anti inflammatory drugs (NSAID) such as aspirin and

indomethacin are the most commonly prescribed drugs for arthritis, inflammation, and cardiovascular protection, however they cause gastrointestinal complication such as ulcers and erosions . The pathophysiology of these complications has mostly been ascribed to NSAID'S action on the cyclooxygenase(cox) inhibition and the subsequent prostaglandin (PG)

deficiency [55]. In 1970s and 1980s , under the concept of cytoprotection , extensive researchers have revealed the role of PG in gastric mucosal defense system.



Pathophysiology of anti-inflammatory activity

11.1.3.Signs and symptoms :

The five cardinal signs of inflammation can affect different parts of the body .some signs overlap between body systems.

11.1.3.1.Pain : with both acute and chronic inflammation, inflammatory chemicals can stimulate nerve endings, causing the affected

areas to feel more sensitive [56] . Inflammation can cause pain in joints and muscles. When inflammation is chronic, a person will have high levels of pain sensitivity and stiffness. The inflamed areas may be sensitive to touch.

11.1.3.2.Heat : when inflamed areas of the body feel warm , it is because there is more blood flow

going to them . People with arthritis condition may have inflamed joints that feel warm to the touch. However, the skin around the joints may not have the same warmth . Whole body inflammation may cause fever due to the inflammatory response in the body when it is fighting off an infection or illness [56].

11.1.3.3.Redness: Inflamed areas of body may look red because the blood vessels of inflamed areas are wider than usual [56].

11.1.3.4.Swelling : swelling (edema) is common when a part of the body is inflamed . It is caused by fluid building up in tissues either throughout the body or in the affected area . Swelling can cause pressure on the skin and other tissue, leading to pain [57] . swelling can also occur without inflammation especially with injuries.

11.1.3.5.Loss of function : inflammation may cause loss of function related to both injury and illness . For example, an inflamed joints may not move properly or a respiratory infection causing sings of inflammation in the lungs can make it hard to breathe. Acute inflammation accurse at the onset of injury that lasts for several days . It has two components,

11.1.3.6.The cellular component, in which first line white blood cells (leukocytes and macrophages) are activated and recruited to the site of injury.

11.1.3.7.The vascular phase ,in which blood vessels open (dilate) and tissues swell to accommodate the rapid influx of immune cells and antimicrobial chemicals [58].

11.2.Treatment :

Inflammation does not always require treatment for acute inflammation, rest , ice and good wounds care often relieve the disvomin few days.

If you have chronic information, your healthcare provider may recommend:

- **Supplement:** certain vitamins (vit.A, vit.C , vit. D) and supplements (zinc) may reduce inflammation and enhance repair. For example, your healthcare provider may prescribe a fish oil supplement or vitamins (s) .or you may use spices with anti - inflammatory properties, such as turmeric, ginger or garlic.
- **Non steroidal anti- inflammatory drugs (NSAID'S) :** These over the counter medicines lower inflammation. Your healthcare provider may recommend ibuprofen (Advil R) , aspirin (Bayer R) or naproxen (Aleve R) .
- **Steroid injections :** corticosteroids shots decrease inflammation at a specific joint or muscle. For example, if you have rheumatoid arthritis that affects your back , your healthcare provider may give a steroid shot in your spine. You should not have more than three to four steroid injections in the same body part per year.

12.Fruit:

1. Hypoglycemia activity
2. Anti - oxidant activity

12.1. Hypoglycemia activity :

Introduction

.There are over 400 different tribal and other ethnic groups in India which constitute about 75% of India's population. Tribal , rural and primitive societies have discovered solution for treatment of disease to almost all their pharmacological studies should be conducted to investigate the unexploited potential of this plant. The genus ficus recemosa constitutes an important group of trees with immense medical

value. The Medicinal plants are widely used by traditional medical practitioners for curing various diseases in their day to day practice. In traditional system of medicine, different parts such as roots , fruits, leaves, stem , seeds , latex

, and even whole plant of ficus recemosa (Linn) have been recommended for treatment of gastric ulcers, diarrhea, wounds healing, diabetic, hypertension etc .

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