IN-VITRO EVALUATION OF ANTIMICROBIAL AND ANTI-INFLAMMATORY ACTIVITIES OF *SANSEVIERIA WHITNEY* LEAF EXTRACT AND ITS ETHYL ACEATE BIOFRACTION

[1]Afra.p,[2]Jasna t.j*

1.Mpharm Scholar,Department of Pharmacognosy , Nehru college of pharmacy, Thirivilwamala, Pampady,Thrissur,Kerala

2.Associate professor, Department of Pharmacognosy, Nehru college of pharmacy, Thirivilwamala, Pampady,Thrissur,Kerala

Phone.no;9809920260

ABSTRACT

Sansevieria whitney, a compact form of *Sansevieria trifasciata*, is well known as an ornamental and indoor air-purifying plant, but its medicinal value has received little scientific attention. This work explores the phytochemical content and in-vitro pharmacological properties of its leaf extracts. Fresh leaves were shade-dried, powdered, and subjected to hydroalcoholic extraction, followed by fractionation using liquid–liquid methods. Both the crude extract and its biofractions were tested for antibacterial, antifungal, and anti-inflammatory effects using standard laboratory techniques. Phytochemical evaluation indicated the likely presence of alkaloids, flavonoids, saponins, tannins, terpenoids, phenolic compounds, and steroids. The hydroalcoholic extract exhibited strong antibacterial activity against *Escherichia coli*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*, producing inhibition zones close to those of gentamycin. Antifungal screening against *Candida albicans* showed moderate inhibition with the crude extract, whereas the ethyl acetate fraction had only mild activity. Anti-inflammatory testing using protein denaturation assays demonstrated significant efficacy for the crude extract (IC_{50}: 280 µg/ml), which was comparable to diclofenac (IC_{50}: 243 µg/ml). These results suggest that the pharmacological effects of *S. whitney* are linked to its rich phytochemical composition. The study indicates that this cultivar holds promise as a natural source of antimicrobial and anti-inflammatory compounds, warranting further investigation and detailed phytochemical characterization.

KEY WORDS:*Sansevieria whitney;* Snake plant; Phytochemical screening; Antibacterial activity; Antifungal activity; Anti-inflammatory activity; Medicinal plants; Natural therapeutics.

INTRODUCTION

Sansevieria, often known as "snake plant" or "mother-in-law's tongue," has attracted more attention lately because of its pharmacological characteristics and environmental advantages. approximately around 70 species of the genus *Sansevieria*, which is a member of the family *Asparagaceae*, are indigenous to tropical and subtropical regions of Asia and Africa. These perennial succulents are prized for their ability to withstand severe weather conditions and for their usage as decorative, therapeutic, and air-purifying plants . The compact cultivar *Sansevieria Whitney*, which has dark green, sword-like leaves with lighter green borders, is one of the less well-known hybrids in this group. Despite being cultivated mostly for interior decoration, *S.Whitney* shares morphological and phytochemical traits with its more well-researched cousins, including *Sansevieria trifasciata* and *Sansevieria cylindrica*, both of which have proven therapeutic use . *Sansevieria* species have long been used in traditional African and Asian medical systems for a variety of medicinal purposes. For example, leaves and roots are used to cure snakebites, respiratory disorders, infections, and inflammation . Numerous bioactive substances, including as saponins, flavonoids, alkaloids, tannins, phenolics, and glycosides, are thought to be responsible for these effects. Some of these old claims have been validated by contemporary pharmacological research, which has shown that different *Sansevieria* species exhibit anti-bacterial, anti-fungal, anti-inflammatory, anti-oxidant, cytotoxic, and wound-healing properties . The majority of current research on *Sansevieria whitney* focuses on more common species, so despite these encouraging results, there is still a big gap in the scientific assessment of this species. It is plausible to speculate that *S.whitney* might have similar therapeutic qualities given the close taxonomic and phytochemical resemblances among the genus's species. A thorough investigation into the biological activity and phytochemical makeup of this plant may reveal novel natural substances with possible pharmacological uses .[1]

PLANT PROFILE

Sansevieria Whitney

Sansevieria, also known as snake plant or mother-in-law's tongue, is a genus of perennial, evergreen plants native to Africa and Southern Asia [4]. Modern taxonomy includes it under the genus Dracaena in the family *Asparagaceae*, but it was previously included under the *Agavaceae* family [2].These species are distinguished by their upright, sword-shaped leaves, which, depending on the variety, may be solid green, variegated, or pattern [3]. Because of their eye-catching leaves, drought resistance, and ease of care, they are frequently grown as ornamental plants. Because of their ecological adaptation to dry conditions and use of Crassulacean Acid Metabolism (CAM) photosynthesis, *Sansevieria* species are able to decrease water loss by opening their stomata at night [4]. *Sansevieria* species have been researched for their ability to filter the air in addition to their aesthetic value. *Sansevieria* species are increasingly widely cultivated in residences, workplaces, and public spaces around the globe because of their adaptability, durability, and advantages for indoor air quality [1].

The compact cultivar of *Sansevieria trifasciata, Sansevieria Whitney*, has not yet been the focus of published phytochemical or pharmacological studies; nevertheless, research on the parent species offers important information about its expected chemical composition and bioactivity. Fatty acids like palmitic acid, linoleic acid, oleic acid, stearic acid, and phytol, as well as sterols like stigmasterol and twelve steroidal saponins—ten of which were recently reported have all been found in phytochemical analyses of *S. trifasciata*. Additionally, triterpenes, flavonoids, alkaloids, saponins, sterols, and glycosides have been validated by qualitative screening, but tannins are typically missing. These ingredients have a variety of pharmacological actions, for example anti-oxidant activity, anti-inflammatory activity, anti-microbial activity, anti-cancer activity, anthelmintic, anti-ulcer properties.[2,3]

Taxonomical classification:

Kingdom: Plantae

Phylum: Tracheophyta

Class: Monocotyledons

Order: Asparagales

Family: Nolinoideae

Genus: *Sansevieria*

Species: *Whitney*

Synonyms:

Vernacular name:

Malayalam: Vazhathiri, Naagadrona

English: Snake plant, Mother-in-Law's tongue, Saint George's Sword

Sanskrit: Nagadrona, Sarpapatra

Hindi: Naag Paudha, Saas ki jeebh

Bengali: Nagphoni Gachh

Tamil: Pampu pasi,Nagapasi

Telugu: Paamu mokka,Naagamani

Fig 1: *Sansevieria whitney* plant

Habitat

The plant is found in semi-arid areas with bright light and sporadic shade, flourishing in sandy or rocky soils that drain well. [1]

Habit

- Type**:** Perennial, evergreen, succulent herb.
- Form**:** Compact rosette of stiff, sword-shaped leaves.
- Growth rate: Slow-growing; adds 3–4 new leaves per year.
- Height**:** Typically, 30–45 cm (12–18 in) tall.
- Spread**:** Around 20–30 cm (8–12 in) across.[1]

Geographical Distribution

The plant is originated found in West Africa, Nigeria, Congo, Madagascar, and Southern Asia, but now widely cultivated as an ornamental plant across the word.

Southern Asia: Widely grown in some part of Malaysia, Thailand, Indonesia and Singapore.

Nigeria: General humid to semi-arid zones.

United states: popular as house plant across all states.

Europe:usually Grown indoor in colder region &outdoor in Mediterranean areas.

India: Commonly cultivated in most states, especially in metropolitan cities.[8]

Plant Description

Sansevieria whitney is a slow-growing, compact cultivar that forms rosettes and grows straight. Over time, it forms clumps as it develops by subterranean rhizomes, usually reaching a height of 20 to 45 cm (8 to 18 inches). Its vertical leaves and neat, symmetrical design make it a popular choice for indoor decoration.[1]

Phytoconstituents

Sansevieria whitney is believed to have a phytochemical profile that is similar to that of its parent plant, despite the fact that there is few research specifically on *whitney. S. trifasciata* frequently contains the following components, which are also likely to be present in *Sansevieria whitney* such as alkaloids, glycosides, tannins, flavonoids, steroids, saponins, terpenoids, phenolic compounds etc. these constituents are may be responsible for the pharmacological activity of *Sansevieria whitney* plants [5]

Alkaloids: Nitrogenous substances known as alkaloids have been found in *Sansevieria trifasciata* in a variety of tissues, including the leaves and roots. These substances are well recognized for their analgesic, anti-inflammatory, and antibacterial properties. Alkaloids may function by rupturing the membranes of microorganisms or by blocking important enzymes involved in inflammatory processes [6].

Flavonoids: Another important class of phytochemicals found in *Sansevieria* species is flavonoids. Strong antioxidant activity is exhibited by these polyphenolic chemicals, which helps shield cells from oxidative damage [36]. They also have hepatoprotective, antidiabetic, and anti-inflammatory qualities. Analogs of kaempferol and quercetin are common flavonoid types found in related species. Colorimetric techniques, such the Shinoda test, are frequently used for detection, while HPLC or aluminium chloride tests are frequently used for quantification [7]

Saponins: sides with a sugar moiety joined to a triterpenoid or steroidal aglycone are called saponins. [35] These can be anticipated in *S. whitney* and are frequently found in *S. trifasciata*. Notable expectorant, immunostimulant, and antifungal qualities are

possessed by saponins. They are surface-active substances that have the ability to lyse red blood cells in a lab setting. For this family of compounds, haemolysis assays and foam tests are common detection techniques [8].

Tannins: *Sansevieria* species are also rich in tannins, a family of high molecular weight polyphenols. These astringent substances have long been utilized for antibacterial and wound-healing applications. By binding proteins and blocking microbial enzymes, tannins lessen inflammation and infection [36]. The Folin–Ciocalteu technique is used to quantify them, while ferric chloride and lead acetate tests are used to detect them [5].

Terpenoids: The plant's essential oils include trace levels of terpenoids, which are generated from isoprene units. These substances have antiviral, anti-inflammatory, and anticancer properties. While *S. whitney* has not yet been thoroughly GC-MS profiled, comparable species have been shown to contain terpenoids such as limonene and β-caryophyllene. Thin-layer chromatography (TLC) or the Salkowski test are commonly used for detection, which is followed by GC-MS analysis [6].

Phenolic compounds: The plant's therapeutic benefit is mostly attributed to phenolic chemicals, which are well known for their antioxidant properties. These substances have anti-inflammatory and anti-chronic illness properties by scavenging free radicals.[37]Phenolics are measured in phytochemical investigations using the Folin–Ciocalteu reagent, and their existence is verified by a colour shift that occurs when they react with ferric chloride [7].

Steroids: Another significant ingredient class is steroidal glycosides, which are frequently associated with saponins. These substances are thought to have a role in the hormonal and anti-inflammatory effects seen in conventional medical applications because they share structural similarities with corticosteroids [14]. To verify if steroids are present in plant extracts, the Liebermann–Burchard reaction is frequently employed [7].

Sansevieria Whitney probably has a wide variety of phytochemicals that support both its potential pharmacological usefulness and its historical medical applications[14]. Comprehensive phytochemical analyses, including chromatographic profiling (HPLC, GC-MS) and spectrophotometric tests, are necessary to validate the precise composition of this cultivar, even if first evidence can be obtained from its parent species. These bioactive components make *S.whitney* a promising candidate for more

study in the creation of topical medicinal agents, natural antioxidants, and herbal medicines [8].

Pharmacological activities

Sansevieria whitney is thought to have comparable bioactive substances that contribute to a variety of pharmacological characteristics including Antimicrobial, antioxidant, anti-inflammatory, wound-healing, analgesic, and insecticidal properties are some of these actions.[6] Such properties have been widely documented in *S. trifasciata* extracts and are most likely present in *S. whitney* due to its shared phytochemical profile .[8,10]

Antimicrobial activity: Among *Sansevieria* species best-known characteristics is their antimicrobial activity. *Staphylococcus aureus, Escherichia coli*, and *Pseudomonas aeruginosa* are among the Gram-positive and Gram-negative bacteria that have been shown to be significantly inhibited by ethanolic, methanolic, and aqueous extracts of *S. trifasciata* [41,44]. Alkaloids, flavonoids, tannins, and saponins that break down microbial membranes or prevent the formation of nucleic acids are thought to be responsible for these effects.[20,30] Extracts from allied *Sansevieria* species have also been shown to suppress fungal infections including *Aspergillus niger* and *Candida albicans* [34,41].

Anti-oxidant activity: Another well-known pharmacological characteristic is antioxidant activity, which is mostly brought on by the abundance of flavonoids and phenolic chemicals [22]. By scavenging reactive oxygen species (ROS), these bioactive compounds lessen oxidative stress, which is a risk factor for a number of chronic illnesses, including diabetes, cardiovascular disease, and cancer.[12] Methanolic leaf extracts of *Trifasciata* have been shown to have significant antioxidant capacity by studies employing DPPH radical scavenging tests [28,39].

Anti-inflammatory activity: Traditional applications of *Sansevieria* species to alleviate pain and swelling support their anti-inflammatory properties. According to scientific research, the anti-inflammatory impact could result from the reduction of pro-inflammatory cytokines like TNF-α and IL-6 as well as the inhibition of cyclooxygenase enzymes (COX-1 and COX-2) [12]. This pharmacological activity is probably caused by saponins, steroids, and flavonoids, which makes *S.whitney* a potential option for natural anti-inflammatory treatments [12,29].

Analgesic and antinociceptive properties: Ethanol extracts of *S. trifasciata* leaves have been shown to have analgesic and antinociceptive effects in mouse models, reducing pain responses in both chemically and thermally produced pain models. Alkaloids and terpenoids that disrupt pain perception pathways may be responsible for this impact [9].

Insecticidal and larvicidal effects: Extracts from *Sansevieria* have also been shown to have insecticidal and larvicidal properties, especially against mosquito larvae. Extracts may interfere with insect neural function and disturb larval development. This implies possible use as a source of botanical insecticides and for vector control [6,8].

Antidiabetic and hepatoprotective effects: The presence of bioactive flavonoids and phenolic substances has led to the proposal of antidiabetic and hepatoprotective properties. Preliminary in vitro results show inhibition of α-amylase and α-glucosidase enzymes, which are candidates for regulating postprandial hyperglycemia, despite the absence of comprehensive in vivo investigations. Furthermore, phenolic substances shield hepatocytes from oxidative damage and aid in liver detoxification processes [8,10].

Materials and methods

Collecting and authenticating plant materials

On February 13, 2025, *Sansevieria whitne*y leaves were gathered from Thrithala, Palakkad, Kerala. verified and taxonomically identified by Dr. Sreekumar VB, the principal scientist and head of the forest botany department of the Kerala Forest Research Institute Peechi (KSCSTE). and dried for 20–25 days in the shade, ground into a coarse powder with a mechanical grinder and kept in an airtight container.

Extraction

Extraction done by maceration process.The plant matter was ground into a fine or somewhat gritty powder. 250ml of menstrual fluid (hydro alcohol (20:80)) was poured to 12.5g of powder that had been stored in a covered container. Let it stand for seven days, shaking now and again. Solid residue was squeezed and liquid was strained off. Evaporation, concentration, and a mixture of strained and expressed

liquids.To obtain enough extract for additional analysis, this extraction process was carried out three times.[17,18]

Using liquid-liquid extraction to fractionate bioactive compounds from hydro-alcoholic extract

The plant extract is first diluted in 100 milliliters of distilled water to produce an aqueous extract, which is then used to extract the bioactive ingredients from a hydro-alcoholic extract. For this, a separating funnel is employed.Petroleum ether, which is non-polar, ethyl acetate, which is polar, and chloroform, which is moderately polar, are often used solvents.

Method: Initial extraction

Fill a separate funnel with 100 ml of the plant extract, then add 100 ml of petroleum ether. Close the funnel and shake it gently every 30 seconds for five minutes to relieve any remaining pressure.Give the layer ten minutes to separate.Next, gather the top layer of petroleum ether into a beaker and carry out the extraction process twice more using the same solvent. Mix all of the solvent layer, then let it evaporate and dry.[**64]**

The second extraction involves taking the residual aqueous layer, adding 100 ml of chloroform, and then closing the funnel. Shake it gently every 30 seconds for five minutes to relieve any leftover pressure.Give the layer ten minutes to separate.Next, gather the top layer of chloroform into a beaker and carry out the extraction process twice more using the same solvent. Mix all of the solvent layer, then let it evaporate and dry.

The third extraction involves taking the leftover aqueous layer, adding 100 ml of ethyl acetate, closing the funnel, and giving it a gentle shake. And carry out the same process as before.[18]

IN-VITRO PHARMACOLOGICAL ACTIVITY

IN-VITRO ANTI-BACTERIAL ACTIVITY

Bacterial test strain and growth conditions

For this study, a strain of,*Escherichia.coli, Pseudomonas,aeruginosa, and Staphylococcus aureus* was used. The cultivation medium was Muller-Hinton agar medium. The Cultures were grown aerobically for 24 h at 37 °C.

Determination of anti-bacterial activity of plant extract by the disc diffusion method

Materials Required

Muller Hinton Agar, *B. subtilis, E. coli, P. aeruginosa, S. aureus.* Distilled water, Gentamycin, Hydo-alcoholic extract of *Sansevieria whitney* leaves and its biofraction.[21]

Procedure

The agar disk diffusion technique was used to measure antimicrobial activity. Muller-Hinton agar was prepared and poured into Petri dishes, which were then allowed to solidify. Muller-Hinton (MH) agar plates were injected with an ,*B. subtilis*, *E. coli*, *P. aeruginosa*, and *S. aureus* culture. Each growth plate was covered with sterile filter paper discs that had been soaked with extracts. The bacterial isolates were then cultured for 24 hours at 37 °C. Alcohol was used as a control, and gentamycin used as the standard antibiotic. The test substances included one dose of the hydro-alcoholic extract of *Sansevieria whitney* leaves (200mg), and biofraction of same plant (200 mg). The zone of inhibition created by the antibacterial activity of extracts made from the leaves of *Sansevieria* species was then measured on the plates. [21,22,23]

Inoculums Details

Inoculums were procured from the Microbial Type Culture Collection and Gene Bank (MTCC), Chandigarh, and were sub-cultured in the microbiology lab of Nehru College of Pharmacy.

5.7.2 IN-VITRO ANTI-FUNGAL ACTIVITY

Determination of anti-bacterial activity of plant extract by the disc diffusion method

Materials Required

Agar, *Candida albicans,* Distilled water, Flucanazole, Hydo-alcoholic extract of *Sansevieria whitney* leaves and its biofraction.

Procedure

The agar disk diffusion technique was used to measure antimicrobial activity. Agar medium was prepared and poured into Petri dishes, which were then allowed to solidify. agar plates were injected with an *C.albican* culture.The growth plate was covered with sterile filter paper discs that had been soaked with extracts,biofraction.. The fungal isolates were then cultured for 48 hours at 37 °C.Alcohol was used as a control, and fluconazole used as the standard . The test substances included one dose of

the hydro-alcoholic extract of *Sansevieria whitney* leaves (200mg), and biofraction of same plant (200 mg). The zone of inhibition created by the antifungal activity of extracts made from the leaves of *Sansevieria* species was then measured on the plates. [23]

5.7.3.IN-VITRO ANTI-INFLAMMATORY ACTIVITY

Protein denaturation inhibition study

To assess an anti-inflammatory effects of plant extract and its biofraction , Diclofenac were used as a reference standard. To2 ml of Diclofenac sodium at concentrations of (100-500µg/ml) and plant extract and its biofraction were homogenised with bovine serum albumin (BSA) and then it is incubated for 15-20 min at 27°C. Then the mixture of BSA and distilled water was used as negative control. For ten minutes, the mixture was maintained at 70°C in a water bath. This will enable the protein to get denaturated. Following cooling to room temperature, the absorbance of each reaction mixture was measured at 680 nm.[24] The proportion of protein denaturation inhibition was calculated using the equation:

% Inhibition=(OD of control-ODof extract/OD of control)×100

RESULT

Extraction

Extraction done by maceration process and the extractive value was found to be 10**.68%w/w.**

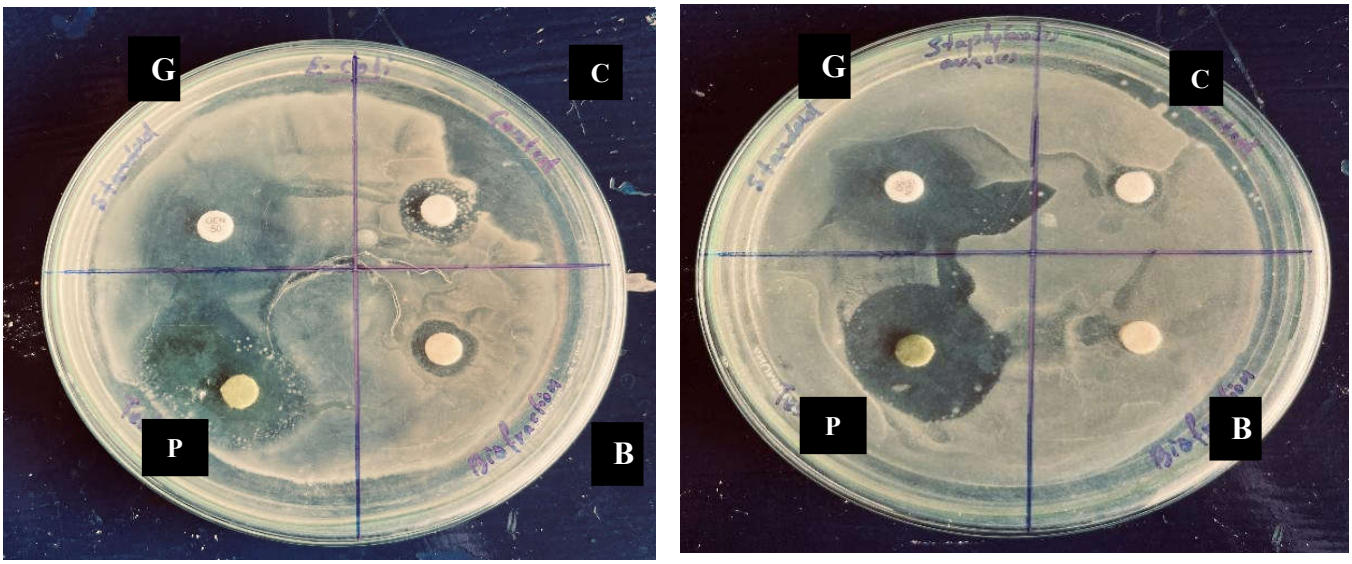
Fig no2 :. leaf extract

Biofraction

After fractionation,we got 3 fractions such as ethyl acetate ,petroleum ether and chloroform fraction.from this ethylacetate biofraction selected for further steps

IIN-VITRO PHARMACOLOGICAL ACTIVITY
ANTI-BACTERIAL ACTIVITY OF PLANT EXTRACT AND ITS BIOFRACTION

Escherichia coli ***Staphylococcus aureus***



Pseudomonas aeruginosa

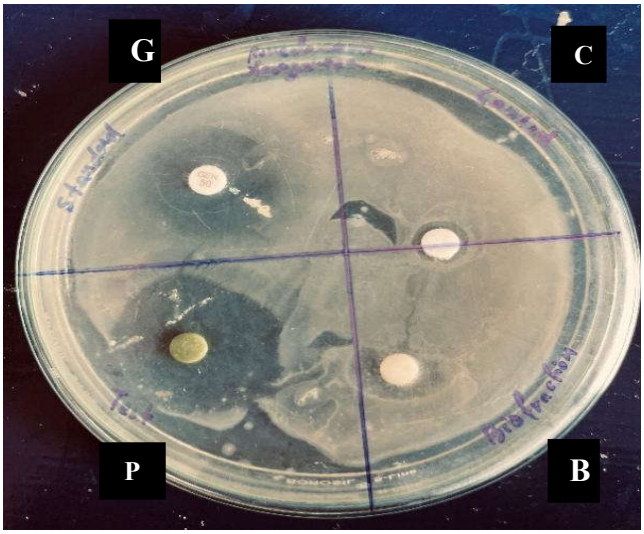
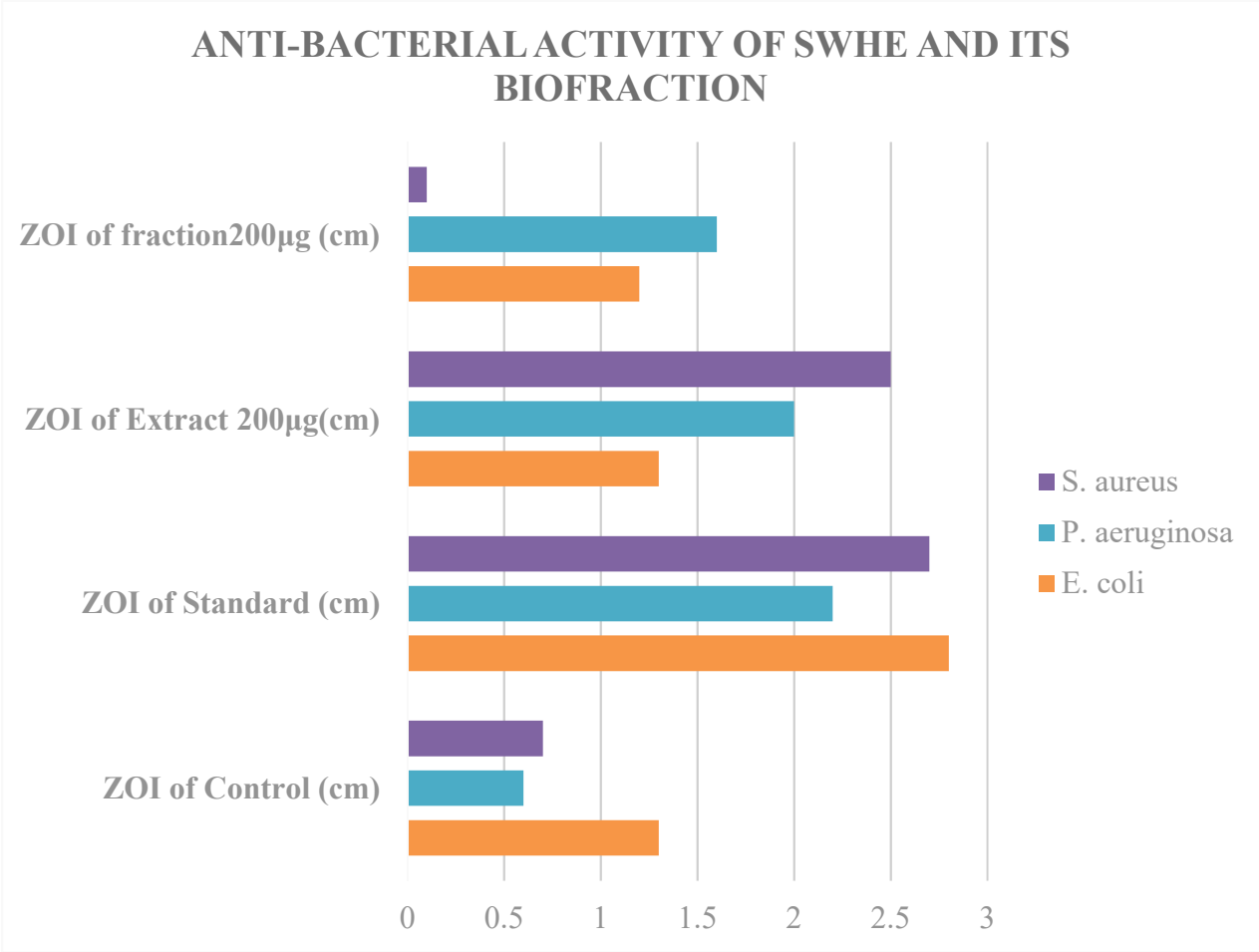


Fig 3: Antimicrobial activity of leaf extract of *Sansevieria whitney* by disc diffusion method

G-Gentamycin ,C-Control, P-plant extract, B-bio fraction

Sl. No	Organisms	ZOI of Control (cm)	ZOI of Standard (cm)	ZOI of Extract 200 µg(cm)	ZOI of fraction200µg (cm)
1	*E. coli*	1.3	2.8	2.5	1.2
2	*P. aeruginosa*	0.6	2.2	2	1.6
3	*S. aureus*	0.7	2.7	2.5	0.1

Table 1: Anti-bacterial activity of SWHE and its biofraction



Graph-1Anti-bacterial activity of SWHE and its biofraction

The antibacterial efficacy of *Sansevieria Whitney's* hydroalcoholic extract and its ethyl acetate biofraction was assessed against *Pseudomonas aeruginosa*,*Staphylococcus aureus,and Escherichia coli*. The outcomes were contrasted with those of the conventional medication and control.

The zone of inhibition (ZOI) for E. coli was 2.8 cm for the standard and 1.3 cm for the control. The biofraction exhibited a somewhat lower inhibition of 1.2 cm, suggesting limited antibacterial activity against *E. coli,* whereas the plant extract shows 2.5 cm inhibition, which was nearly equal to the standard

For *P. aeruginosa*, the extract demonstrated almost equal activity with a ZOI of 2.0 cm compared to the standard's 2.2 cm ZOI. With a ZOI of 1.6 cm, the biofraction demonstrated considerable inhibition and outperformed the control (0.6 cm). This implies that the extract has significant anti-bacterial action.The extract had a slightly lower ZOI of 2.5 cm compared to the normal drug's 2.7 cm inhibition against *S. aureus*. With a ZOI of 0.1 cm, the biofraction showed nearly little activity, indicating that the antibacterial chemicals that are effective against *S. aureus* are either missing or poorly concentrated in the ethyl acetate biofraction, but are present in the crude extract.

Overall, the findings suggest that *Sansevieria whitney's* hydroalcoholic extract has moderate to high antibacterial activity, especially against *P. aeruginosa* and *S. aureus,* and *E. coli.* The fact that the ethyl acetate biofraction only partially recovers its activity, indicates that the crude extract contains phytoconstituents that work in concert to provide stronger antibacterial effects.

ANTI-FUNGAL ACTIVITY OF PLANT EXTRACT AND ITS BIOFRACTION

Sl. No	Organisms	ZOI of Control (cm)	ZOI of Standard (cm)	ZOI of Extract 200 µg(cm)	ZOI of fraction200µg (cm)
1	*C.albicans*	0	1.2	0.7	0.3

Table 2: Anti-fungal activity of SWHE and its biofraction

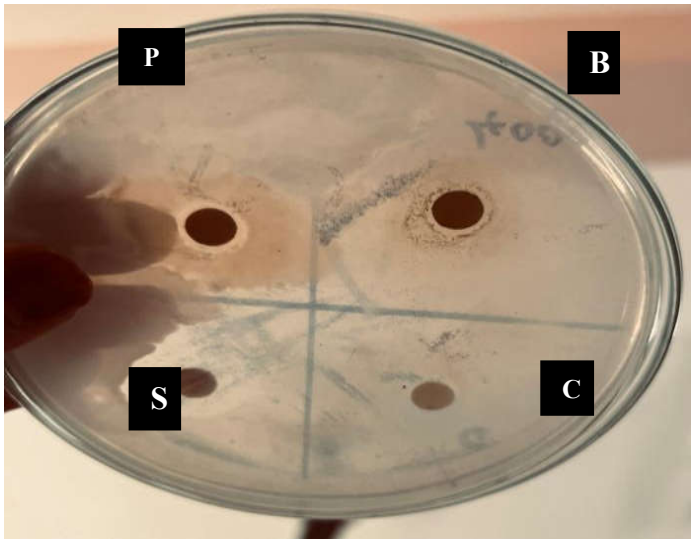


Fig 4: Anti-fungal activity of leaf extract of *Sansevieria whitney* by disc diffusion method

According to the antifungal trial conducted against *Candida albicans,* the conventional medication generated the largest zone of inhibition (1.2 cm). The fraction at the same concentration only demonstrated modest activity (0.3 cm), whereas the crude extract at 200 µg/ml showed moderate activity (0.7 cm). There was no inhibition in the control. Although both were less effective than the usual medication, these data show that the extract had superior antifungal potential when compared to the fraction.

6.9.2.EVALUATION OF ANTI-INFLAMMATORY ACTIVITY OF PLANT EXTRACT AND ITS BIOFRACTION

The anti-inflammatory activity of *Sansevieria* plant extract and its bio fraction was evaluated across various concentration such as 100,200,300,400, and 500(ug/ml).

Concentration (ug/ml)	Absorbance (standard-diclofenac)	Percentage inhibition	Absorbance (plant extract)	Percentage inhibition	Absorbance (Ethyl acetate biofraction)	Percentage inhibition
100	0.56±0.05	37%	0.62±0.02	27%	0.72±0.03	19%
200	0.49±0.03	44%	0.51±0.05	42%	0.55±0.07	27%
300	0.37±0.04	58%	0.42±0.03	52%	0.49±0.05	33%
400	0.22±0.05	75%	0.31±0.07	65%	0.34±0.02	50%
500	0.17±0.02	80%	0.24±0.04	73%	0.27±0.05	54%

Table no-3.Anti-inflammatory activity of plant extract and its biofraction

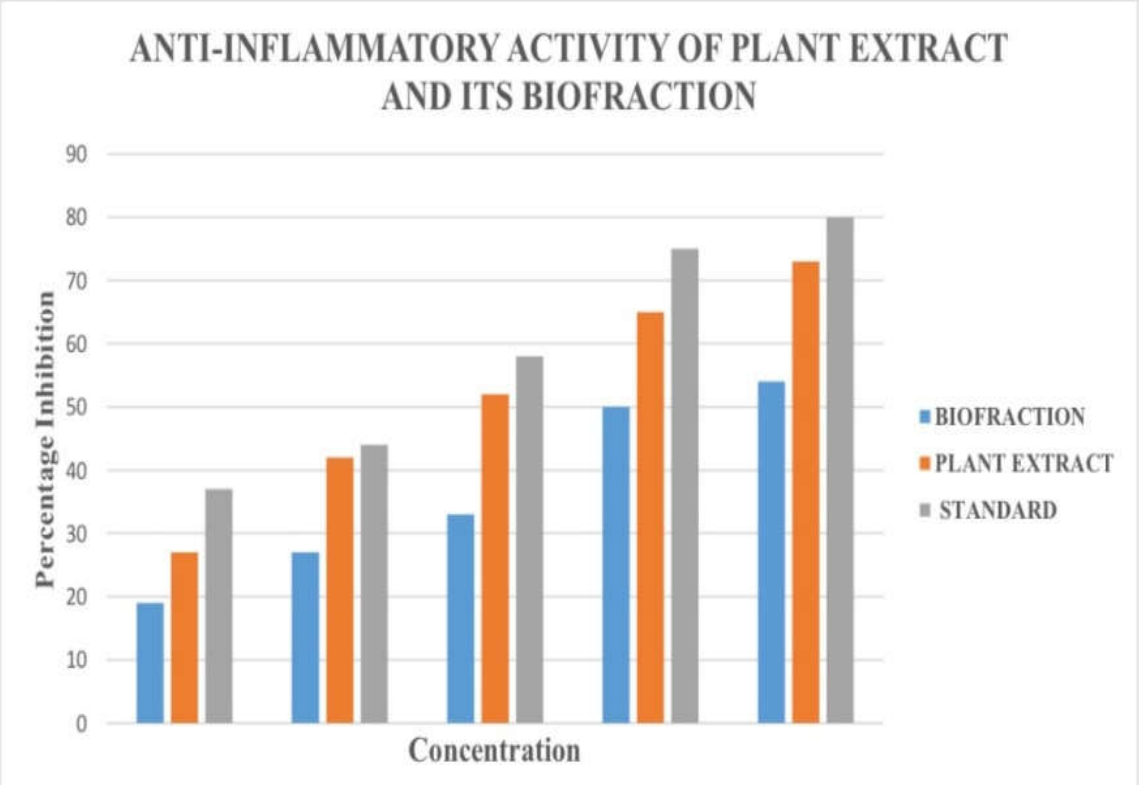
IC 50 VALUES

Standard diclofenac-243µg/ml

Plant extract-280µg/ml

Ethyl acetate biofraction-400µg/ml

Graph-2-Anti-inflammatory activity of plant extract and its biofraction



The anti-inflammatory activity of *Sansevieria whitney* plant extract and its biofraction is increased with increasing the concentration. The plant extract shows significant anti-inflammatory activity that is closely approaching to the standard drug (Diclofenac). The biofraction also shows significant anti-inflammatory activity.

The standard exhibited highest percentage inhibition (80%) at concentration 500 ug/ml and plant extract exhibit 73% inhibition at the same concentration and the biofraction shows moderate activity, with a maximum inhibition of 54%. So, these findings helpful to support the therapeutic application of plant extract and its biofraction.

The calculated IC_{50} values (concentration required for 50% inhibition) were 243 µg/ml for diclofenac, 280 µg/ml for the crude plant extract, and 400 µg/ml for the

ethyl acetate biofraction. These findings indicate that while diclofenac, as expected, showed the strongest anti-inflammatory activity, the plant extract also exhibited notable efficacy, with an IC_{50} value close to that of the standard. The ethyl acetate biofraction demonstrated moderate activity, suggesting that the crude extract may contain a synergistic mixture of phytoconstituents responsible for higher bioactivity compared to the isolated fraction

CONCLUSION

This study investigated the pharmacognostical characteristics, phytochemical profile, and in-vitro pharmacological activities of *Sansevieria whitney* leaf extract and its ethyl acetate biofraction. The plant was processed using hydroalcoholic maceration followed by solvent fractionation to isolate potential bioactive compounds. Preliminary phytochemical analysis revealed the presence of secondary metabolites such as alkaloids, flavonoids, tannins, saponins, terpenoids, glycosides, and phenolic compounds, which are widely associated with medicinal properties.

The pharmacological assays provided significant findings. The hydroalcoholic extract exhibited marked antibacterial activity against *E. coli*, *P. aeruginosa*, and *S. aureus*, while the biofraction showed moderate inhibition, suggesting that the crude extract benefits from synergistic interactions among its phytoconstituents. Antifungal screening against *Candida albicans* indicated that the crude extract possessed higher inhibitory action compared to the biofraction, though both were less potent than the standard drug. In the anti-inflammatory test, the crude extract demonstrated strong protein denaturation inhibition, with results approaching those of the reference drug diclofenac, whereas the biofraction showed moderate but notable activity.

The overall findings confirm that *Sansevieria whitney* has promising therapeutic potential, particularly as an antibacterial, antifungal, and anti-inflammatory agent. The study highlights the enhanced efficacy of the crude extract, which may be attributed to the combined action of multiple phytochemicals, compared with the comparatively weaker biofraction. These results scientifically support the traditional medicinal use of *S. whitney* and provide a basis for future investigations, including in-vivo studies and advanced phytopharmacological research. Such efforts may contribute to the

development of effective, plant-based formulations for managing infectious and inflammatory conditions

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