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NODDING SPURGE

Euphorbia is the third largest genus in the flowering plants after Fabaceae and Rubiaceae with about 2000 species distributed worldwide (1). It has been widely reported for its ethnomedicinal uses for the treatment of diseases ranging from respiratory infections, body and skin irritations, digestion complaints, inflammatory infections, body pains microbial illness, snake/scorpion bite, endocrine and sensory disorders (2). Studies showed the purgative and emetic effects of Euphorbia species (3). They are also implicated in the treatment of skin diseases such as warts, sores, carbuncles, boils, hair loss, dermatitis, sunburn and eczema (4).

Euphorbia was described to treat asthma and cough but also included descriptions of treatment for bronchial complaints, breathlessness, pneumonia and use as an expectorant (5). It is also reported that herbal industry and local residents face the problems of adulteration and substitution at a raw material stage.

Euphorbia mutans, commonly known as eyebane, chamseyge, spotted sand mat, eye bane, spotted spurge, an important member of this genus, has not been explored of its taxonomic and chemical profiling hence this study.

1.1 PROBLEM STATEMENT

Euphorbia nutans, commonly known as eyebane, chamaesyce nutans or nodding spurge are summer annual weeds. It can grow between one and three feet wide. The leaves of eyebane are green and oval shaped. The top surface of this leaf sometimes has a red dot. Eyebane are a ground cover plant and they spread out as they grow. The stem of this plant is weak and can't support much weight (6). They grow and bloom from August to November [ ]7. In the stems there is white poisonous latex, this latex is sap-like and can irritate eyes or make your skin itchy. Eyelane grows almost anywhere as long as there is dirt and plenty of sunlight for it. Chamaesyce mutans attract bees, wasps, and Syphid flies.

1.2 AIM AND OBJECTIVES OF THE STUDY

The aim of this study is designed to set macro/micro morphological standards, phytochemical and physochemical parameters for the identification of Euphorbia mutans, a traditional remedy for the management of many diseases.

Herbal remedies are cheap alternative to conventional medicine. They have contributed significantly to rural livelihoods and apart from the traditional healers practicing herbal medicine, many people are involved in collecting and trading in medicinal plants. Despite the fact that medicinal plant use has been an old habit in most communities, the emergence of drug and multidrug-resistant strains of microorganisms have opened a more wider window for continued research and discoveries on medical plant. Also most communities in developing nations are deep into medicinal plant use due to the alarming rates of poverty and therefore this need

scientific backing especially in deducing their efficacies to treatment of such ailments. They provide unlimited opportunities for new drug leads because of the unmatched availability of chemical diversity.

1.3 JUSTIFICATION OF THE STUDY

Eyelane has potential medicinal properties and a place in traditional medicine. It's important to exercise caution due to its toxicity. Nodding spurge lies in its potential therapeutic benefits and its role in the ecosystem, but its use should be approached with care and awareness of its potential dangers.

1.4 RELEVANCE OF THE STUDY

Euphorbia Nutans is relevant due to its medicinal properties, ecological role and potential toxicity. It's used traditionally for various ailments and can be nectar source for pollinators. It also contains a milky sap that can cause irritation to humans and animals.

1.5 SCOPE OF THE STUDY

This project work is designed to know the health benefit, effect, traditional use of Euphorbia Nutans.

2.0 CHAPTER TWO

LITERATURE REVIEW

Euphorbia nutans is a medicinal herb and are a local heritage with global importance. They are used to treat several diseases of human and animals. Among it is a very large and diverse genus of flowering plants in the spurge family (Euphorbiaceae). All spurge produce mostly white latex which they exude when cut and this sap is often toxic. The rich morphological variability and near-cosmopolitan distribution of Euphorbia have attracted human interest around the world since ancient and even prehistoric times.

In Nigeria for example extracts or exudes of the plant are used as ear drops and in the treatment of boils sore and promoting wound healing. Spurge are known for their uses as ornamental and household plants and their latex contributed to the economic importance of some species such as Euphorbia antisyphilitica, Zucc. (Candelilla wax).

Numerous studies were done on many species of Euphorbia to provide phytochemistry and

biological activity of the compounds.

2.1 HISTORICAL BACKGROUND OF NODDING SPURGE

Euphorbia nutans is a summer annual herb and a native of North American occurs throughout Tennessee. It is a troublesome weed in row and vegetable crops, ornamentals, right-of-way, pastures and hay fields, and many other situations. It was found in disturbed areas like roadsides, riverbanks, and garden, and it has been recognized for its milky sap that can cause skin irritation.

2.2 TAXONOMIC CLASSIFICATION OF NODDING SPURGE

Nodding spurge is a weedy annual or short-lived perennial herb in the spurge family (Euphorbiaceae) - native to much of the United States, Eastern Canada, Mexico, Central America, the Caribbean, and Venezuela. The specific epithet, nutans, means “nodding” and references the nodding nature of stems.

The cotyledons or seed leaves of seedlings are glabrous (lack trichomes or hairs) and the stem are red and glabrous. The first true leaves are opposite with irregularly toothed margins. As the plant grow Fig 1, it continues to form opposite, simple oblong or oblongelliptically shaped leaves that are approximately 0.1 to 0.6 inches wide and 0.2 to 1.6 inches long.

Insert Fig 1: Opposite leaf arrangement of Nodding Spurge.

2.3 BOTANICAL DESCRIPTION AND IDENTIFICATION

The plants are annual or perennial herbs, woody shrubs or trees with a caustic, poisonous milky latex. The roots are fine or thick and fleshy or tuberous. Many species are more or less succulent, thorny or unarmed. The main stem and mostly the side arms of the succulent species are thick and fleshy, 15-91cm (6-36in) tall. The deciduous leaves may be opposite, alternate or in whorls.

All flowers in the Euphorbiaceae are unisexual, and they are often very small in size. In euphorbia, the flowers are reduced even more and then aggregated into an inflorescence or cluster of flowers known as a “cyathium” (plural cyathia). This feature is present in every species of the genus but nowhere else in the plant kingdom. Nodding Spurge produces separate, small, white male and female flowers. [Fig 2]

Insert Fig 2: Nodding spurge flower and seed capsule.

The fruit of nodding spurge is a capsule approximately 0.1 inches wide and long that contains ovoid, irregularly wrinkled seeds.

Fig 3: Nodding spurge seed.

2.4 TRADITIONAL USES

Some species of Euphorbia have been used in traditional medicine since many decades in the worldwide to treat a variety of human and animal diseases. Recent studies show that more than 5% of Euphorbia species are used in medicine { 1 }. They are most often used to treat digestive disorders, skin diseases. Numerous studies referred to the purgative and emetic effect of Euphorbia species { 2 }. Uses of Euphorbia was recorded from all continents except Australasia. For example in India Euphorbia is used to treat worm infestations in children and for dysentery, gonorrhea, jaundice, pimples, digestive problems and tumors { 11, 12 }. China, Nigeria and Philippines { 3 } used this for the same purpose.

Euphorbia is also used to treat skin or subcutaneous cellular tissue disorders. The most frequently treated disorders in the category of skin diseases are warts, sores, boils, carbuncles, dermatitis, calluses, hair loss, irritation, sunburn, eczema, psoriasis, pustules, and the use of Euphorbia spp. as astringents. The milky sap or latex of spurge is used to have a protective and defensive role in helping heal wounds { 4 }.

In the category of respiratory system disorders, Euphorbia Is used to treat asthma and coughs, but also included descriptions of treatments for bronchial complaints, breathlessness, pneumonia and use as an expectorant and originating.

It is also recorded that Euphorbia is used to treat wounds and hemorrhages. The treatment of abscesses, burns and injuries is also recorded.

2.5 PHYT0CHEMICAL COMPOSITION

Phytochemicals are variety of chemicals produced during the growth and metabolism of plants and widely found in fruits, vegetable, cereals, nuts, cocoa e.t.c

Phytochemical can have complementary and/or overlapping mechanism of action in the body,

including antioxidant effects, modulation of enzyme actions, stimulation the immune system, modulation of hormone metabolism, anti-bacterial and antiviral effect, interference with DNA replication and physical action whereby some may bind physically to cell walls by preventing the adhesion of pathogens to human cell walls.

Some of the phytochemicals are:

Tannins

Tannins are astringent, bitter plant polyphenols that either bind and precipitate or shrink proteins. They have physiological role by acting as antioxidants through free radical scavenging activity, chelation of transition metals, inhibition of prooxidative enzymes and lipid peroxidation.

They also inhibit tumor growth by inducing apoptosis, mutagenicity of carcinogens, and inhibiting.

They have economic role of tanning leathers in leather industry. They affect intake and digestibility of feeds among livestock and excess can be carcinogenic on normal tissues.

They also inhibit viral reverse transcriptase.

They accumulate metal ions e.g cobalt, manganese, iron, copper e.t.c necessary for growth microbial growth as cofactors and activators of enzymes.

Flavonoids

They are structural derivatives of flavones, containing conjugated aromatic systems, often bound to sugars as glycosides, and they are phenolic and water soluble in nature. 26 They exert their roles as anti-oxidants and hence protecting against degenerative diseases. Flavonoids such as quercetin act as chain breaking anti-oxidants, preventing oxidation of low-density lipoprotein by macrophages and metal ions like copper. This reduces the oxidative stress. 27. They also act as nature's biological modifiers as anti-allergens, anti-inflammatory, and induces phase two enzymes that eliminate mutagens and carcinogens. Flavonoids are also known to increase coronary flow, to reduce the myocardial oxygen consumption and to lower the arterial pressure. 29. They are also known to reduce capillary fragility. 30 to be anti-allergic and also to be anti-spasmodic and hence applied to relief asthma and nose bleeding. 31

Saponins

These are service active agents with soap-like properties and can be detected by their ability to cause foaming and to haemolyse blood cells. 32. They have a host of biological roles including boosting respiratory system as expectorant and hence activity against cough. They also have anti-protozoa activity whereby they act by reacting with cholesterol in the protozoal cell membranes causing cell lysis e.g. Yucca saponins are effective against protozoan Giardia

lamblia. They serve as vaccine boosters by acting as adjuvant. They have anti-inflammatory, emetic, antiviral, antifungal, insecticidal, molluscicidal, piscicidal and anti-bacterial activity. 33. They also bind to primary bile acids, which are metabolized by colonic bacteria into secondary bile acids. Some of the secondary bile acids are promoters of colon cancer. They have economic values as source of cheap, environment friendly detergents and cosmetics. 39.

Alkaloids

An alkaloid is a plant-derived compound that is toxic or physiologically active. Some alkaloids such as Isopteropoline, phenopyline have anti-microbial activity whereby, they act by promoting white blood cells to dispose harmful micro-organisms and cell debris. Highly aromatic planar polyketary alkaloids like berberine, piperine and harmane work by interacting the DNA and cell wall of others by simulating neurotransmitters such as acetylcholine, dopamine and serotonine. They affect central nervous system (CNS) at the synapses. They also act as narcotics as anti-malaria, as topical anaesthetic for opthalmology, in treating hypertension, neuralgia, rheumatism, motion sickness and also in extending the life of hormones. Some types of alkaloids are hallucinative, addictive, and toxic and hence used as arrow poison for hunting wild game.

Terpenoids

These are derivatives of isoprene molecules having a carbon skeleton built from one or more of CIS units. They exert their roles as anti-bacterial, anti-fungal, anti-viral, anti-protozoan, anti-allergens, as immune boosters and as antineoplastic.

The mechanism of action is speculated to involve membrane disruption by these lipophilic compounds. They are used to relieve cold, influenza, cough and acute bronchial diseases.

Cardiac Glycosides

Cardiac glycosides (also called cardanoids) occurs as a complex mixture together in the same plant and most of them are toxic, however many have pharmacological activity especially to the heart. They are used in treatment of congestive heart failure, whereby they inhibit Na+/K+ - ATPase pump that causes positive inotropic effects and electrophysiological changes. This strengthens heart muscle and the power of systolic concentrations against congestive heart failure.

They are also used in treatment of atrial fibrillation, flatter and they acts as emetics and as diuretics.

2.6 PHARMACOLOGICAL AND BIOLOGICAL ACTIVITIES

Euphorbia exhibits several pharmacological activities.

- Antimicrobial Activity

Evaluated the ethanolic extract of aerial parts on some pathogens bacteria. Euphorbia neriifera has demonstrated antimicrobial activity by fighting off bacterial and fungal infections - e.g pseudomonas aeruginosa, proteus vulgaris and staphylococcus aureus.

- Antioxidant and antiviral activity

Euphorbia neriifera contain compounds that act as antioxidants, helping to protect the body against damage from free radicals. This show that the methanolic extract of E. Spinachler has high content of phenolic and flavonoid compounds with good antioxidant activity.

- Anti-inflammatory activity

The plant's anti-inflammatory properties suggest it could be useful in treating conditions involving inflammation, such as arthritis and skin irritation.

- Anthelmintic Activity

Anthelmintic refers to the ability of a substance to kill or expel parasitic worms. It shows a remarkable and significant reduction in the levels of the identified helminths.

- Immunomodulatory Activity

It refers to the ability of a substance to alter the immune system's response, either by stimulating or suppressing it. Immunomodulation is a promising strategy for treating a range of conditions, including cancer, infectious diseases and autoimmune disorders, by either boosting the immune response or reducing harmful inflammation.

- Other Activities

Prostratin (a tigliane), which is produced by E. fischeriana and E. cornigera, has shown potential as an adjuvant therapy for the treatment of latent HIV infection [51, 52, 53, 54]. They may be useful for the treatment of multidrug resistant cancers [55, 56, 57].

- Neuroprotective activity

It shows that myrsinil diterpenes with strong neuroprotective activities may possibly be useful for the treatment of nervous system diseases, such as Parkinson's disease [50, 57].

Other biological functions, flavonoids exert some antiangiogenic properties [ ] and convey resistance to DATY BRACKET ARAY SIDER EEN radiation [61], Myrsinil diterpenes have a good analgesic effect [22], Phytoestrogens can prevent osteoporosis by activating estrogen receptors in the bone tissue and inhibiting bone resorption of osteoclasts [63], and saponin can improve liver function [64] and also has an antifatigue effect [ ].

2-7 Toxicity AND SIDE EFFECT

The spurges share the feature of having a poisonous, milky, white, latex-like sap. The skin-irritating and caustic effects are largely caused by varying amounts of diterpenes. Tripenes such as betulin and corresponding esters are other major components of the latex [ ]. In contact with mucous membranes (eyes, nose, mouth), the latex can produce extremely painful inflammation.

When large succulent spurges in a greenhouse are cut, vapours can cause irritation to the eyes and throat several meters away.