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REVIEW ON PORTULACA OLERACEAE (PURSLANE)

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ABSTRACT:-

The globe over is home to this plant. utilized as a wholesome and ethno-medicinal food.- Include proteins, terpenoids, alkaloids, and flavanoids. Moreover, vitamins (A.C.E. (3)) and minerals (P. Ca, Mg, Zn) are present.- The presence of gumma acids and omega-3 fatty acids, particularly lindere à. similar to the skeletal hepatoprotective insomnia protective effect of linoleic acid A mild anti-inflammatory and anti-tumor agent. antioxidant, antitumor, and anti-diabetic. anti-analgesic, protective for the stomach wound recovery. neuro-antiseptic.

Keywords:-

Portulaca Oleraceae Linn., Ethno medical plant , Anti-Oxidant, Anti-cancer, Nutritional value.

INTRODUCTION :-

Usually referred to as purslane.Juss Family: Portulacaceae. South America and Africa: Folk medicine is used to treat a variety of maladies, including kidney and cardiovascular diseases. Indigenous peoples propose that communities use traditional foods and herbal remedies to prevent these conditions. Insect bites can cause vascular diarrhea, headaches, ulcers, and snake-related infections, to mention a few. Purslane included a number of prom hundred different types of metabulites. discoveredgive potential. remarkable outcome on its Pharmacological highest concentration of terrestrial thiones, glutar, tocopherols, ascorbic carotene, and acid 4-3 4-6 includes 12.2 mg of lignin in per 300–400 mg of tocopherol found in leaves. contains 26.6 mg ascorbic B-carotene and 14.8 mg a-linoleic Acid.

Leafs of Purslane

Purslane in natural habitat

ETHNO-MEDICINAL IMPORTANCE OF P. OLERACEAE:-

Medicinal and other types such as Diabetes is bitten by obesity. Snake Parts Used for many diseases of the throat and diarrhea, ulcers, dental decay, and asthma Dysentery and this data are jaundice.Charak Sanhita was mentions a traditional Sanskrit medical system. It employed the Dioscorides text system, which focuses on Chinese and medicine. - Persian Chinese and Indian traditional medicine Medications The Purslane family Here are several examples of the Wary Strong Culmentsnamer Lonna Irke's identifications from Khuria in pulli keerai xian, or traditional khorfeh. Ma chi shou medicine, Loni ox Khurfaa, Tukheme Of Medicinen Sidha System, and Ayurvedic onani system in Chang, Persian In Chinese traditional medicine, cai is used.

PHYTO CHEMICAL RICHNESS OF PURSLANE:-

Rich necessary quantity of acid amino acids in proteins. Leaf & Starch greater detected in the stem level. & fat leaves Fibre yet the content is found outside of the stem. On the Primary Metabolites, they are. rich source, but they also include secondary metabolites such as organic acids, flavonoids, cardiac glycosides, alkaloids, saponins, and tannins. Its numerous biological actions should primarily be attributed to the presence of several bioactive chemicals at different quantities. Numerous bioactive substances have been quantified for the various portions of the purslane. It has been discovered that the purslane flower water extract has a higher phenolic content than the stem and leaves, and that the ascorbic acid and total flavonoid contents are higher in the leaves.Additionally, the leaves have more β-carotene than stem.Purslane is well-known for

having exceptionally high levels of omega-3 fatty acids. The omega-3-fatty acid content of P. oleracea wild genotypes is around 188.48 _ 6.35 mg/100 gm. Consequently, one of the richest terrestrial sources of omega-3-fatty acids is purslane. A total of three species—P. oleracea, P. rausii, and P. granulatostellulata—had 85 metabolites discovered, spanning several families including alkaloids, fatty acids, phenolic acids, and amino acids. This study identified four cyclodopa alkaloids from purslane, namely oleracein A, C, K, and N, as well as methoxylated flavone glycosides, O and C-flavonoids. Apart from the finding of oleraceins A, B, C, N, J, and U that were previously identified, Fernandez-Poyatos et al.

DIVERSE METABOLITES BELONGING TO DIFFERENT CLASS OF :-

Specialised metabolites reported in purslane and their individual bioactivities.

ALKALOIDS:-

Alkaloids are a significant class of chemical substances that exist naturally and have a wide range of functions in medicine and pharmacology. P. oleracea has been linked to several alkaloids, including trollisine, scopoletin, oleraceins, and oleraisoindole. These two novel alkaloids are (3R) Tian et al. identified 3,5-dimethyl-6-phenyl-1,2-dihydro-1,2,4-triazin-3(2H)-one and -3,5-bis(3-methoxy4-hydroxyphenyl)-2,3 dihydro-2(1H)-pyridinone from purslane and found their moderate to high cytotoxic activities against various human cancer cell lines. P. oleracea included three phenolic alkaloids that demonstrated antioxidant activity: oleracein A, oleracein B, and oleracein E. P. oleracea's oleracein E and oleracein L have hypoglycemic and antidiabetic properties. Sun et al. used both in vitro and in vivo models to show the neuroprotective potential of oleracein E. For the first time, soyalkaloid A was extracted from P by Xiu et al.

CATECHOLOAMINES :-

A class of amines known as catecholamines are created by humans as neurotransmitters. Additionally, in stressful circumstances, they are generated in plants where they have a variety of functions, such as growth and development. According to recent research, purslane is a rich source of certain CAs that may have health advantages. One of the most significant catecholaminergic neurotransmitters produced in purslane is dopamine. Purslane leaves have a high proportion of noradrenaline, often known as norepinephrine. Another significant catecholamine from P. grandiflora callus, adrenaline (epinephrine), has been found, according to Endress et al. Other investigations also support the existence of dopamine and noradrenaline in purslane.Nine of the 22 chemicals that Hu et al. discovered in a purslane water extract were discovered to be derivatives of catecholamines.

PHENOLIC ACIDS:-

Plants contain phenolic acids, which are significant specialized metabolites derived from benzoic and cinnamic acids. These are groupings of carboxylic acids that contain phenolic compounds. Many phenolic acids have been reported from purslane, including caffeic acid, p-coumaric acid, ferulic acid, gallic acid, gentisic acid, benzoic acid, and anisic acid. Santiago-Saenz et al. found the presence of caffeic, gallic, vanillic, ferulic, and syringic acids.

FLAVONOIDS:-

Plant flavonoids are a broad class of naturally occurring phenyl chromones that can be found in the fruit, stem, root, and floral sections of plants. Because of their antiviral, antibacterial, anticancer, antioxidative, and anti-inflammatory properties, flavonoids are recognized for a variety of biological roles in humans. Moreover, flavonoids support vascular function and offer protection against coronary heart disease. Purslane contains a number of flavonoids that have been identified, including rutin, apigenin, kaempferol, luteolin, quercetin, isorhamnetin, and kaempferol-3-O-glucoside. Five flavonoids—kaempferol, apigenin, myricetin, quercetin, and luteolin—have been found by Xu et al. by capillary electrophoresis combined with electrochemical detection. In mice, the application of purslane-isolated quercetin resulted in a considerable improvement in learning and memory, indicating its neuroprotective properties.

ANTHOCYANINS:-

Plants contain polyphenolic substances called anthocyanins, which appear as pigments with red, purple, or blue hues. Anthocyanins have been shown to have multiple protective effects against a variety of diseases, making them extremely vital for human health as well. There are several anthocyanins found in purslane that have been identified, including Delphinidin-3,5-glucoside, Cyanidin-3,5-glucoside, Pelargonidin-3,5-glucoside, and Delphinidin-3,5-glucoside.

HOMOISOFLAVONOIDS:-

Another significant class of specialized plants that are present in plants are called homosoflavanoids. They differ from flavonoids in that they have an additional carbon atom, while flavonoids do not, and more than 300 HIFs have been found in plants to date. Their antibacterial, anti-mutagenic, anti-inflammatory, anti-diabetic, and antioxidant properties are well recognized. It is known that the purslane synthesizes a number of significant HIFs. Four HIFs, namely portulacanones A-D, are various portions of purslane. Nemzer et al. found four HIFs, namely three (2-hydroxyl benzyl) 6,8 dimethoxy 4H chromen 4-1 (oleracone J) and three (2-hydroxyl benzyl) 6,8 dimethoxy chromen 4, 1 (oleracone K). These were extracted by Duan et al. Yang et al. discovered oleracone C, a novel HIF. (E)-5-hydroxy-7 methoxy-3 (20-hydroxy benzyl) is another significant HIF.The HM-chromanone, or 4C, that was isolated from P. oleraceae shown protective EF-fate against glucose-induced beta cell death in the pancreas, indicating that it possesses anti-diabetic qualities.

NUTRITIONAL VALUES OF PURSLANE:-

A traditional food plant rich in nutrients, purslane has enormous potential as a nutraceutical. Because purslane contains phytoconstituents that promote health, it is a nutrient-rich plant with potential applications in nutraceuticals.People have utilized it as a traditional food plant all throughout the world. The purslane leaves have a protein content of 23-24%. Purslane has been found to have a higher protein, ash, and fiber content than wheat flour.Purslane has been found to contain significant concentrations of important dietary elements, including calcium, magnesium, iron, manganese, copper, potassium, and phosphorus. Potassium (494 mg/100 g), magnesium (68 mg/100 g), and calcium (65 mg/100 g) are all abundant in it. Findings from Santiago- Saenzet al. According to Santiago-Saenzet al.'s results, purslane also appears to have a considerable quantity of protein, fiber, and inorganic nutrients, including B, P, Ca, Mg, and K, as well as Fe, Cu, Mn, and Zn. Roots were found to have notable levels of total solids by Mohamed and Hussein. various growth stages have various quantities of total solids and protein. Significant differences were seen between growth phases for

total phosphorus, calcium, potassium, iron, manganese, and copper. Vitamins A, C, pyridoxine, niacin, riboflavin, thiamin, α-tocopherol, and pantothenic acid are all abundant in purslane. It has been discovered that purslane possesses more α-tocopherol, vitamin C, and β-carotene than spinach. Antioxidant molecules' presence indicates that purslane consumption may aid in overcoming oxidative stress.

THERAPEUTIC VALUES OF PURSLANE:-

Due to its abundance of valuable phytochemicals, purslane is a herb with therapeutic value. China has thousands of years of history using purslane as food and medicine.Iranian medical texts from antiquity also contain references to the use of purslane for respiratory conditions. Ethnobotanical research indicates that it has had a significant role in traditional medicine practiced by a variety of civilizations worldwide.The pharmacological value of phytochemical composition is also supported by qualitative and quantitative investigation. Because it is significant in many cultures, numerous metabolic investigations have unraveled its phytochemical composition. Using a variety of models, including in vivo experiments and cell lines, scientists have made significant progress in demonstrating the pharmacological potential of this ethno-medicinal plant against a range of illnesses, including diabetes, malignancies, neurological disorders, asthma, obesity, and bacterial and viral infections.Information on the ethnopharmacological functions and characteristics of purslane is provided in the following subheadings.

ANTI-OXIDANT ACTIVITY:-

Purslane's phytochemical makeup suggests that it may have antioxidant capability, and numerous investigations have demonstrated this using a variety of assays (Alam et al., 2021). The antioxidant potential of purslane has been tested in a number of plant components, including the leaves, stem, and flowers. Strong antioxidant activity was demonstrated by the methanolic extract of six Purslane cultivars, as demonstrated by Lim and Quah (2007). Nonetheless, it was discovered that flowers had the highest antioxidant activity and that this activity is associated with higher levels of ascorbic acid, β-carotene, omega-3 fatty acids, and total phenolic content (Siriamornpun and Suttajit, 2010).Because they lower the chance of free radicals damaging cells, antioxidants are crucial for maintaining human health (Korade and Deokule,2015). Purslane's ant-oxidant potential has been the subject of numerous investigations and studies (Alam et al., 2014; Yang et al., 2018; Baradaran-Rahimi et al., 2019; Yahyazadeh Mashhadi et al., 2018). Purslane has a number of chemicals that have been identified and their antioxidant properties validated. For instance, phenolic alkaloids with antioxidant properties included oleracein A, B, and E (Yang et al., 2009). A comparative study between the antioxidant activity of raw and steamed purslane extracts revealed a decrease after steaming (Fernández-Poyatos et al., 2021). Additionally, P. quadrifida aerial component extracts demonstrated DPPH radical scavenging activity (Desta and Cherie, 2018).

MUSCLE RELAXANT ACTIVITY:-

Numerous studies have looked into the muscle-relaxing characteristics of purslane, with encouraging results (Okwuasaba et al., t 1987a,b; Parry as al., 1987a,b; Habtemariam et al., 1993; Parry et al., 1993). Purslane extract's neuromuscular activities and muscle relaxing qualities could be brought on by its increased K+ion concentration (Habtemariama, 1993).

ANTI-CANCER ACTIVITY:-

A major cause of death worldwide is cancer. Work on the prospecting of anticancer drugs against a range of cancer kinds is being done by many researchers worldwide. Many cancer-fighting medications, including taxol , vincristine, vinblastine , paclitaxel, docetaxel, camptothecin, and irinotecan, are derived from plants (Greenwell and Rahman , 2015; Habtemariam and Lentini, 2018). Furthermore, many pharmaceuticals used today also have plant origins.That Purslane likewise has a large number of these significant anticancer compounds is therefore not surprising. The anticancer properties of purslane have demonstrated encouraging outcomes against several forms of cancer. The production of nodules in colon cancer stem cells was found to be inhibited by Purslane extract (Jin et al.2017). In rats and mice, it was similarly successful in treating ulcerative colitis (Huang and Dong, 2011; Kong et al., 2018). In in vivo models, the use of a special polysaccharide component (POP) from Purslane shown anticancer effects (Shen et al., 2012). In vitro and in vivo models of cervical cancer cell growth shown an inhibitory impact for water-soluble Purslane extract (Zhao et al., 2013). Its efficacy against stomach cancer has also been demonstrated (Li et al., 2014). Purslane seed oil significantly reduced cell development and exhibited cytotoxicity against human lung cancer (A-549) and liver cancer (HepG2) cell lines (Al-Sheddi et al., 2015). According to Ye et al. (2015), PCA, which was extracted from Purslane, shown efficacy against acute myeloid leukemia.

ANTI-MICROBIAL ACTIVITY:-

Additionally, purslane is recognized to have antifungal and antibacterial qualities (Elkhayat et al., 2008). According to da Silva et al. (2019), a lectin derived from P. elatior roots exhibited antifungal qualities against Candida albicans, Candida parapsilosis, Candida krusei , and Candida tropicalis in addition to bacteriostatic activity against Enterococcus faecalis, Pseudomonas aeruginosa, and Staphylococcus aureus. According to Lei et al. (2015), cerebrosides like portulacerebroside (A-D) had strong antibacterial activity against enteropathogenic bacteria, indicating their potential utility in the prevention of bacillary dysentery. Purslane extract has been shown by Soliman et al. (2017) to have antibacterial properties against multidrug-resistant bacteria such as Klebsiella pneumoniae and Acinetobacter baumannii, as well as S. aureus, P. aeruginosa, and E. coli. The Purslane extract exhibited antifungal efficacy against Candida albicans in the same investigation. El-Desouky et al. (2021) discovered antifungal activity against A. flavus, A. ochraceus, and A. parasiticus, three species of Aspergillus. According to recent research by Tleubayeva et al. (2021), purslane's carbon dioxide extract has antifungal properties against Candida albicans as well as antibacterial properties against E. Coli, S. aureus, and B. subtilis.

ANTI-INFLAMMATORY AND IMMUNOMODULATORY ACTIVITY:-

Purslane's anti-inflammatory properties have been supported by a number of studies (Li et al., 2016; Meng et al., 2016; Allahmoradi et al., 2019; Miao et al., 2019; Gu et al., 2020; Hu et al., 2021). Purslane has also been shown to reduce pulmonary inflammation (Baradaran-Rahimi et al., 2019). Di Cagno et al.'s (2019) research on caco-2 cell lines revealed the efficacy of fermented purslane juice against intestinal inflammation and epithelial damage. By preventing oxidative stress, Purslane's aqueous extract was shown by Samarghandian et al. (2017) to be effective against inflammation in streptozotocin-induced diabetic rats. Rats who receive purslane extract also experience immune-modulatory effects (Kaveh et al., 2017). In studies conducted by Agha-Hosseini et al. (2010), the Purslane demonstrated encouraging outcomes against oral lichen planus (OLP), a chronic inflammatory and immune-mediated illness.

ANTI-VIRAL ACTIVITY:-

The antiviral properties of purslane have only been the subject of a few investigations. Antiviral activity against influenza A virus (IAV) infection was demonstrated by Purslane water extract (Li et al., 2019). According to Dong et al. (2010), a pectic polysaccharide that was isolated from purslane exhibited anti-herpes simplex virus type 2 (HSV-2) properties.

ANTI-OBESITY AND ANTI-DIABETIC ACTIVITY:-

Purslane's ability to combat obesity was validated by Li et al. (2019) through an examination of its anti-adipogenic properties in 3T3-L1 cells. Purslane's antioxidant and hypoglycemic properties were also noted by Sicari et al. (2018). Several researches have independently assessed its potential to prevent diabetes (Gong et al., 2009; Bai et al., 2016; Hu et al., 2019; Lee et al., 2020). Purslane polysaccharides have been shown to stimulate insulin secretion in insulin-secreting β-cell line cells (INS-1 cells), indicating significant potential functions for the plant in diabetic patients (Hu et al., 2019). Park and Han (2018) achieved comparable results. In streptozotocin-induced diabetic mice, Purslane has been shown to greatly reduce liver injury (Zheng et al., 2017; Park and Han, 2018).

NEUROPROTECTIVE ACTIVITY:-

Numerous researchers have reported the neuroprotective effects of Purslane seeds and aqueous extract in rats and mice (Hongxing et al., 2007; Abdel Moneim , 2013; Farag et al., 2021). Purslane betacyanins have been shown to be useful in protecting mice against D-galactose-induced neurotoxicity (Wang et al., 2010). According to Truong et al. (2019), the levodopa and dopamine present in purslane extract function as a neuroprotectant against Parkinson's disease. Rats' lead-induced memory impairment was prevented by polysaccharides isolated from purslane (Tao et al., 2018). Numerous alkaloids exhibited anticholinesterase activity, including oleracea (Xiu et al., 2019) and oleraisoindole (Ma et al., 2021).

HEPATOPROTECTIVE ACTIVITY:-

A evaluation of Purslane's Heaptoprotective and gastroprotective properties was conducted by Farkhondeh and Samarghandian in 2019. Farkhondeh et al. provide a thorough overview of the hepatoprotective role (2019). According to Anusha et al. (2011), rats exposed to carbon tetrachloride-induced hepatotoxicity shown hepatoprotective responses to an aqueous extract of Purslane combined with lycopene. The most prevalent type of chronic liver illness, nonalcoholic fatty liver disease, can be effectively treated with Purslane seeds (Mohamed et al., 2018; Gheflati et al., 2019).

ANTI-ASTHAMATIC ACTIVITY:-

According to Malek et al. (2004) and Khazdair et al. (2019), purslane has bronchodilatory and anti-asthmatic properties. In guinea pigs with asthma produced by histamine dihydrochloride, Iyekowa et al. (2012) saw improvement in bronchial asthma. Tannins, steroids, flavonoids, saponins, and alkaloids were found in the extract that was given, according to a phytochemical investigation, indicating that it may have antiasthmatic properties.

HEALING ACTION :-

When crude extract from the aerial portions of Purslane was applied topically to excised wounds in house mice (JVI-1), healing activity was seen, indicating the plant's potential significance in the healing process (Rashed et al., 2003).

CONCLUSION :-

With significant nutritional value, purslane has enormous pharmacological and nutraceutical potential. It is regarded as a significant crop for the future because of the presence of very important features. Despite being a wonder crop, purslane is still one of the world's least used crops, despite evidence of its use in traditional diets and ethnomedical systems across several nations. The eighth-most-distributed plant in the world, its use as a food and medication can enhance people's health in addition to offering nourishment. It is a nutraceutical plant since it contains a variety of significant bioactive chemicals and nutritional elements. Due to the global water shortage, attempts are being made to find new, water-efficient crops.The FAO's Global Framework on Water Scarcity in Agriculture has identified saline agriculture as one of the key tactics for addressing water scarcity in the event of future water shortages. Purslane can be encouraged as a biosaline crop for future food and nutritional security because it has a high tolerance to salinity.

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