Exploring The Pharmacological and Phytochemical Profiles of Xanthium Strumarium: Insights from Recent Studies

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***Abstract*—The traditional use of *Xantium stumarium* is been used by many countries like China, India, North America and many other countries in which it grows. In this review we could find out its phytochemical properties like presence of flavonoid, glycosides. *Xanthium strumarium* also show a very good property of anti- bacterial, Anti- Microbial, appetizer, diaphoretic, diuretic, emollient, and sedative, anti- inflammatory and many other medicinal properties that are needed for us. Anatomy of plant is been studied and it is found that each part of the plant shows same or the other medical property that have been used for centuries through traditional Knowledge like Ayurveda in India. Know through advancement in the medical science medicinal properties of *Xanthium strumarium* is been used for public health. By making herbal drugs, its leaf is been used for many pharmacological properties and in this review, we have discussed the extraction method from the leaf and application of the plants and their parts.**

This review connects traditional medicinal knowledge with modern research, highlighting *Xanthium strumarium* as a promising option for future drug development and public health uses in phytotherapy and beyond.

***Index Terms*—Xanthium stumarium Leaves, Anti-bacterial, Therapeutic Effect of leaves, Leaves extract, Medicinal property**

I INTRODUCTION

Herbal medicine is a burgeoning area of wellness that deserves awareness. Plants have performed a key role in sustaining the wellness of people and raising the standards of life for individuals for several thousand years and have provided human as precious ingredients in pharmaceuticals. One of the significant medicinal plants, Xanthium strumarium, is also referred to as cocklebur and is found throughout the continent of North America, China, Brazil Malaysia, and the sultry regions of India. Xanthium is a member of the plant family Asteraceae, which is made up of three species with a single varietal in China and around 20 species elsewhere. X. strumarium is a perennial plant that grows to a height of 20–90 cm. Its stems are upright, frequently branched, and covered with short white hairs that are dispersed throughout the surface. The cauline primarily alternates with the petioles, the leaves are green, and the margins are toothed. Anodyne, cooling, laxative, fattening, anthelmintic, tonic, digestive, antipyretic, appetite improvement, voice, complexion, appetizer, diaphoretic, diuretic, emollient, and sedative are just a few of the many medical qualities of Xanthium strumarium. (Qader, 2022)

The herb Xanthium strumarium belongs to the biggest family of flowering plants, the Compositeae (Angiosperm). The family Asteraceae is so named because the blooms are grouped on inflorescences that resemble stars. Its 950 genera have 20,000 species that grow as climbers, trees, shrubs, and herbs all throughout the world. Sunflower and niger seeds are a natural source of food oil; spinach and artichokes are edible; the complete family is helpful in many ways. Decorative plants include zinnia, marigold, and daisies. Rubber from parthenium is well-known, and oaks are used as building materials. (Sultana, 2019)

Fig.1- Image of Xanthium strumarium plant (Sruthi, 2017)

Phytochemical profile

"Since the plant's leaves are utilized medicinally, a phytochemical examination of the entire plant was conducted. Anthraquinone, cardenolide, leucoanthocyanin, simple phenolics (catechol), and triterpenoids were discovered to be present in the entire plant. The entire plant was discovered to have nine free amino acids. These include proline, valine, isoleucine, glutamic acid, threonine, Dl alanine, argenine mono hydrochloride, and methionine. Alkaloids, anthraquinone, cardenolide, flavonoids (flavonol), leucoanthocyanin, simple phenolics (catechol), and triterpenoids (Bhogaonkar, 2012) were discovered to be present in leaves." Xanthium spinosum (Pandy, 2012) aerial portions have yielded three kaurene glycosides and two sesquiterpene lactone glycosides.

Total Flavonoid Content of the Extract

Flavonoids have been demonstrated to have antioxidant qualities, and their influence on health and nutrition is enormous. Flavonoids work through scavenging and chelation processes. (Gharari, 2017)

The total flavonoid content of the examined extracts was determined using the aluminum chloride method. The flavonoid concentration in the subjects' extracts was assessed using the calibration plot and provided as mg quercetin equivalent per gram of extract. (Gaikwad, 2016)

Sesquiterpenoids and Triterpenoids

Sesquiterpenoids, which are numerous in X. strumarium, perform a number of biological and physiological functions. Sesquiterpene lactones, the major distinguishing feature of plants in the Asteraceae family, exhibit potent antibacterial, antiviral, anti-tumor, and antiinflammatory activities. Triterpenoids are further significant family of biomolecules found in X. strumarium. (Fan, 2019)

II PHENYLPROPENOIDS

Phenylpropenoids are another major active component identified in X. strumarium. This plant has been reported to contain 45 phenylpropenoids. Phenolic acids, particularly chlorogenic acid, are thought to be the most active anti-inflammatory and analgesic compounds, as well as the richest source of organic acids. (Sahoo, 2020)

Lignanoids and Coumarins

In the last few years, various investigations discovered that X. strumarium contains lignanoids and coumarins; in fact, 21 lignanoids and four coumarins have been recognized in this plant. (Jiang 2017).

Macromorphology

Erect, annual under shrubs that reach 20-90 cm tall; the stem is strong, terete, and rough, with short prickly hairs. Leaves are alternating, widely oblong or suborbicular, somewhat broader than long, cordate-cuneate at base, sometimes 3-lobed, irregularly in ciso-serrate sharp, rough with appressed hairs on both surfaces; petioles are broad and hairy. Heads form axillary and terminal racemes, with many sterile/neutral heads concentrated at the stem's apex and fewer fertile heads that are mostly axillary.

Xanthium strumarium is a dicotyledonous plant with a typical anatomy. Here's a breakdown of its main structures:

Stem:

When young, the stem is striate. The epidermis is blotched with anthocyanin. Stomata are confined to anthocyanin-containing regions. Hypodermis is collenchymatous. Cortex is parenchymatous with scattered, tiny resin channels. The endodermis is not defined, and the pericycle is sclerenchymatous in contrast to the vascular bundles. Vascular bundles can be conjoint, collateral, open, organized in a ring, widely spaced, or close together. Because of medullary cell invasion between the series of vessels, most of the bundles' vessels organize in a palmate pattern as they expand. The pith is big and parenchymatous; the cells contain several tiny sphaeraphides. The node is trilacunar and has three traces.

Herbaceous: The stem is typically green and non-woody, indicating its herbaceous nature.

Erect: The stem usually grows upright, allowing the plant to reach sunlight.

Nodes: Points on the stem where leaves, flowers, and branches arise.

Internodes: The segments of the stem between nodes.

Root System:

Taproot: The primary root, which grows vertically downward, is a taproot. This provides a strong anchor and helps in absorbing water and nutrients from deeper soil layers.

Lateral Roots: Smaller roots that branch off from the taproot, increasing the plant's surface area for absorption.

Leaves:

Alternate: Leaves are arranged alternately on the stem, reducing shading and maximizing light capture.

Simple: Each leaf is undivided, without lobes or leaflets.

Lobed: The leaf blades may be lobed, with rounded or pointed lobes.

Margin: The edges of the leaves can be serrated (saw-toothed), dentate (toothed), or entire (smooth). (Cronquist)

Flowers:

Monoecious: Xanthium strumarium has separate male and female flowers on the same plant.

Inflorescences: The flowers are grouped in small, inconspicuous clusters called inflorescences.

Male Flowers: Small, greenish flowers with numerous stamens.

Female Flowers: Hidden within spiny burs, containing a single pistil. (Zheng, 2022)

Fruits:

Burs: The fruits are enclosed in spiny, hooked burs that aid in seed dispersal by attaching to animals.

Achenes: The seeds are contained within achenes, which are dry, one-seeded fruits. (Susan, 1982)

Table 1:-Distribution of chemical compounds

Sr. No.	Different part of the plant	1	2	3	4	5	6
(a)	ROOT	+	-	++	+	+	-
(b)	LEAF	+	-	-	+	-	-
(c)	STEAM	+	+	+++	+	+++	+

1.Alkolides, 2. Anthraquinone, 3. Tannins, 4. Steroids, 5. Saponins, 6. Iridoids. (Chavan, 2021)

Traditional Usages

In North America, China, Malaysia, and Pakistan, X. strumarium is utilized as a traditional medicine. The herb has cooling, laxative, fattening, anthelmintic, alexiteric, tonic, digestive, and antipyretic qualities, according to Ayurvedic tradition. Additionally, it enhances memory, voice, complexion, and appetite. It relieves fever, salivation, epilepsy, leukoderma, biliousness, and fatal bug bite. (Masvingwe,1998) It has been reported that it is used by several Native American tribes to cure constipation, diarrhoea, and vomiting. In China, it is frequently prescribed for headache, ulcers, and issues with the sinuses. (Chopra 1986) It has also been stated that the plant can be used to treat chronic malaria and as an adulterant for D. stramonium. Additionally, they are used topically to treat smallpox and pruritus. The root has febrifuge and bitter tonic properties. The analgesic, antirheumatic, antisyphilitic, appetizer, diaphoretic, diuretic, emollient, laxative, and sedative qualities of both the roots and the leaves make them useful. The plant's preparation has been used to cure tuberculosis, kidney disease, and rheumatism. (Beyatli, 2025)

To stop perspiration, it has also been applied as a liniment to the armpits. Glycosides and phytosterols are among the homeopathically active substances found in the fruits. They are cytotoxic, hypoglycemic, stomachic, antirheumatic, antispasmodic, antitussive, analgesic, antibacterial, antifungal, and antimalarial. Allergy, sinusitis, urticarial, catarrh, rheumatism, rheumatoid arthritis, constipation, diarrhea, lumbago, leprosy, and pruritus are among the conditions they are employed for treatment systemically. (Moerman, 1998)

In earlier times, it has been used for treating abscesses, boils, ulcers, and scrofulous tumors. (Ovalı, 2025). The roots are utilized for curing cancer, the juice of leaves and fruits is supposed to help treat smallpox, and the paste of green, spiny fruits is used to alleviate migraines. (Chopra,1986). In China, burs has been utilized as a sedative, diuretic, and tonic. (Nazish, 2025).

The root's infusion was historically used to help a woman evacuate the afterbirth and to cure leucorrhea and high fevers. Similar to sunflower oil, seeds have a 25–30% oil content and are used to treat erysipelas, herpes, and bladder infections. Tannin is one of the secondary metabolites found in the dried leaves. Yellow dye is produced from the leaves. (Nazish, 2025). The powder was utilized as blue body paint (Moerman, 1998). The dried herb deters weevils from stored wheat grain. X. strumarium is thought to be harmful, although the toxic compounds can be eliminated with washing and cooking (Ullah, 2025). X. strumarium is also considered a hazardous plant in traditional Chinese medicine. It has several harmful effects on the human body. Dizziness, drowsiness, coma, extended tonic seizures, jaundice, hepatomegaly, liver damage, proteinuria, cylindria,

and hematuria are examples of toxic symptoms in humans. (Kumar, 2024)). Many people use the toxic substance that dissolves in water to alleviate sinus congestion. It has not been outlawed by any health authority in any nation, and it is not held responsible for any adverse consequences for Western customers. However, it is a herb that should be studied, as shall be done below. Because of its multi-activity, particularly its antitumor and anticancer properties, the herb receives a lot of attention.

The herb is thought to cause allergies only in autumn, when it is in the pre-fruiting stage (Beyatli, 2025). X. strumarium is categorized as a wind chill or wind damp herb in the most recent edition of Materia Medicas. Currently, it is primarily used to treat allergy-related conditions such as chronic paranasal sinusitis, atopic dermatitis, allergic rhinitis, and chronic eczema. (Alkac, 2025).

Dye: The plant's roots and leaves have been used to produce natural dyes for textiles.

Fish poison: In some cultures, Xanthium strumarium has been used to poison fish.

Pest control: The plant's strong odor has been used to repel insects.

Anmany other usage is there for medicinal application of the leaves that were used we needed it for anti-bacterial, anti-microbial, anti- inflammatory properties. (Moreman, 2009)

III PHARMACOLOGICAL PROPERTIES OF XANTHIUM STRUMARIUM L.

The chemical components of essential oils may be connected to antibacterial activity and purported therapeutic effects, according to phytopharmacological research on the biological activity of essential oils. The most common component of our essential oil, the sesquiterpene β-caryophyllene, has been thoroughly studied due to its many biological characteristics, which include antibacterial, insecticidal, anti-inflammatory, anti-carcinogenic, and local anesthetic effects. (Parveen, 2017); (Alsabah, 2018)

IV ANTIBACTERIAL TEST

The inhibition of bacterial growth was tested using the disc diffusion technique. The filter paper Sartorious stedium 292 was pounded to make the test disc (5mm diameter). This Nutrient Agar medium (HI media approach recommended) was utilized. About 10–10 cc was added to each sterilized petri plate, and it was left to solidify for 15–20 minutes. Six chambers were formed into each petri plate to create the nutrient agar plates for the experiment, which were then labeled with the date, concentration code, and bacteria code name. Using a cotton sponge that had been cleaned, bacterial inoculums were put into petri plates containing solidified media. A well-mixed distilled water test culture was used to dip the cleaned cotton sponge, which was then moved in a Z-shape to distribute it throughout the media. A single sponge was used for each microorganism. Each bacterium underwent seven replications. “The culture plates were let too dry for 5-10 minutes. Then, using sterile forceps, different concentration and control discs were placed in each petri plate and chamber. The plates were then incubated at 37° C for 24 hours. Microbial growth was measured by measuring the diameter of the zone of inhibition (ZOI)”. (Devkota, 2015)

We can also determine the antibacterial properties of Xanthium strumarium leaves by the 'agar well diffusion method' and after that we would find the zone of inhibition and if it gets to a particular mm like 19mm and beyond then we could say that it had exhibited the anti-bacterial activity. (Khuda, 2012)

Antioxidant activity

Chemicals known as antioxidants have the ability to suppress oxidation. At low concentrations, they have been demonstrated to halt oxidant chain reactions, removing the risk of harmful effects. (Sridharamurthy, 2011) Antioxidant activity was measured using the paired diene technique. The observed antioxidant activity demonstrates the plant extract's capacity to inhibit linoleic acid peroxidation, which happens when the dual bond is transformed into an attached diene. In order to create an emulsion in 0.2 M sodium phosphate buffer (pH 6.6), the extract samples (0.01-30 mg/mL) in 100 µL of methanol were mixed with 3 mL of 10 mM linoleic acid (Sigma Chemical Co., St. Louis, MO, USA) in test tubes. The tubes were then left in the dark at 37°C to cause oxidation. 7 mL of 70% methanol in a solution of deionized water was incorporated after 17 hours of incubation, and a Hitachi U 2001 spectrophotometer (Tokyo, Japan) was used to measure the mixture's absorbance at 234 nm in comparison to a blank. The following method was used to measure antioxidant activity: [(ΔA234 of

control - ΔA234 of sample)/ΔA234 of control] × 100 is the antioxidant activity (%). By interpolating using linear regression analysis, the effective concentration at which the antioxidant capacity was 50% reduced was determined to be the IC50 value (mg/mL). Three technical replicates of the studies were conducted. However, ascorbic acid, butylated hydroxyanisole (BHA), and α tocopherol (all from Sigma Aldrich, USA) were used as comparative controls. (Gawad, 2019)

Antifungal Activity

Pyricularia oryzae, Fusarium oxysporum, Sclerotinia sclerotiorum, Alternaria alternate, Botrytis cinerea, and Rhizoctonia solani were among the microorganisms used. The agar-well diffusion method was used to investigate the essential oil's antifungal qualities. Potato Dextrose Agar (PDA) was used to cultivate the fungus that was being studied. Twenty-five microliters of X essential oil were infused into sterile paper discs (6 mm in diameter, Padtan, Iran). The fruit of strumium. On an agar plate that had been seeded, the sterile impregnated discs were put. While Fusarium oxysporum, Sclerotinia sclerotiorum, Alternaria alternate, Botrytis cinerea, and Rhizoctonia solani were incubated for 7-9 days, Pyricularia oryzae was incubated for 12-14 days at 28°C and 70% relative humidity.

Around the paper disc, there was a zone of fungus growth suppression, indicating the antifungal impact. After three repetitions, the results were given as mean ± SD. As a control, the pathogen was grown on PDA without the addition of plant-derived oil. (Ghahari, 2017)

By assessing its zone of inhibition across a range of fungal strains, the antifungal activity of X. strumarium essential oil was ascertained. By evaluating ZOI, all tests will be examined to determine how effectively they demonstrate antifungal action. (Parveen,2017)

Antibacterial Screening

“The essential oil from X. strumarium fruits' MIC and MBC values compared to the examined bacteria were determined using the disk diffusion method. S. aureus and P. syringae subsp. syringae (MIC= 50 µg mL-1) were the most active against R. toxicus (MIC= 25 µg mL-1) subsequent to B. subtilis, P. viridiflava, and P. aeruginosa (MIC= 100 µg mL-1), E. coli, and X. campestris pv. Campestris (MIC= > 100 µg mL-1), in that order.” Gram-negative bacteria's reduced sensitivity to essential oil can be attributed by the hydrophilic barrier that prevents important components from diffusing through their outer membrane. This barrier restricts the passage of macromolecules and hydrophobic substances even if it is not totally impermeable. (Ghahari, 2017)

Antibacterial and Antifungal Activities

All microbes were obtained from the Persian Type Culture Collection (PTCC) in Tehran, Iran. The essential oil was evaluated with three gram-negative bacteria: Klebsiella pneumoniae, (American Type Culture Collection ATCC), Escherichia coli, and Pseudomonas aeruginosa ; three gram-positive bacteria: Staphylococcus aureus , Staphylococcus epidermis , and Bacillus subtilis and two fungi “The disc diffusion method was used to evaluate various amounts of essential oil towards bacteria and fungus for short, bacteria were cultivated at 37°C for 14-24 hours before being converted to 0.5 McFarland standards at A530 nm (108 CFU/mL). Next, 100 µL of microbial preparations (108 CFU/mL) were spread on nutritional agar (Merck) plates (100 mm x 15 mm). After being impregnated with 10 µL of different essential oil concentrations (10, 20, 40, 60, 80, and 100 µg/mL), individual discs (6 mm in diameter) were put on the inoculated agar. For a whole day, all infected plates were incubated at 37 degrees Celsius. Gentamicin (10 mg/disc), ampicillin (10 mg/disc), and ketoconazole (10 mg/disc) served as positive controls for fungi, gram-positive, and gram-negative bacteria.” The negative control was DMSO. The zone of inhibition (mm) was measured to determine the antibacterial and antifungal activities. (Sharifi, 2015); (Zazharskyi, 2024)

Anti inflammatory

We examined the anti-inflammatory properties of a methanol extract of Xanthium strumarium L. semen both in vitro and in vivo as part of our continuous screening program to evaluate the anti-inflammatory potentials of natural compounds. (Kim, 2005) Sneezing, rhinorrhea, and nasal congestion are symptoms of allergic rhinitis (AR), a chronic upper respiratory inflammatory disease, which may also be treated with this.

Anti-epileptic activity

Impact on seizures caused by maximum electroshock (MES) Male and female albino wistar rats weighing 160–220 grams were divided into four groups of six. "Group II was given the standard medication (phenytoin, 25 mg/kg), whereas the first group was given vehicle control (1% w/v SCMC, 1 ml/100 g). Petroleum ether extract of Xanthium Strumarium L. (PEXS) was injected intraperitoneally into Groups III and IV for 20 days at a dose of 250 and 500 mg/kg body weight, respectively. Using an electro convulsiometer, seizures are produced in all groups on the twentieth day. To produce the strongest electroshock convulsions, a 60 Hz alternating current with a 150-mA strength was administered for 0.2 seconds." A drop of lignocaine-containing electrolyte solution (0.9% NaCl) was administered to the rats prior to the application of ocular electrodes.
This reduces the danger of death and enhances contact. The length of time spent in each phase of epilepsy was noted. The number of animals exhibiting the removal of hindleg tonic extension (or elongation less than 90°) was used to calculate the percentage of protection. (Senthil, 2010) (White, HS. Clinical value of animal seizure models and mechanism of action investigations of prospective antiepileptic medicines.

Anti-AR Effect (XM4)
X. strumarium is a conventional medicine commonly used to treat nasal problems, particularly allergic rhinitis (AR). "In current pharmacology, the mechanism of action of X. strumarium in treating AR has been widely investigated. In 2003, WEX was shown to prevent compound 48/80 (C 48/80)-induced systemic anaphylaxis in rats (0.01 to 1 g/kg, p.o.). The way it works may be related to the suppression of histamine and TNF-α generated from rat peritoneal mast cells" (RPMC). (Hong, 2003); (Hong, 2004) WEX (0.25-1 mg/mL) was found in 2008 to alter the immunological and inflammatory responses brought on by pro-inflammatory cytokines. (Zhoa, 2008) In addition, MEX was discovered to have an inhibitory effect on the activation of C 48/80 activated mast cells, and the way it works was linked to inhibiting Ca2+ absorption and histamine release while increasing cAMP in RPMC. (Yan, 2010)
In addition, it was demonstrated that the caffeoylx anthiazonoside (CXT) (5, 10, 20 mg/kg, p.o.) obtained from X. strumarium fruits was effective in reducing the nasal symptoms of ovalbumin (OVA)-induced AR mice by anti-allergic, anti-inflammatory, IgE-down-regulating, and analgesic effects. (Peng, 2014)

Anti-Tumor Effect
Lung, breast, cervical, colon, liver, meningioma, and leukemia cancers have all been the subject of substantial research on X. strumarium's anti-tumor effects, which are also regarded as its key pharmacological characteristics. (Fan, 2019)

Insecticide and Antiparasitic Effects
It has been reported in 1995 that EEXL has antiplasmodial efficacy against Trypanosoma evansi in vitro and in vivo. In vitro, EEXL showed trypanocidal action at doses of 5, 50, 500, and 1000 µg/mL. It also considerably extended the survival duration of T. evansi-infected mice at concentrations of 100, 300, and 1000 mg/kg. (Talakal, 1995) xanthatin was established as the dominant insecticidal active chemical against Trypanosoma brucei brucei, with an IC50 value of 2.63mg/mL and a selectivity index of 20. (Nibret, 2011) With an LC50 of 11.02% (w/w), MEX was found to have both ovicidal and ingestion toxicity against Paralobesia viteana. (Gökçe, 2011) Using the schizont inhibition assay, EEXL's anti-plasmodial activity against Plasmodium berghei was evaluated in 2012. In vitro, it showed good selectivity and significant activity (IC50 = 4 µg/mL). (Chandel,2012) At 1%, 2%, and 4% doses, WEXL was found to have considerable toxicity, repelling properties, decreased fecundity, and adult emergence of the insects, demonstrating particular insecticidal powers against Callosobruchus chinensis in 2014. (Roy, 2014)

"Furthermore, it has been reported that EEX shown anti-nematode action against Meloidogyne javanica in preventing egg hatching and producing mortality among second stage juveniles. (Kepenekci, 2015) MEX's LC50 values against Aedes caspius and Culex pipiens were 531.07 and 502.32 µg/mL, respectively". (Al-Mekhlafi, 2017)

Antidiabetic Effect
When WEX (15 and 30 mg/kg, i.p.) was discovered in 1974, it showed a substantial dose-dependent hypoglycemic effect in normal rats. (Kepenekci, 1974) In 2000, streptozotocin-induced and insulin-resistant rat models were used to examine the antidiabetic

effects of caffeic acid derived from X. strumarium. The findings showed that by increasing glucose consumption, caffeic acid (0.5–3.0 mg/kg, i.v.) can lower plasma glucose levels. (Hsu, 2000) In 2011, it was found that MEXS significantly reduced the risk of diabetes in rats with normal blood sugar levels and rats with hyperglycemia caused by streptazocin at dosages of 100 and 200 mg/kg (p.o., for 30 days). (Narendiran, 2011) In 2013, a study found that methyl-3,5-di-O-caffeoylquinate effectively prevented diabetes complications by inhibiting aldose reductase (AR) and galactitol production in rat lenses. (Yoon, 2013) CFMEXL α-glucosidase enzyme inhibition with an IC50 of 72 µg/mL. (Khuda, 2014)

Another investigation indicated that MEX has a high α-glucosidase inhibitory action, with an IC50 value of 15.25 µg/mL. (Ingawale, 2018)

Antilipidemic Effect

Studies on X. strumarium's antilipidemic qualities have recently been conducted. Swiss albino rats with Triton WR-1339-induced hyperlipidaemia were used to assess the anti-lipidemic effectiveness of CEXR and EEXR in 2011. The findings demonstrated that CEXR and EEXR (200 and 400 mg/kg p.o.) can significantly increase plasma HDL levels while decreasing plasma cholesterol, TG, LDL, and VLDL contents. This may be related to their strong antioxidant activity. (Sridharamurthy, 2011)

Afterwards, in the year 2016, it was found that WEX (570 and 1140 mg/kg, p.o., for 6 weeks) might improve the formation of fatty acid and TG, lowering the quantity of FFA in the blood. This suggests that WEX contributes to the solution of the abnormally high levels of FFA in the blood, which arises from encouraging the retention of extra fat instead of the elimination of extra fat. (Li, 2016)

Additionally, following treatment with WEX (3.7 and 11.11 g/kg, p.o., for 4 weeks), diabetic mice's HDLC levels rose whereas their blood glucose, TC, TG, and LDLC levels decreased. (Li, 2017)

Scolicidal Activity

For scolicidal tests, Echinococcus granulosus protoscolices were isolated from the sick livers of calves killed during the killing process. The Helsinki Declaration served as a guide for ethical animal care. The Smyth and Barrett method was used in this work to extract protoscolices and hydatid fluid. Hydatid fluid had been temporarily transferred to a glass cylinder. After 40 minutes, protoscolices that had settled to the tube's bottom were rinsed three times with regular saline, and their motility was assessed using a light microscope (Nikon Eclipse E200, Tokyo, Japan) to assess their vitality. The protoscolices were transferred to a dark room with regular saline and kept at 4°C.

For 10, 20, 30, and 60 minutes, four essential oil concentrations—2.5, 5, 10, and 20 mg/mL—were investigated. Add 25, 50, 100, and 200 µL of essential oil to test tubes and dissolve it in 9.7 mL of regular saline along with 0.5 mL of Tween-80 (Merck) to produce those concentrations. Stir continuously. For each test, 3 mL of essential oil solution was mixed with one drop of protoscolices-rich solution, stirred gently, and then incubated at 37 °C. (Javad Sharifi-Rad, 2015)

Provision

Animals are poisoned by X. strumarium. Its allergenic qualities are described as modest to strong. A sulphated glycoside known as carboxyatractyloside, which is found in the seeds and in the two-leaf seedling stage, is the toxic component. Although it is generally believed that burs consumption ought to be restricted by physical harm during chewing, toxicosis has been reported in calves that consumed fully developed plants with burs, even though the fully developed plant is thought to be non-toxic.

V CONCLUSION

Xanthium strumarium L. a pharmacological property rich plant that is used in for many things and have many medicinal properties that is very beneficial for us. And many herbal drugs could be made from it and many herbal drugs have been made also. In this review we discussed about the pharmacological property and phytochemical profile of the plant.

Conflict Of Interest

There is no conflict of interest.

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