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A review on wonder herbs: "Smilax zeylanica" and "Smilax china"

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ABSTRACT

"Smilax zeylanica" and "Smilax china", species of the Smilacaceae family, have been Smilacaceae family members have been utilized in classical medicine for their purported therapeutic properties, especially in the treatment of inflammation, pain, and other chronic illnesses. Pharmacological investigations have revealed a wide spectrum of bioactive compounds in these species, including "flavonoids", "saponins", alkaloids, and sterols, which contribute to their pharmacological potential. Both species exhibit notable anti-inflammatory, antioxidant, antimicrobial and anticancer activities. "Smilax china" , in particular, has been studied for its potential to modulate metabolic disorders, enhance immune function, and provide cardiovascular benefits. "Smilax zeylanica" has shown promise in managing conditions such as diabetes, arthritis, and skin disorders due to its anti-inflammatory and wound-healing properties. Moreover, these plants' ability to regulate oxidative stress, inhibit pro-inflammatory cytokines, and promote cell apoptosis highlights their role in managing chronic diseases and conditions related to aging. While the medicinal use of Smilax species holds promise, additional investigation is required to clarify their modes of operation, establish safety profiles, and explore their clinical efficacy. This review seeks to synthesize current knowledge on medicinal properties of "Smilax zeylanica" and "Smilax china", and to propose possible directions for further research into their medicinal applications.

Keywords: Anti inflammatory,anti cancer,anti oxidant, Smilax.

1. INTRODUCTION

"Smilax zeylanica" is a species of perennial climbing shrub in the family Smilacaceae, commonly found in tropical and subtropical regions of Asia, particularly in countries like "India, Sri Lanka, and parts of Southeast Asia". This plant is widely recognized for its traditional medicinal uses and is known for its role in indigenous healing practices. *"Smilax zeylanica"* is characterized by its long, slender stems, which often have thorns, and its ovate to elliptical leaves. The plant can grow in forested areas, often climbing up trees or other vegetation for support. [1]

It goes by several names, including "Ayadi, Tirunamappalai, Periyakanni, Karuvilanchikudam, Kaattukkodi, Malaitthamarai, Jangaliaushbah, Bhitura, Kumarika, and Ramdatun, Kumarilata in Hindi,Chopachinee and Vanamadhusnuhi in Sanskrit. Gholbel, Guti, and Gutwel; Cherunchakayagavalli, Kalthamara, and Karivilanti in Malayalam Kannada: Kaaduhambuthaavaare, Kummeritheega, Kondadantena, Kondagarbhathige, Konda, Sithapa, Gurivatheega, Kondathaamara, Kummarabaddu, and Kushtaptamara are Telugu terms; Kumarika."[2].

The little creeper known as "*Smilax china*" is native to southern China and has been used for a very long time. "Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Tripura, Nagaland, and Sikkim" are among the regions of India where

it may also be found. The perennial herbaceous climber "*Smilax china*" is distinguished by its stiff, often thorny stems and glossy, dark green leaves. It typically grows in forested areas, climbing on nearby trees or shrubs for support.[3]

2. PHYTOCHEMISTRY OF *"Smilax zeylanica"*and*"Smilax china"*

Phytochemical evaluation of "*Smilax zeylanica*" roots and rhizomes showed the existence of "alkaloids, carbohydrates, phytosterols, fixed oils and fats, phenols, tannin, "flavonoids", proteins and amino acids, "saponins", gum, mucilage, alkaloids, triterpenes, steroids, and phenolic compounds".[4] *Smilax china* is of great interest to phytochemistry researchers. Numerous chemical components from *Smilax china* have been isolated and identified thanks to the quick development of detection and separation technology; they include amino acids, polyphenols, "flavonoids", polysaccharides, and "saponins". The most bioactive of them are the steroidal "saponins" found in *Smilax china*.
Furthermore, as study progresses, there is a growing spate of chemical investigations on *Smilax china*'sleaves, blooms, stems.Lipids, organic acids, and amino acids are among the many nutrients plentiful in this plant. It contains seven different kinds of amino acids that the human body needs, as well as Histidine, an important amino acid for the developing fetus. [5]

3. PHARMACOLOGICAL POTENTIALS OF *"Smilax zeylanica"* and "*Smilax china"*

Pharmacological studies of "Smilax zeylanica"

Anti epileptic action:

Working with extracts of ethanol and water "*Smilax zeylanica*" Madhavan, Varadharajan et al. verified the anti-epileptic effect of "*Smilax zeylanica*" aqueous extracts by administering the extracts orally to the rats that are deprived in night at concentrations of "30, 100, 300, 1000, and 3000" mg/kg body weight. For the first three hours after the extract was administered, the animals were attentively observed for any negative effects, including augmented movements, salivary flow, abrupt tremors, unconsciousness and death. Aqueous extract's The effect on the extensor phase showed a dependency on the dose. When compared to the control, both extracts and "*Smilax zeylanica*" dramatically shortened recovery time ($p<0.001$). None of the groups had any recorded deaths. Giving extracts of ethanol and water based extracts of "*Smilax zeylanica*" at a dosage of 600 mg/kg an hour before the pentylenetetrazole injection greatly shortened the recovery time in seizures caused by pentylenetetrazole($p<0.001$). [6]

Anti pyretic activity:

Prabhat Kumar Jena and colleagues explored into The extracts of "*Smilax zeylanica*" in "petroleum ether, ethyl acetate, n-butanol, and ethanol" were examined at 200 mg/kg dose for each group. A control group was given regular saline water. The standard medication for the antipyretic activity investigation was paracetamol. Rats with pyrexia produced by Brewer's yeast were used to test the anti-pyretic properties of the simple extracts of "*Smilax zeylanica*". The control group was given 0.3 ml of regular saline (5 ml/kg), whereas the other groups were given 200 mg/kg i.p. of "petroleum ether, ethyl acetate, n-butanol, and ethanol extract". 100 mg/kg body weight of paracetamol equipped as the conventional medication. [7]

Analgesic activity:

The study by Bhabani Shankar Nayak et al. was expanded to evaluate the analgesic effectiveness of several "*Smilax zeylanica*" leaf extracts using methanol, petroleum ether, and chloroform as solvents. Each experimental model group received a single dosage of "*Smilax zeylanica*" extracts (100 mg/kg). In the tail immersion model, aspirin was administered as the standard treatment at a concentration 10 mg/kg body mass of the mice's body mass. The analgesic activity was assessed using the tail immersion method.Here, the animals' agonizing reactions were induced by a thermal stimulus, which involved plunging their tail tip into hot water. It is essential to note that, considering the fact that different elements were extracted using different solvents according to their polarity, the methanolic extract works better than the other three extracts. This extract's significant activity supported the traditional medicines' recommendation that it be used to alleviate pain.[8]

Anti helminthic activity:

Bhabani Shankar nayaket al. explored the anti-helminthic activity of "petroleum ether, diethyl ether, chloroform, and methanolic extracts" of "*Smilax zeylanica*" in different concentrations (10, 50, and 100 mg/mL) in each group. As a control, normal saline was chosen. Piperazine citrate served as a standard in the anthelmintic activity investigation. "*Smilax zeylanica*" extracts indicated notable anthelmintic action in a concentration based fashion. It was demonstrated that the methanolic extract outperformed the other three extracts.[8]

Anti-inflammatory Activity:

Lakshyajeet Nath and team used carrageenan-induced inflammation in mice's paws to explore the anti-inflammatory actions of ethanolic derivatives of "*Smilax zeylanica*". The effectiveness of two dosages of "*Smilax zeylanica*" ethanolic

extract (“250 mg/kg, 500 mg/kg”) in in vivo anti-inflammatory testing was contrasted with that of the conventional treatment (acetyl salicyclic acid). [9]

Anti microbial activity:

According to Lakshyajeet Nath et al., “*Smilax zeylanica*” has antibacterial action against S. aureus and E. coli at multiple concentrations. While it came to all bacteria, the gentamicin reference displayed the broadest zones of inhibition, while the negative control exhibited smallest zones of inhibition. Increased zones of inhibition in the leaf extract of "*Smilax zeylanica*."At concentrations of “4 mg/disc, 2 mg/disc, and 1 mg/disc”, respectively, the leaf extract of "*Smilax zeylanica*" demonstrates its increased effectiveness against S. aureus and E. coli. “*Smilax zeylanica*” leaves have been demonstrated to have potent antibacterial properties. Excellent antibacterial properties were demonstrated in "*Smilax zeylanica*" leaves[9].

Preliminary phytochemical analysis “Alkaloids, “flavonoids”, tannins, triterpenoids, and sterols” were found in the extracts of leaves and fruits, according to Prashith Kekuda's T.R. et al. Compared to fruit extract, leaf extract was found to exhibit much stronger antibacterial activity. Bacillus cereus and Salmonella typhimurium revealed the maximum and lowest susceptibilities to extracts, respectively. When compared to fruit extract, leaf extract inhibited test fungus the most. Bipolaris species were more susceptible to extracts than Aspergillus niger. In a dose-related manner, both fruit and leaf extracts indicated ferric reducing potential and scavenged 2,2 diphenyl-1-picrylhydrazyl radicals. Leaf extract was more effective than fruit extract at stopping DPPH radicals (IC50 value: 35.85µg/ml), with an IC50 value of 20.80µg/ml.[10]

Anti fungal activity:

Kekuda Prashith T.R. et al. gazed into Using the poisoned food technique, the ability of “*Smilax zeylanica*” extracts of leaves and fruits to suppress seed-borne fungus was evaluated. The test fungi's mycelial growth was significantly inhibited when the medium was poisoned with the extracts. Fruit extract was less effective than leaf extract, but both extracts slowed fungal growth to almost the same degree. The test funguses were inhibited by both extracts to a degree of greater than 50%. When compared to A. niger, Bipolaris sp. was more sensitive among fungi .[10]

Anti oxidant activity:

Prashith Kekuda T.R. et al. employed the DPPH assay to investigate the possible scavenging ability of “*Smilax zeylanica*” leaf and fruit extract. Both fruit and leaf extracts demonstrated concentration-dependent “DPPH radical scavenging”, with the leaf extraction displaying the maximum scavenging activity (IC50 value 20.80µg/ml) in contrast with the fruit extract (IC50 value 35.85µg/ml). Between 25 µg/ml for leaf extract and 50 µg/ml for fruit extract,, a scavenging activity of greater than 50% was noted. More than 90% of DPPH radicals were scavenged by both extracts at the maximum concentration (200µg/ml).[10]

Anti obesity activity:

The pharmacological screening of “*Smilax zeylanica*”“cyclohexane extract, ethyl acetate extract, and methanolic extract” was carried out by Rosaline Mishra et al. Studies on acute toxicity were carried out in a range of animal species. Obesity induced with diet was examined, and plasma samples were examined for a number of biochemical parameters, including “glucose, lipid profile (cholesterol, TG, HDL, LDL, and VLDL), and liver function tests (SGPT, SGOT)”. Rats fed CD exhibited elevated serum triglycerides, total cholesterol, and HDL levels, while oral administration of “*Smilax zeylanica*” extract of methanol greatly suppressed the rise of lipid profile as well raised HDL levels .[11]

Anti thrombolytic activity:

According to this study's findings, “*Smilax zeylanica*” extracts have shown promise in clot lysis via regulating the synthesis of autoantigens. These extracts can help prevent membrane lysis and protein denaturation provides a percentage summary of the thrombus breakdown outcomes using the extract of chloroform and methyl alcohol extracts of various “*Smilax zeylanica*” sections, with water serving as the negative control and streptokinase as the positive control. The clot lysis rate of the positive control, which included 100 µL of 30,000 IU streptokinase, was 76.15 ± 1.94 percent. [12]

Anti arthritic activity:

The highest anti-arthritic activity was found by Raman, Md. Samsur et al. using leaf, stem, and roots methanol extracts of *S.Zeylanica* are to be “52.38 ± 2.12, 32.24 ± 1.45, and 24.71 ± 1.76”, and by “chloroform (CHCl3) extracts of stem, root, and leaf samples” to be “34.92 ± 1.28, 33.02 ± 0.81, and 30.32 ± 0.66” at 500 ppm, respectively. However, diclofenac sodium, the standard, displayed anbustle of “85.10 ± 0.45” at the same ppm.[12]

Pancreatic Lipase Activity:

Pancreatic lipase inhibition is a well-established feature of phytochemicals derived from “flavonoids” and phenols, according to Rosaline Mishra, Divya Juyal, and Sadish Kumar Shanmugham. Porcine lipase activity was measured further. In an experiment for the inhibition sof pig pancreatic lipase, the extracts demonstrated a dose-dependent effect. Cyclohexane extract (SZC) inhibition percentages were 37.52%, 54.44%, and 77.07 at the maximum dosage of 200 µg/ml.[13]

Neuroprotective activity:
K. Premalatha, P. Researchers lead by Muralidhar Reddy established the non-cataleptic efficiency of *Smilax zeylanica*'s ethyl alcohol root extract by investigating behavioral and biochemical markers in rats with haloperidol-induced catalepsy. Male albino rats administered haloperidol at a dose of 1 mg/kg exhibited catalepsy. Compared to the haloperidol group, all medication-treated groups demonstrated a significant reduction in cataleptic scores, with the group that received Smilax zeylanica at a dose of 500 mg/kg exhibiting the most pronounced decrease. Assessments combining cognitive and metabolic tests found that Smilax zeylanica alleviated catalepsy induced by haloperidol administration in mice. Haloperidol's antioxidant properties facilitated the reduction of oxidative stress and catalepsy resulting from its administration. [14]

Mosquito repellent activity:
Balamurugan Chandramohan, Kadarakarai Murugan et al.According to the percentage of protection in relation to dose, the deterrence of "*Smilax zeylanica"* extracts against "An. stephensi, Ae. aegypti, and Cx. Quinquefasciatus" was assessed.Extracts of leaves of *"Smilax zeylanica"* in p.ether, acetone, and ethanol have adulticidal efficacy against adults of Ae. aegypti, Cx. quinquefasciatus, and An. stephensi. It has been shown that *"Smilax zeylanica"* leaf extracts may knock down mosquitoes after exposing them to varying amounts of paralysis and inactivity. The study's findings indicate that the "*Smilax zeylanica*" leaf extract offered the highest defence against bites from "An . stephensi, Ae. aegypti, and Cx. Quinquefasciatus" three solvent extracts were examined ("p.ether, acetone, and ethanol").An increased dose of 1.5 mg/cm2 offered 100% protection for 210 minutes.[15]

Cyto toxic activity:
Muhammad Nasir Uddin and colleagues found that in their evaluated models, "Smilax zeylanica" stems methanolic extract demonstrated more effective antioxidant properties than the petroleum ether extract; however, the petroleum ether extract displayed higher cytotoxicity.Determining the structure of the cytotoxic chemicals contained in this plant is critical because the extracts have demonstrated a stronger ability to battle breast cancer cell types.This might help uncover new molecules for the treatment of breast cancer.[16]

Anti lipidemic activity:
Using in vitro and in silico techniques, Rosaline mishrametabolomically profiled the extracts of *"Smilax zeylanica"* roots and searched for possible anti lipidemic chemicals. Using spectroscopy and chromatography methods like GC-MS and HPLC, metabolomic study showed that the roots of*"Smilax zeylanica"* comprises a variety of metabolites, including "flavonoids", phenolic acids like gallic acid, chlorogenic acid, and quercetin, along with numerous other potent phytochemicals.. The HMGCoA reductase and pancreatic lipase experiments conducted in vitro demonstrated that the root extract of *"Smilax zeylanica"* had strong inhibitory potential, akin to that of the conventional medications atorvastatin and orlistat, respectively. Plenty metabolites found in *"Smilax zeylanica"* roots, such as "quercetin, kaempferol, gallic acid", etc., have been shown through molecular docking experiments to bind to the HMG-CoA reductase enzyme, which is crucial for the synthesis of cholesterol. [17]

The proven pharmacological potentials of *Smilax zeylanica* are depicted in figure-1

4. PHARMACOLOGICAL POTENTIALS OF *"Smilax china"*

Anti-inflammation activity:
By suppressing the COX-2 activity and TNFa generation caused by "lipopolysaccharide (LPS) in murine peritoneal macrophages", *S.china's* anti-inflammatory properties were examined. The nine compounds suppress the generation of PGE2 generated by LPS in mice peritoneal macrophages at a closing dose of 105 Moles at the following rates: 76.1%, 78.5%, 75.9%, 82.0%, 59.1%, 82.5%, 81.5%, 76.5%, and 81.7%, respectively. The positive control in this study was indomethacin.According to the results of this initial screening, each compound significantly inhibited COX-2.[18]The test for carrageenan-induced hind paw swelling was conducted. Carrageenan-induced paw swelling was notably diminished by SA (Sieboldogenin) treatment in a dose-dependent manner. [19]

Anti microbial activity:
In order to evaluate the prospects of *"Smilax china"* L. root extracts for use in skin care, Joo, Ji-Hae et al. looked into the antibacterial qualities of these extracts against C. acnes. It is known that the phenolic chemicals included in extracts of *"Smilax china" L*. exhibit a range of antibacterial properties. The antibacterial activity can be greatly increased by the synergistic action that has been noted for numerous phenolic compounds.[20]

Action on gut-liver axis:
For 12 weeks, Xin Li, Lulu Chu, et al. randomly assigned C57BL/6J mice to seven groups: "normal chow (NC), HFHS, Orlistat, *S.china* extract, and low-, medium-, and high-doses of SCF". Mice's body weight, liver weight, and blood levels of inflammatory cytokines and lipopolysaccharide (LPS) were measured. Supplementing with *S.china* Flavanoid

decreased body weight growth, liver and adipose tissue indices, decreased serum levels of TNF-α, IL-6, and LPS, and raised adiponectin and IL-10. The findings demonstrated that *S.china* Flavonoid efficiently reduces HFHS-induced inflammation by inhibiting the group of bacteria that produce lipo polysaccharides and pro-inflammatory bacteria .[21]

Vasodilatory activity:
In their work, Clement Okraku Tettey et al. sought to comprehend the fundamental biochemical mechanisms in vascular relaxation and the pharmacological impact of *"Smilax china"* Linn. Water extracts (SCLWE). We used phenylephrine (PE) to pre-constrict isolated rat aortic rings. The inclusion of *S.china* Water Extract cumulatively came next. Before constriction with PE, endothelium-intact aortic strips were pretreated to investigate the effects of PI3K/Akt and endothelial nitric oxide on the vasodilation elicited by *S.china* Water Extract. Following the application of water extract of *S.china* to PE (1 lM)-pre-contracted aortic strips, wortmanin and L-NAME reduced the endothelium-dependent relaxation that was induced. These results suggest that *S.china* water extract produces vasodilatation via using PI3K/Akt-dependent eNOS phosphorylation to increase NO generation in endothelial cells.[22]

Anti diabetic activity:
B.G. Solomon Raju and associates assessed aqueous, alcoholic, and petroleum ether extracts of "*Smilax china*" roots and their effects when taken orally. In rats with alloxan-induced diabetes, experimental research shows that oral regimen of 200 mg/kg of aqueous, alcoholic extracts from "*Smilax china*" roots for seven days significantly reduced blood glucose levels. There is virtually little anti diabetic action in petroleum extract.[23]

Anti obesity Activity:
Following its separation from the "*Smilax china*" L. rhizome., SCLPolyphenols[SCLP] was identified using "liquid chromatography tandem mass spectrometry (LC–MS/MS)". After that, for 12 weeks, C57BL/6J mouse were fed the "Chow diet, HFHS, and HFHS supplement with *S.china* polyphenols or Orlistat". The "flavonoids" and phenolic acids were typically present in polyphenols of *S.china*. *Smilax china* polyphenols therapy effectively decreased inflammation, body weight, fat buildup, and blood and liver lipid concentrations while also improving glucose tolerance. Additionally, the overall prevalence of Desulfovibrionaceae, Lachnospiraceae, Streptococcaceae, and Firmicutes to Bacteroidetes was dramatically reduced by *S.china* polyphenols. Findings showed that SCLP could be employed as a possible agent to shield HFHS-fed mice against obesity and associated metabolic disorders. [24]

Wound healing and skin barrier property:
For the first time, Nilika Bhattachary et al. demonstrated how epidermal BCL11A functions in vivo to preserve adult epidermal homeostasis and to inhibit the healing of cutaneous wounds. The keratinocyte proliferation and differentiation program is enhanced when Bcl11a is conditionally ablationated in skin epidermal keratinocytes (Bcl11aep−/−mice), indicating that Bcl11a essential for preserving "epidermal homeostasis" of adult mouse skin. The Bcl11a knockout mouse, which is specific to the epidermis, is used as a model to obtain a mechanistic knowledge of the different downstream processes that converge to the phenotype of rapid healing after its deletion .[25]

Anti oxidant activity:
Si Eun Lee and associates this study looked into the potential antioxidant properties of *"Smilax china"* extract from root. Methyl alcohol extract (Me) demonstrated good "1,1-diphenyl-2-picrylhydrazyl (DPPH) free radical scavenging activity (IC50 7.4 µg/ml) and cell viability protection". The "ethyl acetate, butanol, and water" extracted fractions reported raised levels of activity to remove free radicals after further fractionation using different solvent extraction and testing. Furthermore,When V79-4 cells were treated with "*Smilax china*" root, the activities of "glutathione peroxidase, catalase, and superoxide dismutase" arose in the presence of doses between 4 and 100 µg/ml. The data recommended that the therapeutic ingredient in *"Smilax china"* root extracts also have antioxidant properties. [26]

Anti cancer Activity:
Researchers led by San Fu investigated the in vitro effects of SCR extracts on human lung adenocarcinoma A549 cells. The effects of total saponins, flavonoids, and tannins on A549 cell growth were studied using the CCK-8 assay. Flow cytometry analysis showed that total flavonoids and tannins from SCR induced apoptosis in A549 cells in a dose-dependent fashion. At a given dose, the overall amount of tannins led to a greater total apoptosis than the overall amount of flavonoids. The concentrations of total saponins, total flavonoids, and total tannins were found to suppress the growth of A549 cells in a dose-dependent fashion relative to the control group. The viability of the cells decreased to 89.57%, 72.73%, and 49.51% after being treated with 75 µg/ml of total saponins, total flavonoids, and total tannins for a period of 24 hours, respectively. Their inhibitory effect became significant at the concentration of 50 micrograms per milliliter. [27]
Wu et.al, demonstrated the potential interaction between the active medicines and the protein Hsp90α, which was evaluated by integrating transcriptome, proteomics, and docking, using microscale thermophoresis (MST). We have also shown that Hsp90α can interact with Fatty Acid Synthase (FASN) and Vinculin. Meanwhile, 'scopolin' could potentially influence the relationship between FASN and Hsp90α. Research on animals suggests that Scoprin could exert an

anticancer effect by influencing the stability of proteins associated with tumors. The findings suggested that scopolin can interact with Hsp90α, thereby blocking protein interactions which in turn could hinder cancer progression.[28]
Wu Li-Sheng and colleagues, using bioassay-guided screenings, isolated three fractions and six polyphenolic compounds from *Smilax china* L. roots and tubers. Through spectroscopic methods and comparison with existing literature, the complex structures were dogged. The purified compounds were evaluated for cytotoxicity and apoptosis in breast tumors. Following a “bioassay-guided separation of the ethyl acetate extract polyphenols” were recovered, and their cytotoxic properties against breast tumors were examined. With “IC50 values ranging from 2.1 to 38.9 g/mL”, they demonstrated anti-tumor effects against “MCF-7 and MDA-MB-231” and the ability to trigger apoptosis in both of these cells. [29]
It was discovered that the root extraction of "*Smilax china*" repressed "G6PD at a final dose of 4 lg/ml with an IC50 value of I.397 lg/ml” in this work by Lubna Kanwal, Shaukat Ali, et al., following screening of the plant extracts library. We used an enzymatic assay-based screening strategy to find plant extracts that could decrease G6PD. The screening process exposed that *“Smilax china”* root extract may be a G6PD inhibitor. research that shows *“Smilax china”* 's anti-cancer potential against HepG2 cells through G6PD inhibition. *“Smilax china”* root extract was found to be harmless in mice's acute and sub acute toxicity tests., through in silico screening, "*Smilax china*" was found to contain Multiple G6PD modulators Scirpusin A, Smilachinin, and Daucosterol.[30]

Anti colitis activity:
Xin Li and colleagues investigated the potential of the "Smilax china" polysaccharide to prevent ulcerative colitis in mice induced by dextran sulphate sodium. Specifically, they isolated three polysaccharides (SCP C, A, and N) from "Smilax china" L. using a process involving hot water extraction, ethanol precipitation, deproteinisation, and separation via DEAE-cellulose column chromatography. A 3% w/v solution of DSS was administered to drinking water for a period of one week with the intention of inducing acute colitis. The medication "Sulfasalazine, SCP-C, SCP-A, and SCP-N" was administered via gavage over a period of nine days. The decline in the "disease activity index" was associated with lower spleen weight, longer colon length, and enhanced colonic histology, suggesting that SCP-C, SCP-A, and SCP-N could effectively alleviate symptoms. Furthermore, in colon tissues, SCP-C, SCP-A, and SCP-N reduced levels of malondialdehyde, nitric oxide, myeloperoxidase, and pro-inflammatory cytokines, while increasing serum glutathione levels. Studies have revealed that the polysaccharide from "Smilax china" L. offers a highly effective treatment strategy for ulcerative colitis in mice, which involves decreasing oxidative stress, regulating levels of inflammatory cytokines, and altering the composition of gut microbiota.[31]

Anti Parkinson’s Activity:
The group administered 200 mg/kg "Smilax china" extract showed significantly reduced motor impairment, as evidenced by a catalepsy score of 17.061.74/s, in comparison to the group treated with rotenone, which had a catalepsy score of 67.593.27/s. Analysis of biochemical data showed an imbalance in groups treated with rotenone. Research indicates that animals administered with 100 and 200 milligrams per kilogram of Smilax china ethanolic extract exhibited enhancements in mass, movement, and motor functions, in addition to a reduced likelihood of cerebral palsy. The group receiving *"Smilax china"* 200 mg/kg extract had substantially fewer motor defects as shown by the catalepsy score (17.061.74/s) than the group induced by rotenone (67.593.27/s). Levels of superoxide dismutase (SOD) increased to 5.440.01 units/mg protein in comparison to 2.050.104 units/mg protein in the rotenone-induced group, thereby providing the brain with additional protection against oxidative stress. Decreased inflammation and enhanced alpha-synuclein breakdown were observed in the vagus nerve, substantia nigra, and basal ganglia of the treated groups. Research indicates that administering an ethanolic extract of Smilax china bark to male Wistar rats with Parkinson's disease results in significant neuroprotective effects and a substantial antioxidant response. **[**32]

Inhibiting osteoclastogenesis:
Zhou et al. found that A furostanol saponin called chongrenside D (CGD) is taken from "*Smilax china*" L. The levels of inflammatory cytokines were measured using an ELISA technique.CGD inhibited bone resorption activity by dramatically preventing RANKL-induced osteoclast growth, lowering osteoclast marker expression, and preventing the formation of actin rings. In addition to restricting osteoclast marker expression and actin ring formation, CGD significantly stopped RANKL-induced osteoclast development, which in turn decreased bone resorption activity. CGD attenuated inflammation related cytokines Interleukin-6 and Tumor Necrosis Factor-α, strengthened joint bones, and diminished TRAP-positive staining.[33]

Regulating hepatic fat metabolism:
Li and her team explored the positive outcomes of "SCP" on liver fat metabolism and gut microorganisms in rats suffering from nonalcoholic fatty liver disease caused by a high-fat diet. SCP was derived from extracting and purifying the rhizome of Smilax china L. Six cohorts of C57BL/6J mice were established: Simvastatin was given to mice which had been fed a high-fat diet and received different SCP doses - low, medium and high - for a duration of 12 weeks, with a control group fed a regular chow diet. Measurements of lipid levels in the liver and serum were taken, in addition to weighing the body, liver, and other adipose tissues. Proteins and genes associated with hepatic fat metabolism were identified utilizing Western blot and RT-PCR. The weight gain resulting from a high fat diet (HFD) in the body, liver, and other adipose

tissues was effectively reversed by the treatment with SCP. Significant decreases in both serum and liver lipid levels were observed following administration of SCP. Data from Western blot and RTPCR analyses revealed an enhancement of genes and proteins linked to lipolysis, concurrently with a suppression of those involved in lipogenesis.[34]

Effect on skin cancer cells:
Si-Yeol Song, Min-Yeong Jung, and colleagues aimed to explore the effect of "*Smilax china*" L. (SCL), which has anti-inflammation, antioxidant, and cyto toxic activities, on the proliferation of skin cancer cells. "*Smilax china*" L. ethanol extract was applied to HaCaT cells, a normal human cell line, and skin cancer cells (A431, SK-MEL-5, and SK-MEL-28) at concentrations of 5, 10, 20, and 40㎍/㎖. Additionally, JB6 Cl41, a normal mouse epithelial cell line, was treated with "epidermal growth factor (EGF) and phorbol 12-myristate 13-acetate (TPA)", an inflammatory agent, to promote cell transformation, then treated with *S.china* ethanol extract. We further confirmed the decrease in Cyclin B1 expression and increase in p27 expression associated with the "G2/M phase of the cell cycle through western blot analysis. Flow cytometry analysis confirmed that ethanol extract of S.china induced cell apoptosis". Furthermore, through Western blot analysis, it was observed that here was evidence of cleaved-caspase-7, which is related to apoptosis, increased. Finally, it was confirmed that the expression of COX-2, an inflammatory marker protein.[35]

Anti hyperuricemia effect:
Mingen Yan, Xiaoman Zheng and his colleagues confirmed the anti hyperuricemic effect of "*Smilax china*" extract using hens fed with high calcium,high protein diet a model for hyperuricemia. Working on This model showed that "*Smilax china*" extract dramatically lowered the serum uric acid levels thus improving renal function. In addition, S.china was capable to suppress the Xanthine Oxidase both in vitro and in vivo ,minimizes uric acid levels. As thus, findings imply that S.china may be a potential anti-hyperuricemia agent[36].All the possible potentials of *Smilax china* is displayed in the figure-2.

5. TRADITIONAL USES OF *"Smilax china"*:

In Chinese medicine Syphilis, psoriasis, rheumatoid arthritis, gout, urinary tract infections, and energy tonic are all treated using *"Smilax china"* root. Seminal diseases and impotency. Secondary and tertiary syphilis, as well as persistent arthritis. epilepsy as well as schizophrenia. Skin conditions, including pemphigus the condition of osteoarthritis, Leucorrhea Getting rid of numb joints, Diabetes mellitus, and excretory system.
"Syphilis, skin conditions, epilepsy, insanity, flatulence, dyspepsia, constipation, fever, neuralgia, rheumatism, gout, and general debility" are among the conditions for which it is employed in the Ayurvedic, Siddha, and Unani medicinal systems. Decoction of rhizomes and roots used as a depurative for syphilis and herpetism. "Leprosy, scrofula, and numerous skin infections" that progress to ulcers have also been shown to respond well to its therapy. The roots were used to cure burns, pyoderma, and ulcers. [37]

6. TRADITIONAL USES OF *"Smilax zeylanica"*:

The plant has been used historically to treat toothaches, diarrhoea, venereal illnesses, wounds, and piles. The herb is beneficial for a variety of ailments, including "skin disease, pitta, insanity, diarrhoea, colic, vata, syphillis, gonorrhoea, fever, arthritis, leucorrhea, impotence, and general weakness", according to Ayurveda. The rhizomes have a variety of properties, including being tonic, febrifuge, laxative, depurative, thermogenic, anodyne, anti-inflammatory, and bitter. It is used to treat constipation, helminthiasis, colic, gas, and dyspepsia. Psoriasis, leprosy, and other skin conditions can benefit from it. Neuralgia, fever, epilepsy, and insanity are treated with it. It is used to treat general debility, syphilis, strangury, and seminal weakness. purifies blood, aids in absorption, eliminates bacteria, and detoxifies organs. Additionally, it protects the liver, encourages sweating, increases urine, and stimulates digestion.[38].

7. DISCUSSION

Modern changes in lifestyles have resulted in significant alterations to human dietary habits, thereby causing diverse disruptions in individuals' daily lives. The presence of bioactive compounds in these herbs resulted in improved well-being for the people concerned. Smilax china and Smilax zeylanica are two distinctive Chinese plants with significant cultural value, exhibiting a diverse array of biological features. The Smilax china plant's leaves are rich in various bioactive compounds, including polyphenols, flavonoids, and steroidal saponins.
The "*Smilax china"* plant's leaves are a source of phenol compounds including resveratrol and kaempferol, which have been shown to offer anti-obesity advantages by suppressing the formation of adipocytes and decreasing fat production. Studies have found that these compounds possess anti-inflammatory, anti-cancer, anti-diabetic, anti-obesity, and anti-hyperuricemia properties, primarily due to the presence of rutin, kaempferin, and kaempferitrin.
The floral extracts obtained from *Smilax china* contain significant quantities of n-heneicosane and β-sitosterol, which are compounds that can aid in the healing process of wounds. Extracts of *Smilax zeylanica* have been discovered to display a broad spectrum of biological effects, which can be credited to the presence of diverse phytoconstituents such as alkaloids,

tannins, diterpenoids, and sterols;the plant has been verified to possess neuroprotective, antioxidant, skin-healing, anticancer, and cardio-protective properties.
For centuries, a broad spectrum of health problems has been treated with these extraordinary herbs,such as parasitic infections, psoriasis, joint pain caused by osteoarthritis and rheumatoid arthritis, wound healing, and reproductive problems. As a result of their traditional uses, these herbs have had a profound impact on the practice of Ayurveda, Siddha, and Unani.

8. CONCLUSION

In a nut up, "Smilax zeylanica" and "Smilax china" exhibit a range of pharmacological activities, which include hepatoprotective, antioxidant, antibacterial, anti-inflammatory, and potentially anticancer effects. Scientific research indicates that they are traditionally used as a tonic to aid detoxification and reproductive health; further clinical trials are necessary to verify the full extent of their therapeutic benefits. This review may facilitate the unlocking of folk medicine's potential, help alleviate the drawbacks inherent in herbal medicine, and lead to the development of innovative formulations that can be valuable in treating human ailments using nature's gift of greenery.

CONFLICTS OF INTEREST

The authors state that there are no conflicting interests.

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Figure Captions

Fig. 1 The pharmacological potentials of *Smilax zeylanica.*

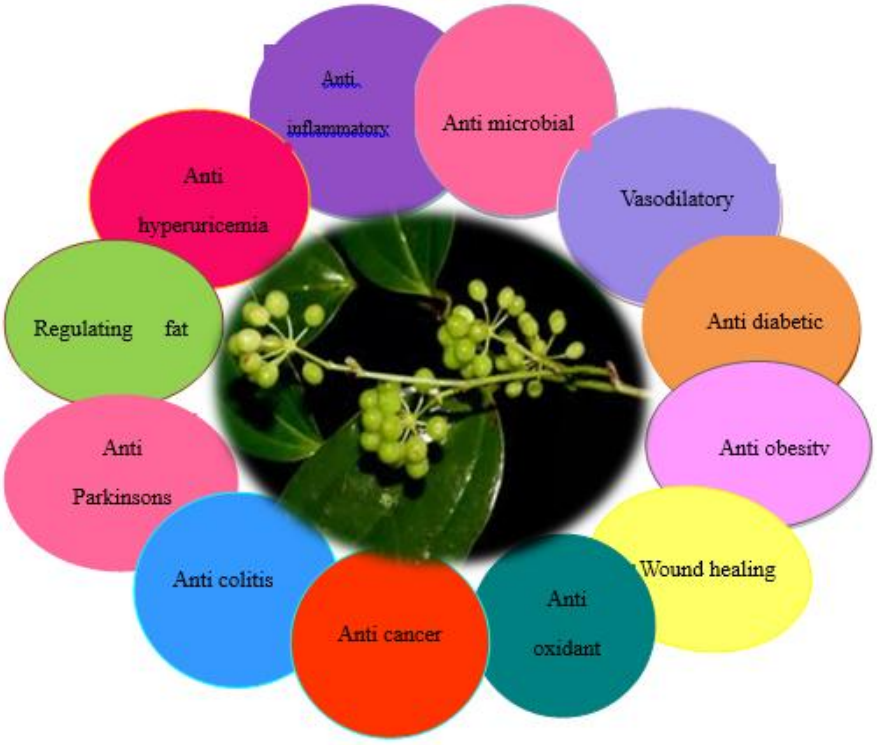

Fig. 2 The pharmacological potentials of *Smilax china.*