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Elephantorrhiza Elephantina: Phytochemistry,Pharmacology and its Traditional Applications –A Brief Review

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ABSTRACT:- Elephantorrhiza elephantina, or Elephant's Root, a significant plant, holds substantial value in traditional medicine, food, and as a water source for local communities. This review describes current knowledge regarding its phytochemistry, pharmacology, and traditional applications. The plant has garnered increasing research interest due to its extensive ethnomedicinal uses across southern Africa and world, where it is employed to treat ailments such as wounds, gastrointestinal and dermatological disorders, sexual dysfunction, and STIs, and in ethnoveterinary practices. Phytochemical investigations have revealed a rich array of bioactive compounds, including anthocyanidins, flavonoids, tannins, and triterpenoids, which are responsible for its reported anthelmintic, antibacterial, anti-inflammatory, and antioxidant properties. Ongoing research aims to elucidate the mechanisms of action of these compounds and explore the potential for developing novel medicinal agents and other applications for this valuable plant resource. This review documents the botany, traditional uses, phytochemistry, and pharmacological properties of E. elephantina, highlighting advancements and discussing perspectives for future research to promote a better understanding and sustainable utilization of this species.

I. INTRODUCTION:-

Elephannorrhiza Elephantina (Burch.) Skeels are members of the small, purely African genus, represented by nine species of the continent [1]. Elephannorrhiza Elephantina is a type of genus, meaning the common name Elephannorrhiza Elephant Wurzel, and is most descriptive in the large undergr ound tribe common to most members of this genre [2]. Four species of this genus are: E. Burkei Benth . , E. Elephantina, E. Goetzei (damage) damage and E. Sobruticosa Schinz are considered medicinal pl ants in South Africa [3,4]. Elephantorrhiza Elephan tina is an important plant resource in South Africa, where it provides food and medicine to the indigen ous people, and the bark of the massive rhizome is a popular source of sunburn and coloring materials [5,6]. Subterranean rhizomes, often called roots, are one of South Africa's main herbal medicines. Beca use of its popularity as a herbal medicine, E. Eleph antina is sold as a herbal medicine in the Botswana and Zimbabwean herbal medicine market [7], East ern Cape Provinces of South Africa [8, 9], Goten Pr ovinces [10], Limpopo Provinces [11], and Norther n Cape Provinces [12]. According to Dold and Coc ks , the average price of E. Elephantina per kg in O stkap is $3.60 USD and 108.80 kg per year. E, as th ere is a high demand for seeds as a herbal medicine and the harvest is primarily aimed at rhizomes. Ele phantina has been recorded in the Red Data List of Lesotho as data used for herbivore use [13] as treat ment for grassland and intestinal disorders. Van W yke [14] is E. We listened to Elephantina as an imp ortant plant species, thereby potentially identifying roots that were potentially identified in overthecou nter drug formulations as antioxidants, skin disease s, skin diseases, perforated ulcers, perforated ulcers , and alopecia in male models in South Africa. In S outh Africa, E. Elephantina is used as a traditional t reatment for a wide range of diseases, including dia rrhea and Ruhr, stomach disease, skin diseases and acne, hemo bones, germs, and perforated peptic ulc ers [15]. Rhizomes or bark from Elephantina is crus hed by a little water. Apply the resulting paste to a t an to tan and dye the reddish color [16]. The young buds of E. Elephantina are eaten by cows, and his s eeds have a sweet taste, followed by a burning sens ation, and are often roasted in South Africa as a cof fee substitute. Applications, chemical constituents, and biological activity with E. Elephantina over the past 30 years. Unfortunately, no comprehensive re view of these important plant species in South Afri ca has been published. This review documented bio logy, traditional uses, phytochemistry and pharmac ological properties. Therefore, E. Advances in tradi tional use, botany, phytochemistry, pharmacology, and safety by Elephantina have been systematically

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checked in this study. Furthermore, the perspectives of future research on elephantina are discussed in the hope that this article will provide a better understanding of plant species.

Figure No.-: 1.1 Elephantorrihza Elephantina

II. METHODOLOGY OF REVIEW:-

Literature research was conducted between March 2016 and January 2017 using electronic search engines such as Google and Google Scholar, as well as publishing websites such as Elsevier, Science Direct, Biomed Central (BMC), and PubMed. Databases and literature sources were selected based on topics treated (i.e. biological activity, ethnobotany, ethnopharmacology, pharmacology, plantchemical assets, therapeutic value) and geographical reporting (South Africa). The following keywords were used to search for sources of literature: Acacia Elephantina, Elephantorryza burchellii, Elephantorryza Elephantina, dwarf Elephants Wurzel, Eland's Bean, Elde Wattle, Elephants Foot. Other literature sources included articles published in international journals, reports from international, regional and national organizations, meeting discussions, books, papers, websites and other gray literature. References were also identified by searching the library collections of the National Botanical Gardens and Botanical Gardens (SRGH), Harare, Zimbabwe and Fort Hare University in South Africa.

III. SPECIES DESCRIPTION:-

Elephantorrhiza Elephantina was recorded in South Africa, namely Namibia, Botswana, Zimbabwe, Mozambique, Swaziland, Lesotho and South Africa. Elephannorrhiza Elephantina is usually widely popular and often sociable, forming large spots in hot and arid areas of grasslands and open peeling. The synonym for E. Elephantina is Acacia Elephantina Burch. Elephannorrhiza Burchellii Benth. Elephannorrhiza Elephantina is a shrub, which is an annual stem up to 90 cm from the bottom of the wood in the longitudinal wooden edge, and is a shrub up to 90 cm at the bottom of the rhizome, often thickened to 8°C . Its leaves are undoubtedly composed, almost naked with petioles up to 8 cm [17]. The leaves consist of two four pairs of pinna in the lower lobe and seven pairs in the upper part, with axial length of up to 10 cm. The leaves are up to 55 pairs per earworm, linear to elongate in shape, 45 mm long, 0.50 2.50 mm wide, with an asymmetric base, acute tip, and usually mucosal fluid . Elephannorrhiza Elephantina inflorescences are x-fossas that are usually confined to the lower part of the trunk, usually solitary or grouped. The flowers are bisexual, with reddish brown glands at the base and free petals that are slightly connected to the base. The petals have a linear smell, with a yellow colour of 24 mm long and about 1 mm wide . Stamens are 10 free filaments, up to 6.50 mm . The fruit is a pod that is 5 21 cm long, 3 cm wide, reddish brown, coloured, prominently manufactured, often swollen, compressed, straight or slightly curved on the seeds .

IV. VERNACULAR NAMES OF ‘ELEPHANTORRHIZA ELEPHANTINE’ :-

Elephannorrhiza Elephantina is known for its geographical outbreak region through several local names (Table 1). In the literature review, E. More than 41 joint names or local names of E. Elephantina, a native E. Elephantina, was revealed (Table 1). Locals rarely call plant species that they don't use [18]. This list of popular names means that South African locals are actively interested in E. Elephantina. South Africa has the most common names , followed by Botswana (7), Namibia (5), and four names Zimbabwe, with the remaining countries having one or two names (Table 1). Local names often describe some distinctive features of plant species or part of the plant. For example, Elands Bean (Eland is an Indigenous Gazelle speech). Elandsboontjie; erands wattle; elephant feet. Elephant root; or the unjust route of the d star (Table 1). Elephantorrhiza Elephantina is commonly referred to as the "Elandsboontjie" of Africans in South Africa and is called English by Elander Bean and Eland of the British in Namibia and South Africa. Another common English name, the roots of the elephant's feet refer to large, long

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rhizomes or roots of species up to 8 m long . The common name for the root of a dwarf is compared to the closely related species E. goetzei, also known as the "elephant root." It refers to the height of the Elephantina.

Table 1. Vernacular names of Elephantorrhiza elephantina.

Vernacular name(s), ethnic group or geographical region in brackets	Country	References
Elephant's foot (English), chizezana, mosibe, mosidi, mositsane, mositsane tjizezana, motshijane (Setswana)	Botswana	[21–23]
Mositsane (Sotho)	Lesotho	[24]
Xivurayi (Changana), dwarf elephant's root (English)	Mozambique	[25]
Elandsboontjie (Afrikaans), eland's bean (English), gerbwürzel (German), ǁ an‡gâb (Khoekhoegowab), omundjoze (Otjiherero)	Namibia	[26]
Baswortel, elandsboontjie, leerbossie, looiersboontjie, olifantswortel (Afrikaans), dwarf elephant's root, eland's bean, eland's wattle, elephant's foot, (English), leshitšana, mosehlana, mošitšana, motshitshane (Sepedi), gwejobomvu, mositsane (Sotho, Tswana), ntolwane (Swazi), intolwane, xixuvari (Xhosa), intolwane, intolwanu (-enkulu), ugweje, umdabu (Zulu)	South Africa	[4, 8, 11, 17, 20, 27–33]
Intolwane (Swazi)	Swaziland	[34]
Elephant-root (English), intolwane encinyane (Ndebele), chizezepasi, mupangara (Shona)	Zimbabwe	[20, 35]

V. ETHNOMEDICINAL USES OF ELEPHANTORRHIZA ELEPHANTINE:-

E. Elephantina rhizomes, roots, leaves and tribes have a variety of medical properties and have been reported to be used in the treatment or treatment of different human and animal complaints and diseases in the areas of South Africa (Table 2). A total of 42 or 14 human and animal complaints and illnesses, E. Treated with plant drugs made from Elephantina (Table 2). These reports are E. It comes from all countries. Elephantina is a native speaker. The country with the highest ethnomical purpose is South Africa, based on 25 literature documents, followed by Lesotho, with 10 uses and two literary sets. Botswana is a record of Mozambique and Zimbababwe with nine uses and four literary data sets, five uses and two literary records, and Namibia and Swaziland, respectively. Elephantorrhiza Elephantina is primarily used to treat gastrointestinal tract disorders (21 quotes in six countries), followed by veterinarians (14 quotes in two countries), skin diseases (6 quotes from South Africa), pain (5 quotes in five countries), and information and impotence (5 quotes in four countries). These records show a high degree of consensus for major diseases and symptoms (Table 2), indicating high intercultural practices among E. elephantinas across the distribution area.

Table 2. Ethnomedicinal uses of Elephantorrhiza elephantina in southern Africa.

Use	Plant part(s) used and preparation	Country of practice	References
Abdominal pains	Rhizome, root decoction taken orally	Lesotho; Zimbabwe	[3, 24]
Acne	Rhizome, root infusion applied externally	South Africa	[15, 36–38]

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Anemia	Root decoction taken orally	Mozambique	[25]
Aphrodisiac	Root decoction taken orally	Zimbabwe	[3]
Bleeding	Root decoction applied on affected body part	Lesotho	[39]
Bloody diarrhoea in children	Root powder wiped around anus	Botswana	[40, 41]
Blood pressure	Rhizome decoction taken orally	South Africa	[12]
Breast cancer	Rhizome decoction taken orally	Lesotho	[24]
Chest pains	Roots taken as emetics	South Africa	[42]
Cleans blood	Rhizome decoction taken orally	Lesotho	[24]
Cleaning the womb after abortion	Rhizome decoction taken orally	Botswana; South Africa	[36, 40, 41]
Clearing air canal	Rhizome decoction taken orally. .	South Africa	[12]
Constipation, heartburn, indigestion, loss of appetite, stomach ailments, vomiting	Ingredient of a herbal mixture known as "Sejeso" (Ingwe brand) which also includes Alepidea amatymbica Eckl. & Zeyh., Hypoxis obtusa Burch. ex Ker Gawl., Pentanisia prunelloides (Klotzsch & Eckl. & Zeyh.) Walp., deionized water and potassium sorbate as preservative	South Africa	[43]
Diarrhoea	Leaf, rhizome, root, stem decoction taken orally	Mozambique, South Africa, Swaziland	[15, 28, 29, 32, 34, 38, 44–46]
Diarrhoea	Rhizome mixed with root of Acokanthera oblongifolia Benth. & Hook.f. ex B.D. Jacks	South Africa	[44]
Dysentery	Root decoction taken orally	South Africa	[15, 38, 46]
Earache	Rhizome decoction taken orally	Botswana	[41]
Eczema	Roots and rhizome used in combination with Pentanisia prunelloides to treat eczema	South Africa	[36, 37]
Erectile dysfunction	Rhizome, root decoction taken orally	Botswana, South Africa	[21, 31, 47]
Fever	Roots taken as emetics	Mozambique, South Africa	[25, 42]
Fever	Rhizome decoction taken orally mixed with Pentanisia prunelloides	Zimbabwe	[43]
Haemorrhoids	Rhizome, root decoction taken orally	Lesotho, South Africa	[15, 24, 38, 48]
Herpes	Rhizome decoction taken orally	Lesotho	[24]
HIV/AIDS opportunistic diseases	Rhizome decoction taken orally mixed with roots of Boscia albitrunca (Burch.) Gilg & Gilg-Ben., Peltophorum africanum Sond. and Plectranthus ciliatus E. Mey.	South Africa	[49]
Itching	Rhizome decoction taken orally	South Africa	[12]
Infertility in women	Rhizome, root decoction taken orally	Lesotho, Zimbabwe	[3, 24]
Intestinal disorders	Rhizome, root decoction taken orally	Lesotho, South	[15, 24, 38, 39]

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		Africa	
Kidney failure	Rhizome decoction taken orally	South Africa	[12]
Love charms	Roots taken as emetics	South Africa	[42]
Menstrual problems	Root, stem decoction taken orally	Botswana, South Africa	[40, 44]
Pain killer	Root decoction taken orally	Mozambique	[25]
Peptic ulcers	Root decoction taken orally	South Africa	[4]
Rheumatic heart conditions	Root decoction taken orally	South Africa	[4]
Rheumatic heart conditions	Root decoction taken orally	South Africa	[4]
Sexually transmitted infections	Rhizome decoction taken orally	Botswana, Mozambique	[41, 45]
Shingles	Rhizome decoction taken orally	South Africa	[50]
Shingles	Root decoction taken orally in combination with Cladostemon kirkii (Oliv.) Pax & Gilg (roots), Drimia delagoensis (Baker) Jessop (bulb), Sarcophyte sanguinea Sparm. subsp. piriei (Hutch.) B. Hansen (bark)and Ranunculus multifidus Forssk. (whole plant)	South Africa	[51]
Sores	Rhizome decoction taken orally	South Africa	[50]
Sores	Root decoction taken orally in combination with Cladostemon kirkii (root), Drimia delagoensis (bulb), Ficus sur Forssk. (bark), Ranunculus multifidus (whole plant), Sarcophyte sanguinea subsp. piriei and Senecio serratuloides DC. (leaves)	South Africa	[51]
Stomach ailments	Roots taken as emetics	Lesotho, South Africa	[24, 42]
Stomach ailments	Rhizome decoction taken orally mixed with Acokanthera oblongifolia root or Pentanisia prunelloides	South Africa; Zimbabwe	[43, 44]
Sunburn	Underground parts used to treat sunburn	South Africa	[15, 38]
Syphilis	Root decoction taken orally	Lesotho, South Africa	[15, 24, 38, 39]
Tonsillitis	Rhizome boiled and extract taken orally	South Africa	[12]
Tuberculosis	Rhizome decoction taken orally	Lesotho	[24]
Ethnoveterinary medicine			
Appetite stimulant	Rhizome decoction	South Africa	[27]
Black quarter	Rhizome decoction	South Africa	[27, 30]
Cough	Rhizome decoction	South Africa	[52]
Diarrhoea	Rhizome decoction	South Africa	[30, 48, 52]
Dysentery in cattle and horses	Root decoction	South Africa	[48]
Ectoparasites in	Root decoction	South Africa	[33]

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goats (mites, ticks)			
Gastrointestinal parasites	Rhizome decoction	South Africa	[30]
Gall sickness	Rhizome decoction	South Africa	[30]
Heartwater	Rhizome decoction	South Africa	[27, 52]
Mange	Root decoction given to cows	South Africa	[53]
Pneumonia	Rhizome decoction	South Africa	[52]
Retained placenta in cattle	Rhizome decoction	Botswana, South Africa	[22, 30]
Tonic	Rhizome decoction	South Africa	[27]

Reproduction of rhizomes or root meat in E. Elephantina is used to relieve abdominal pain in Lesotho and Zimbabwe [24] and South Africa [42] and is applied to open wounds to stop bleeding [39]. In South Africa, E. Elephantina roots and rhizomes are cooked in water for the treatment of acne and other skin diseases [36°3]. & Zeyh.)Walp. It is used to treat eczema [36, 37]. Roots or rhizome decoction of E. elephantina is taken orally as remembered for various ailments and diseases including anemia in Mozambique [25], Blood Pressure, Clearing Air Canal, Eectile dysfunction, Haemorrhoids, ITching, Kidney Failure, Intestinal Disorders, Menstrual Disorders, Peptic Ulcers, Rheumatic Conditions, Shingles, Sores, Syphilis, Flexural Conflanks in South Africa [4, 12, 15, 31, 38, 44, 47, 48, 50]. Botswana, E rhizome or root powder Elephantina is used as a treatment for early menstruation of children, earaches, erectile dysfunction, and sexually transmitted diseases to wipe off the anus of children with bloody diarrhea and to clean the uterus after abortion. In Lesotho, E. The rhizomes of elephantina are used to clean the blood as a treatment for breast cancer, herpes, infertility, intestinal disorders, stomach problems, syphilis and tuberculosis [24, 39]. E. Elephantina leaves, Rhizom, and Root Cups have been used as treatments for diarrhea and Ruhr in Mozambique [45] and South Africa [15, 28, 29, 32, 38, 44, 46]. In South Africa, E. The rhizomes of Elephantina are mixed with Acokanthera oblongifolia Benth. &hook.F. Ex B.D. Jax's root as a treatment for South African diarrhea and stomach complaints [44]. In Mozambique, E. The root cup of ElephantinaOral is assumed as an analgesic [25] and sexually transmitted disease [45]. The rhizome of E. Elephantina is mixed with the roots of Pentanisia Pruneloides and is orally considered a treatment for fever and stomach disease in Zimbabwe [43]. Elephannorrhiza Elephantina is an ingredient in herbal mix made up of Alepidea Amatymbica Eckl, such as "Sejeso" (Ingwe® brand). & Zeyh. , Hypoxys Obtusa Burch. Ex Ker Gawl. , Pentanisia Pruneloides, Entorsion water, and adsorbent potassium adsorbents as preservatives as treatments for constipation, heartburn, digestive disorders, loss of appetite, loss of stomach disease, and vomiting [43]. According to Semenya et al. [49], E. The rhizome of Elephantina is Boscia albetrunca (Burch.) Gilg & Gilg-ben. , has the roots of Peltophorum african sond. Plectranthus Ciliatus E. Mey Mixed. As a treatment for HIV/AIDS -Port -insionist. Study by De Wet et al. [51] showed that root cooking with E. Elephantina in combination with Cladostemon Kirkii (Olive) Pax & Gilg (Roots), Drimia deloagoensis (Baker) Jessop (Lightburn), and Sarcophyte sanguinea Sparm is carried out. SSP. Piriei (Hutch.) B. Hansen (bark) and Ranunculus Multifidusforsk. (Whole plant) As a treatment for shingles. Study by De Wet et al. [51] also showed the roots of E. Elephantina in combination with Cladostemon Kirkii (root), Drimia delagoensis (Glühbirne), and Ficus sur forssk. (Rinde), Ranunculus multifidus (Ganze pflanze), Sarcophyt sanguinea ssp. Piriei und Senecio serratuloides dc. (Leaf) As a treatment for pain. E. Elephantina rhizome decoction is widely used by small farmers in Botswana and South Africa as a placenta maintained as placenta medicine for cattle breeding placenta medicine and for placenta medicine for other animals such as goats, horses, pigs, and magicians like pastors. -darm -darten, gallenkrankheit, herzwasser, meige, Lungenentzündungund ektoparasiten [22, 23, 27, 30, 33, 48, 52, 53]. Die Jungen Triebe von E. Elephantina can be eaten by South African cows and wildlife [6]. In Namibia, E. Elephantina pods are eaten by both humans and animals [26].

VI. PHYTOCHEMISTRY:-

Some classes of phytochemicals in several classes, including anthocyanidins, anthratinones, esters, fatty acids, phenolic compounds, flavonoids, glycosides, polysitels, saponins, sugars, tannins, triteroids, E. Isolated from rhizome extracts from

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Elephantina. The considerable pharmacological possibilities of E. Elephantina have been documented through the detection, separation, and purification of natural products through advances in field-technological search as attenuated total reflection, Fourier transform infrared (FTIR) spectroscopy chromatography chromatography electron spray ion ionization mass spectroscopy (LC-ESI-MS), gas chromatography massconrome (LC-ESI-MS), and gas chromatography maspractrome (LC-ESI-MS). (NMR) For structural education of new and complex connections (Table 3). With advanced studies via ATR, LC-ESI MS, FTIR, GC-MS, and NMR spectroscopy, the researchers have shown that E. We have a better understanding of the correlation between the molecular structure and biological activity of natural connections. Elephantina and its importance as a herbal medicine. Compounds isolated from E. Elephantina are documented and listed in Table 3. Their structure is shown in Figure 1. Aakuetal. [41] The following connections from the n-butanol rhizome extract from E were insulated. Elephantina: Dihydrocaempferol 1, Kaempferol 2, (â)-Catechin 3, Ethyl gallate 4, Gallic acid 5, 2-(3.4-dihydroxyphenyl)ethanol 6, 4-hydroxybenzoic acid 7, ethyl-1-D-galanoside 8, and quelside 3-O²-D-glucopyranoside 9. Phytochemical examination of E. Elephantina Rhizomes by Mthembu [57] showed the presence of several phenolic compounds, including catechin 3, gallic acid 5, quercetin 3-O-D-glypyriside 9, methylgarat 11, Oral, authors 11, îstoster 11, π-sittoster 11, and venom ost11. 3-O-Galloy-3.3², 5.5², 7-Pentaydroxyflavon 12, Taxifolin-3²-O²-D-glucoside 14. Especially recently, Msimanga et al. [55] insulated the following connections from the Hexwurzel extract from E. Elephantina: Hexadecanoic 15, 9.12-Octadecadienoic 16, 9-Octadecenoic 17, Octadecanoic acid 18, Butanedioc acid 19, Benzoic acid 20, 3-phenyl-2-propenoic acid 21, Non-anedioic acid 23, Methylpentadecanoate 25, Methylpentadecanoic acid 23, Hexadecanoate 26, 3.5-di-tert-butyl-4-hydroxy-phenyl)propionic acid 27, CIS-10-heptadecenoic acid 28, 30, CIS-5, 8, 8, 8, 11, 17-eicosapenta - Hexacosanoic acid 35, methyloctacosanate 36. E. Ephantina, The Mpofu et al. [54] showed the presence of Anthraquinon 38, triterpenoid olenololic acid 39, diosgenin 40, rhamnose 41, glucuronic acid 42, and arabinosis 43. Elephantina Rhizome Extracts, Mpofu et al. [56] Isolated Kaempferol 2, epicatechin 14, glucuronic acid 42, arabinosis 43, epigalocatechin galat 44, quercetin 45, and epicatechin galat 46. The major phytochemical compounds isolated from E-Elphantina are primarily separated from fatty acids). (26.09%) and Ester (13.04%) and the remaining connection contributions are less than 10%. See Table 3.

Table 3. Phytochemical compounds isolated from rhizomes or roots of Elephantorrhiza elephantina.

Phytochemical compounds	**Extrects**	**Method of compound characterization**	**References**
Ethyl gallate **4**	n-butanol	GC-MS	[54]
Butanedioic acid **19**	Hexane	GC-MS	
Benzoic acid **20**	Hexane	GC-MS	[41]
3-phenyl-2-propenoic acid **21**	Hexane	GC-MS	[55]
Methyl pentadecanoate **24**	Hexane	GC-MS	[55]
Methyl hexadec-9-enoate **25**	Hexane	GC-MS	[55]
Methyl hexadecanoate **26**	Hexane	GC-MS	[55]
Cis-10-Heptadecenoic acid **28**	Hexane	GC-MS	[55]
Methyl heptadecanoate **29**	Hexane	GC-MS	[55]
Methyl octadecanoate **30**	Hexane	GC-MS	[55]
Cis-5,8,11,14,17-eicosapenta-enoic acid **31**	Hexane	GC-MS	[55]
Eicosanoic acid **32**	Hexane	GC-MS	[55]
Kaempferol **2**	Ethanol, n-butanol	GC-MS, LC-ESI-MS	
Glycoside			[41]
Ethyl-1-O-β-D-galactopyranoside 8	n-butanol	GC-MS	[41, 56]

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Phenolic compounds			
2-(3,4-Dihydroxyphenyl) ethanol **6**	n-butanol	GC-MS	[41]
Catechin **3**	Chloroform, methanol, n-butanol	GC-MS, NMR	
Gallic acid **5**	Chloroform, methanol, n-butanol	GC-MS, NMR	[41]
4-Hydroxybenzoic acid **7**	n-butanol	GC-MS	[41, 57]
Quercetin 3-O-β-D-glucopyranoside **9**	Chloroform, methanol, n-butanol	GC-MS, NMR	[41, 57]
Epigallocatechin gallate **44**	Ethanol	LC-ESI-MS	[41]
Quercetin **45**	Ethanol	LC-ESI-MS	[41, 57]
Epicatechin gallate **46**	Ethanol	LC-ESI-MS	[56]
Methyl gallate **10**	Chloroform, methanol	NMR	[56]
3-O-Galloyl-3,3′,5,5′,7-pentahydroxyflavone **12**	Chloroform, methanol	NMR	[56]
Taxifolin-3′-O-β-D-glucoside **13**	Chloroform, methanol	NMR	[57]
Epicatechin **14**	Chloroform, ethanol, methanol	FTIR, LC-ESI-MS, NMR	[57]
Phytosterols			[57]
β-Sitosterol **11**	Chloroform, methanol	NMR	[56, 57]
Saponin			
Diosgenin **40**	Chloroform, methanol	LC-ESI-MS	[57]
Sugar			
Rhamnose **41**	Chloroform, methanol	LC-ESI-MS	[54]
Glucuronic acid **42**	Chloroform, ethanol, methanol	LC-ESI-MS	
Arabinose **43**	Chloroform, ethanol, methanol	LC-ESI-MS	[54]
Triterpenoid			[54, 56]
Oleanolic acid **39**	Chloroform, methanol	LC-ESI-MS	[54, 56]
Anthraquinone			
Anthraquinone **38**	Chloroform, methanol	LC-ESI-MS	[54]

VII. PHARMACOLOGICAL ACTIVITIES:-

7.1. Anthelmintic Activity:-

Maphosa et al. [58] There is a hinged macroscopic aqueous extract by rots of eggs and larvae eggs and larvae egg roots using 10 mg/kg and 0.5°C/kit/kit and negative water and negative water. Elephannorrhiza Elephantina had 100% egg ruts at a concentration of just 2.5 mg/ml. It was tested at a lowest concentration of 0.63 mg/ml. Elephantina inhibited egg hatching by 96%, comparable to albendazole at the same concentration [58]. Elephannorrhiza Elephantina completely inhibited larval development at a concentration of 1.25 mg/ml [58]. This study by Maphosa et al. [58] showed that egg inhibition and larval development were significantly increased than the concentration of elephantina root extract.

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In another study, Maphosa and Masika [59] examined the effectiveness of E. Water root extract of Elephantina-goat-magen-worm-worm natural mixed infections and natural mixed infections from coccidia species that were not administered in barba (11.36% albabazole) at 10 mg/kg. In this study, E. Elephantina reduced Trituris Eggs on days 3 and 6 at a dose of 250 mg/kg. In this study, E. also showed that elephantina is a highly effective elephantina. At 500 mg/kg. A reduction in the number of extracts administered by E. Elephantina for mixed gastrointestinal parasite infections indicates that this type has the properties of angelmin, indicating that the use of ethnic dealers against gastrointestinal parasites provides goat reliability. In another study, Maphosa and Masika [60] used bioactivity tests using albendazole and distilled water as positive or negative checks for adult Haemonchus contortus, E. We evaluated the crent bone activity of aqueous, hexane and ethyl root extracts by Elephantina. The aqueous and ethyl acetate fractions showed high motility inhibition after 6 hours of exposure at concentrations above 2.50 mg/mL, and the hexane fraction showed motility inhibition at concentrations above 5 mg/mL. After 30 hours of exposure, all ions, namely aqueous, hexane, ethyl acetate, and albendazole (over counter drugs), inhibition of mortality with significantly different mortality indicators [60]. All previously performed by the Anthelmin assessment [58,60] identified the root anhelmin activity of E. Elephantina, which was commonly used in South Africa as anthelmine tool for small-scale farmers in South Africa.

7.2. Antibacterial Activity:-

Aaku et al. [41] E. using biological techniques (TLC) with thin layer chromatography (TLC) using chloranphenicol or miconazole as positive and negative controls. The antibacterial activity of 70% ethanol and N-butanol lysom extracts by Elephantina was evaluated. Both extracts showed activity against subspecies, E. coli, E. coli, P. aeruginosa, and Staphylococcus aureus, for loads below 15¼g. Under the compounds in washing, only ethyl-garat 4 and brave acid 5 showed activity against subspecies and Staphylococcus aureus for loads below 50 euros. Similar results were made by Cueva et al. [66] We evaluated the effects of pure phenolic compounds such as catechin 3, ethylgarat 4, gyalcinic acid 5, and epicatechin 14 to inhibit potential atomischiogenic growth. These authors have found that non-flavonoid compounds such as ethylgarat 4 and galic acid 5 are more active than flavonoids such as catechin 3 and epicatechin 14. [28] Bacteria causing gastrointestinal infections, namely Staphylococcus aureus, Shigella Disorders, Shigella dysenteri, Shigella fencenteri, Shigella flexeris flexery, Shigella flexery and Shigella flexery, Shigella dygella dygella dygellad, Shigella dygellad and Shigella dysenteri, Shigella dygella dysenteri, Shigella dygella dysenteri, Shigella dygella dyssys, The extracts were determined by microplat dilution tests. Mathaben et al. [28] used 10 microliters with dimethylsulfoxide (DMSO) per negative control, and used paines (5 mm diameter) of nalidixic acid (30 mg), erythromycin (15°), and cotrimoxazole (25°) as positive controls. Microphone activity against pathogens was 0.08-0.63 mg/ml, with the highest inhibition being shown for Shigella Flexneri with microphone values between 0.08-0.16 mg/ml [28]. Mukanganyama et al. [21] Evaluated the antibacterial activity of ethanol root extracts by E.E. Elephantina is Elephantina against Staphylococcus aureus in cereus, subtils, E. coli, E. coli, P. aeruginosa, and Staphylococcus aureus using agar diffusion tests. This species exhibited antibacterial properties against all tested microorganisms, and the authors investigated minimal inhibitory concentrations (MICS) against Mycobacterium aurum and E. Elephantina showed specific activity at a MIC value of 1.25 mg/mL [21].

7.3. Antifungal Activity:-

As a negative controller. Mabona et al. [61] We discovered a variety of antifungal activities of aqueous and diclomethanol/methanol (1â1) leaf, root and rhizome extracts.

Aaku et al. [41] E. using TLC bioautography technology as a positive or negative check for chloramphenicol and miconazole. The antifungal activity of 70% ethanol and N-butanol rhizome extracts by elephantina was evaluated. Both extracts showed activity against Candida dermatosis against a type of load of <15. These results support traditional use of E. Elephantina in the treatment of fungal infections associated with gastrointestinal infections. Mukanganyama et al. [21] We evaluated the antifungal activity of the root ethanolx tract by E. elephantina against Candida albicans and Candida mycoderma using agar diffusion tests. This species exhibited antifungal properties against both tested microorganisms, and the authors examined minimal inhibitory concentrations (MICs) for

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Candida albicans and E. Elephantina Zeigte Eine Gewisseaktivitätmit-wert von 1,25 mg/ml [21]. Mabona et al. [61] We evaluated the antifungal activity of aqueous and dichromethane/methanol (1â:1) using microtittle plate dilution techniques for skin-related pathogens such as amphexin bedide such as Candida albicans, Microspormucanis, and Trichophytonmentaglophytes and Mentablopatos of aCotone and aChetheTone. Elephantina extracts were extracted. (DMSO ycotic activities were presented for canis (0.50 mg/ml), candida albicans (1.00 mg/ml) and trichophyton-mentan (1.00 mg/ml) by micromethanol/methanol leaf, root and rhizome extracts. Water root extracts of Pentanisia Pruneloides (1Â1) with E. Elephantina showed synergistic interactions with the sum of fractional inhibitory concentrations (£fic) ranging from 0.31 to 0.38 mg/ml for candida sterilization. Synergistic interactions found in Pentanisia Pruneloides and E., and E. Elephantina by Mabona et al. [61] These two types are often used in combination as herbal medicines for the treatment of skin infections, and therefore examine their antifungal effects. Similarly, Nciki et al. [50] used microtitru dilution techniques for dermatologically related pathogenic albicans, Microsporum canis and trichophyton Be. The antifungal activity of aqueous and diclomethanol (1":1) root extracts by Elephantina was evaluated. The best antifungal results were performed by dichromethane/methanol extract against Candida albicans with a microclospole value of 130 ¼ g/mL euros, microsporam canis (microsporam value of 250 im/mL) and 250/ml with trichophyton-menmentophyte with a microlophyte value of microlophyte. Nciki et al. [50] evaluated only the antifungal activity of the root extract, but Mabona et al. [61] Antifungal roots, leaves, rhizomes evaluated according to E. Elephantina. There are also differences in the best antifungal results documented in these two studies. According to Mabona et al. [61] The best antifungal activity is crabs with micropartial values of 0.50 mg/ml by dichromethane/methanol leaf, root, and rhizome extracts, but Nciki et al. [50] was demonstrated by dichromethane/methanol extract against Candida albicans at a MIC value of 130 îg/ml. Overall, Nciki et al. [50] and Mabona et al. [61] forms the scientific basis for the traditional use of E. Elephantina as a Chinese herbal medicine for several South African skin infections, including acne [15, 36â38], eczema [36, 37], itching [12], wounds [50, 51], sunburn [15, 38].

7.4. Anti-Inflammatory and Antinociceptive Activities:-

. Aqueous extracts from Elephantina reduced the formation of carrageenan and histamine-induced edema, resulting in a wiping of the acetic acid test and a reduction in leakage of the formalin test [62]. According to Maphosa et al. [62] Root extract of E Elephantina reduced pain even more than indomethacin, a potent inhibitor of prostaglandins (PG) synthesis, than controls. This indicates that plant species have potent anti-inflammatory and anti-classification activities. The anti-inflammatory activity exhibited by root extracts with E. Elephantina is Mishchenko et al. [72] showed cell cultures isolated from Rubia Cordifolia L. isolated from Anthraquinon 38. These results support the traditional use of species in a variety of inflammatory diseases and diseases, from microbial infections to wounds and wounds that lead to cell damage and pain.

7.5. Antiplasmodial Activity:-

Clarkson et al. [63] Parasite-dehydrogenase (PLDH)-antenize and churorcin-dyphonate (phazigma) were used to assess the aqueous, dichromethane and dichromethane/methane (1) leaf and root extracts of E. elephantina leaf and root extracts against Plasmodium falciparum falciparum. Dichromethane/methane (1Â1) leaf and root extracts showed weak activity at IC50 values of 26 and 28¼g/ml, while aqueous extracts of both leaf and root bone showed >100¼g/ml root [62]. E. Elephantina is often used as a traditional treatment of fever in Mozambique [25], South Africa [42], and Zimbabwe [43]. Possible explanation is E. Instead of having direct antiparacic activity, Elephantina acts as an antipyretic or immunologic to alleviate symptoms of the disease [73]. Alternatively, pioneering active ingredients can be present in E-Elephantina

7.6. Antioxidant Properties:-

Mpov et al. [54] used the DPPH radical catcher method with percentage inhibition values of circles and duh in the range of 33-72% in both methanol and water extracts, E. The antioxidant properties of Elephantina were evaluated. This was due to Mpoh et al. [54] showed that more extractable antioxidants, including methanol, are present as solvents compared to water. The antioxidant activity proven by the E. Elephantina-Rhizom extract is likely due to the presence of flavonoids and phenols [74]. The antioxidant

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properties shown by E. Elephantina are the complex gallstones 4, separated from ethanol extracts by Acacia nilotica wild ex del. It is located in Ethilgarat 4. Sub. Indica (Benth.) Brennan leaves exhibited antioxidant activity [75] in some of -Vitro -Assays.

7.7. Antirickettsial and Antibabesial:-

Cells in thin cultures are calculated by fusion of the extent of residual infection. Antibiotics used as controls, Imidocarb and Diminzen showed efficacy and showed EC50 values of 0.08 or 0.30 gem/ml. Similarly, E. The ElephantinaAceton Rhizoma Extract showed activity at 100°g/ml. Acetone rhizome extract from E Elephantina showed significant activity against mites transmitted diseases that are problematic for cows of South African farmers [64]. Using Antibabia and Anti-rickettsi-Vitro test systems, E. Elephantina-Rhizom extracts were evaluated. Naidoo et al. [64] Using cell culture-based antibacterial tests exposed to Babesia Cavalli culture E. Elephantina and effectiveness were used by assessing the degree of inhibition using a color change method and the proportion of parasitized naidoo et al. [65] is an in-vitro-hrlichia-reminantium culture system, E. We evaluated the anti-ricket attitude of Blattasetone's attitude by Elephantina. ehrlichia-reminantium cultures were incubated with acetone extracts from leaves and results were compared to those received on oxytetracycline and untreated checks. Elephantorrhiza Elephantina had antitonic activity with an EC50 value of 111.40 îg/ml and an EC90 value of 228.90 î¼ g/ml. The EC50 and EC90 values for oxytetracycline were 0.29 and 0.08î¼g/ml. These results are E. We show that Elephantina-Blatteblatte extracts may inhibit Ehrlithia parasites with similar mechanisms.

7.8. Toxicity:-

Despite the long-term use of E. elephantina as a herbal medicine in South Africa for the treatment of many human and animal diseases and complaints, this type is known to be harmful when used at excessive doses [3, 4, 48]. Root injection of E. Elephantina has a certain effect [48], and seeds have been severely stimulated and it has been reported that human death is suspected to be caused as a herbal medicine [4]. Hutchings et al. [4] Aqueous extracts of seeds corresponding to 0.75 g caused extensive necrosis upon injection and pulmonary edema when stained subcutaneously for gastroenteritis and pulmonary edema. Symptoms of poisoning were indifference, loss of anorexia, and severe diarrhea, which occurred in the animal with fatigue within 24 hours. Postmortem examinations developed acute gastroenteritis with numerous bleeding and significant degeneration of the liver [4]. Janssen [16] reported that seeds of E. elephantina in sheep with a fatal dose of 250 g and rabbit (fatal dose of 5.50 g/kg) cause gastroenteritis and pulmonary edema. Elephantina using Wistar rats showed no physiological and behavior-related changes in the animals, and no dials were recorded [62]. In another study, Maphosa et al. [76] We evaluated the acute, subacute and chronic toxicity of oral extracts of E. Elephantina rooted extracts in male and female Wistar rats. Although the authors did not die, changes in body weight and hematological and serum biochemical parameters between control and treated animals were observed. In acute studies, Maphosa et al. [76] observed a decrease in respiratory rate at a high dose of 1600 mg/kg, and in subacute studies, E. Elephantina root extracts caused increased serum levels of leukocytes, monocytes, and creatinine at higher doses of 400 and 800°/kg. In chronic toxicity, E. Elephantina Extracts caused an increase in lymphocytes and platelets, and changes in body and organ weights were also observed in both subacute and chronic toxicities. Maphosa et al. [76] We observed renal crystals with renal crystals and acute hepatitis with secondary elevated renal lonephritis, and intrarenal sediments (memory of oxalate crystals), but pulmonary sarcoma was found to be 400°C/kg, and secondary elevated renal lonephritis in animals receiving 800 mg/kg in a subacute toxicity test. In chronic toxicity studies, Maphosa et al. [76] observed splenic siderose, pulmonary granuloma, refractive crystal deposits, and associated renal lone nephritis. Mpov et al. [54], using only Garnellen-Paresis Test, E. The cytotoxic activity of Elephantina was evaluated. Chloroform-Rhizom Extract by E. Elephantina showed some biological activity with an LC50 value of 0.80 [54]. Based on previously performed toxicity assessments [54, 62, 76]. Elephantina is potentially toxic to certain doses, so it should be used with caution in herbal medicines.

VIII. CONCLUSION:-

Over the past decade, the gap in knowledge of medical plants has been limited in the past decade. This is from extensive research from a variety of scientists trying to understand the benefits of traditional medicines and the majority of the population still uses them as primary

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healthcare choices. However, some studies have questioned whether appropriate research or guidelines have been asked to certify traditional medicines for formal inclusion in the health system. There is still no gap in understanding how plant extracts inhibit the various microorganisms exposed, and how they inhibit antidiabetic and antimalarial properties. The effects on mechanisms of action on antibacterial, antidiabetic, anti-inflammatory, anti-inflammatory, wound healing may lead to a better understanding of the medical properties of plant extracts and future product production.

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