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A REVIEW ON PLANT EXTRACT OF NYCTANTHES ARBOR TRISTIS AND GLYCYRRHIZA GLABRA ON MOUTH ULCER ACTIVITY

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ABSTRACT

Mouth ulcers often cause swelling, irritation, and a decrease in daily functioning of the oral mucosa. Growing dissatisfaction with the drawbacks of synthetic drugs has spurred interest in plant-based alternatives. This review highlights the therapeutic value of two medicinal plants that are frequently used in traditional healing systems: Glycyrrhiza glabra and Nyctanthes arbor-tristis. Their rich phytochemical composition, which includes flavonoids, glycosides, tannins, triterpenoids, and other phenolic compounds, supports a number of beneficial actions, such as anti-inflammatory, antioxidant, antibacterial, analgesic, and wound-healing properties. Research indicates that while N. arbor-tristis promotes tissue healing, reduces oxidative damage, and controls inflammatory pathways, G. glabra has important anti-ulcer, calming, antibacterial, and mucosal-protective qualities.

KEYWORDS: Glycyrrhiza glabra, Nyctanthes Arbor-tristis Mouth ulcers Herbal medicine Phytochemicals Anti-inflammatory activity Antioxidant activity Antibacterial properties Wound healing Natural therapeutics.

1. INTRODUCTION

The medicinal plant Nyctanthes arbor tristis Linn. is found throughout India. Oleaceae is a well-known family. It is frequently referred to as "Parijat," "night jasmine," or "harsingar." The Greeks refer to "sad tree" as Arbor tristis because it loses its luster during the day, and "night flower" as nyctanthes. In India and throughout Asia, it is a traditional ethno-medicinal factory. It originates in India and is widely distributed south of the Godavari River and beneath the Himalayas. Important medicinal systems like Ayurveda, Sidha, and Unani employ the factory's leaves, flowers, dinghy, fruits, and seeds, all of which have distinct pharmacological rates.[1] Other names for it are Coral Jasmine, Harsinghar, Parijat, Queen of the Night, and Night Flowering Jasmine. A night jasmine is another common name for it. Aromatic and therapeutic flowers have become popular all over the world because their energy principles are safe and strong. The night-blooming jasmine's flowering phenology helps the people of Tripura plan their agroforestry projects and avoid disasters by helping them predict changes in the weather and rainfall.[2] Flavanol glycosides (astragaline and nicotiflorin), triterpenoids (nyctanthic acid and oleanolic acid), iridoid glycosides (arborside A, B, and C), and iridoid glucoside (arborside D) were found in the leaves according to phytochemical examination. The current study focuses on defining the quality criteria of N. arbor-tristis leaves in accordance with WHO requirements, while the various portions of this plant have varying medicinal properties.[3] Glycyrrhiza garb, also known as liquorice and sweet wood, is a member of the Leguminosae family and comes from the Mediterranean and parts of Asia. People have been using liquorice in medicines for over 4000 years. The first proof that it was used in a solution is in Code Humnubari (2100 BC). Also, Assyrian naturalism (2000 BC) said it was one of the most important plants. Glycyrrhiza glabra means "sweet root." Also called liquorice and sweet wood, it only grows in parts of Asia and the Mediterranean. The Egyptians, Chinese, Greeks, Indians, and Romans used the dried rhizome and base of this plant to help with gas and coughs.[4] Liquorice, scientifically known as Glycyrrhiza glabra, is a perennial herb native to parts of Asia and the Mediterranean region.

Because of its medicinal properties, this plant's root has been used for thousands of years by numerous civilizations. Liquorice's anti-inflammatory, antioxidant, and antibacterial qualities make it a valuable component of traditional medicines. Glycyrrhizin, flavonoids, and saponins are among the bioactive components of liquorice that have been connected to its therapeutic qualities. Glycyrrhiza glabra is used as a general tonic to treat respiratory and gastrointestinal disorders and to increase vitality.[5] Liquorice is an undershrub or resistant plant that grows upright to a height of about two meters. The roots are long, cylindrical, strong, and multi-branched. The parts of the plant that are used are the rhizomes and roots. A physiologically active, water-soluble complex that accounts for 40–50% of the dry material weight is one of the many components of liquorice. This complex is composed of simple sugars, amino acids, mineral salts, polysaccharides, pectin, flavonoids, and triterpene saponins. Glycyrrhizin is a triterpenoid compound that gives licorice root its sweet taste.[6] The liquorice shrub of the pea family frequently grows well in subtropical soils. The average height of its pinnate leaves, which have 9–17 leaflets each, is 7–15 cm. The flowers are thin and born in axillary spikes, and the calyx is small and campanulate. The blooms are about 1 cm long and vary in colour from purple to pale white blue. The perennial plant itself can grow up to 2.5 cm in height. Usually containing three to five brown reniform seeds, the fruit is a compressed legume that is 1.5 cm long.[7]

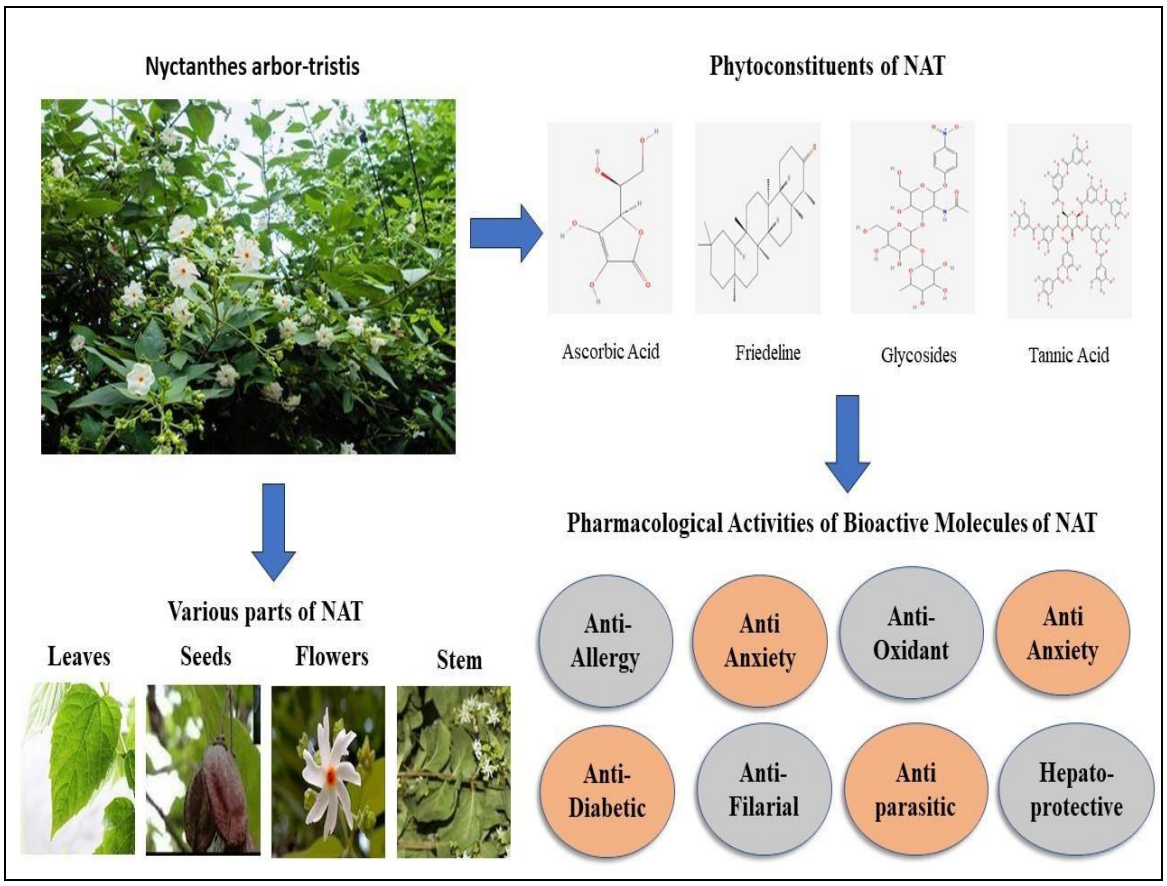

Fig. N Arbor tristis and the parts of plant.

2. Biological profile of *N. Arbor tristis*

2.1. Taxonomical classification

- **Kingdom: Plantae**
- **Subkingdom: Viridiana**
- **Infrakingdom: Streptophyta**
- **Super division: Embryophyte**
- **Division: Tracheophyte**
- **Subdivision: Spermatophyta**
- **Order: Lamiales**
- **Family: Oleaceae**
- **Genus: Nyctanthes**
- **Species: Nyctanthes arbor-tristis[8]**

3. Biological profile of *Glycyrrhiza glabra*

3.1. Taxonomical Classification

- **Kingdom: Plantae**
- **Division: Angiospermae**
- **Class: Dicotyledonae**
- **Order: Rosales**
- **Family: Leguminosae**
- **Genus: Glycyrrhiza**
- **Species: glabra Linn[9]**

4. Phyto-constituents of N. Arbor-tristis.[22]

Plant parts	Phyto-constituents
Bark	Alkaloids and glycosides.
Flower oil	Anisaldehyde, α-pinene, p-cymene, 1-deconol, 1-hexanol methyl heptanone, and phenyl acetaldehyde.
Flowers	Apigenin, Anthocyanin, D-Mannitol, Tannin, Glucose, Carotenoid, Essential Oil, Kaemferol, Nyctanthin, Glycosides, Quercetin, Rengylone, α-crocetin (or crocin-3), β-monogentiobioside, β-monogentiobioside-β-D, and β-digentiobioside.
Leaves	Ascorbic Acid, Benzoic Acid, Carotene, D-Mannitol, Flavanol Glycosides-Astragaline, Friedeline, Fructose, Glucose, Iridoid Glycosides, Lupeol, Mannitol, Methyl Salicylate, Nicotiflorin, Nyctanthic Acid, Oleanolic Acid, Tannic Acid, and β-Sitosterole.
Seeds	3–4 Glycerides of Linoleic Oleic, Lignoceric, Myristic Acids, Nyctanthic Acid, Palmitic, Stearic, Arbor tristoside A & B, a Pale Yellow Brown Oil (15%), and a Seco-triterpene Acid.
Stem	β-sitosterol, glycoside-naringenin-4'-0-β-glucapyranosyl-α-Xylopyranoside.

5. Microscopic study of N. Arbor-tristis

During the midrib convex project on the inferior field, the Nyctanthes arbor tristis leaf, which was likewise somewhat wavy between a thin middle rise leading to the superior sector, was cut. A few collenchyma coatings are situated beneath each other's epidermis, and the superior coating is situated near the curved xylem hole. On the underside of the bear plain layer, cystolite is formed by unicellular trichomes of various diameters. Glandular trichomes were located close to a bicellular top that was full of dark, tanned satisfaction among the single-cell shadow. The upper epidermis of the lamina cell rapidly acquired a wide wall and no stomata. The lamina at the midrib exhibits two rows of epidermis. Cuticle striated with slanting and regular anomocytic by sinous stockade on spaces. Because of anomocytic stomata, the inferior epidermis contains fewer cells than the upper epidermis. Two rows of pole cells make up the upper epidermis, followed by seven to nine rows of soft parenchyma that are often surrounded by parenchyma cells and transversed near vascular bundles.[21]

(a)Trichomes

(c)T. S. leaves of NAT mid-rib

(b) Vascular bundle

6. EFFECT OF LIQUORICE IN DIFFERENT DISEASES

a) Anti-inflammatory activity

Both in vitro and in vivo tests have been conducted on the anti-inflammatory properties of Glycyrrhiza extracts. By lowering the production of nitric oxide, interleukin-6, and prostaglandin E2 in lipopolysaccharide-induced macrophage cells, five flavonoids that were separated from liquorice extract demonstrate anti-inflammatory potential. Treating the macrophage cells with liquorice extract at a concentration of (0.2–0.5) mg/ml significantly decreased cytokines like tumour necrosis factor-alpha, interleukin-6, and interleukin-10. Cyclooxygenase activity can be inhibited by glycyrrhizin acid, an aqueous root extract of liquorice. Similar to hydrocortisone, it has steroid-like anti-inflammatory properties by inhibiting phospholipase A2 activity, which is the cause of many inflammatory processes.[10]

b) Dental carries

The dental caries is an issue of concern in the field of public health since it is one of the commonest problems across the globe. The most common health issue, the 2017 Global Burden of Disease study documents, is undressed dental caries, which is tooth decay in an unlimited amount of teeth. In the last 3 decades, dental caries has affected the poor and less privileged individuals more than it has affected the upper socioeconomic classes. Tooth decay is caused by the shrine accumulation in the tooth surface which converts the sugar in food and beverages to acids. Poor brushing, excessive free sugar and lack of exposure to fluoride make it a cause of pain, depressions, infections and even loss of teeth. Dental caries has become one of the most common health issues among the youths. Fifty percent of children in the United States aged five to seventeen years are found to have different dental issues, including rotted, decayed, malformed teeth, or lost teeth. To examine the efficacy of suppressing Streptococcus mutants with the help of the strategy of herbal caries-instillation, an airman exploration of young children was carried out in a preschool classroom. During three weeks, children were provided with sugar-free lollipops that are composed of liquorice root extract twice per day. In order to obtain the SM counts specific monoclonal antibodies of slaver were anticipated. Threat SM extent was taken as a threat index to establish three threat orders namely low, medium, and high.[13]

c) Anti-tussive activity

Liquorice powder and its extract are useful treatments for sore throats, bronchial catarrh, and cough. Glycyrrhizin, the active component of Glycyrrhiza glabra, gives it expectorant loosening, demulcent, and antitussive qualities. Glycyrrhizin helps reduce upper respiratory tract congestion and increases the production of tracheal mucus. The active component of liquorice methanolic extract, liquiritinapioside, can inhibit the cough-inducing effects of capsaicin. Additionally, liquorice ethanolic extract can stop sulphur dioxide gas-induced coughing in experimental mice. Similar to codeine, liquorice effectively eases sore throats and lessens irritation. Carbenoxolone, a semisynthetic compound that stimulates the production of stomach mucus, is derived from Glycyrrhiza glabra.[10]

d) Anti-oxidant Activity

The antioxidant potential of Glycyrrhiza has been confirmed by both in vitro and in vivo studies. For an in vitro scavenging test, glycyrrhiza root extract was mixed with DPPH (1,1-diphenyl-2-picrylhydrazyl). The methanolic extract was found to be a potent antioxidant with a maximum scavenging efficacy of 67.22% at a concentration of 500 µg/ml. ItsIC50 was determined to be 359.45 µg/ml. Phenolic components in ethanolic extracts, including glabridin, hispaglabridin A, and 30-hydroxy-40-methylglabridin, all demonstrate antioxidant activity by scavenging free radicals. capacities for hydrogen donation, metal ion chelation, and reduction. Glabridin's antioxidant qualities stop LDL from oxidizing.[10]

e) Anti-bacterial Activity

Glycyrrhiza Glabra hydro-methanolic root extract contains secondary metabolites such flavonoids, alkaloids, and saponins that have potent antibacterial properties against Staphylococcus aureus. Additionally, a number of investigations on ethanolic and aqueous liquorice extracts have shown their inhibitory effectiveness against Streptococcus pyogenes and Staphylococcus aureus cultures.[12]

f) Anti-malarial Activity

Liquorice contains a form of chalcone called Lico chalcone which is responsible for its antimalarial qualities. Oral dosages of 1000 mg kg-1 of Lico chalcone A against P. Yoeli in mice completely eradicated the malaria parasite in previously published research.[12]

7. Effects Of *N. Arbor Tristis* on Different Diseases

a) Anti-oxidant Effect

Antioxidants are those substances which protect the body against oxidative stress caused by accumulation of free radicals. Lipids, lipoproteins, and DNA are some of the substances that are destroyed by this oxidative stress, thereby causing a variety of diseases. Here, the antioxidant activity of the NAT leaves methanol extract was examined using in vitro methods in diverse ways. In tests like 1,1-diphenyl-2-picrylhydrazine (DPPH) radical scavenging, hydroxyl radical scavenging, nitric oxide scavenging, and superoxide radical scavenging the half-maximal inhibitory concentrations (IC50) were 57.93, 98.61, 91.74, and 196.07 µg/ml respectively. Phenolic content of the extract that stood at 78.48 ± 4.26 mg of tannic acid equivalent per gram could be the cause of the antioxidant properties of the extract.[15] The ability of the different N. Arbor-tristis leaf extracts to scavenge unbound radicals in vitro was evaluated using the diphenyl-picryl-hydrase (DPPH) test method. Plant extracts were combined with the stable free radical

DPPH to produce 1, 1-diphenyl-1, 2-picryl hydrazine, which had a wavelength of 517 nm. The capacity of plant extracts and standards (ascorbic acid and BHT) to scavenge DPPH radicals is diminished. (Butanol > Ethyl acetate > BHT > Pet ether > Ascorbic acid). Ascorbic acid was found to be the most abundant chemical at a concentration of 10 mg, while butanol, ethyl acetate, BHT, and pet ether were found to be the least abundant at concentrations of 100 mg, 95.22%, 84.63%, and 82.04%, respectively.[16]

b) Anti- Malassezia

Malassezia eukaryotic fungus are common members of the microbiological flora on human and animal skins. Nevertheless, infections caused by Malassezia species may cause various conditions, including pityriasis versicolor, seborrheic dermatitis, and folliculitis. Moreover, contact with this fungus may induce hypersensitivity, immunoglobulin E (IgE) production, and T cells reactions. It stimulates the production of IgE to produce Mala s1, which causes major allergens related to skin issues. Malassezia infection prevention was found to be effective when using the ethanol extract of NAT in a microdilution technique. The ethanol extract prevented the growth of two different strains of Malassezia and minimum inhibitory concentration of M. globosa and M. restrict were 1.05 µg/ml and 1.47 µg/ml, respectively.[14]

c) Antitussive Activity

Coughing is the defence mechanism in the body in order to exclude foreign objects in the respiratory system. Moreover, a cough may be a symptom of some underlying medical condition or anomaly. Codeine as well as dextromethorphan is the two most commonly used drugs to treat coughs. They can however cause severe side effects, including sleepiness, respiratory depression, and changes in mucus viscosity. A polymer carbohydrate (CP) prepared by the aqueous extract of NAT decreases coughing in guinea pigs caused by citric acid by 66.5% at 50 mg/kg dose. This effect was slightly higher than the one of codeine phosphate (62.1%). Previous studies also suggested that CP minimized airway discomfort by protecting cough receptors and reflex coughing.[14]

d) Analgesic and Anti-inflammatory activity.

Anti-inflammatory properties Nyctanthes Arbor Tristis's strong anti-inflammatory properties are among its main therapeutic qualities. Plant extracts have demonstrated potential in lowering inflammation and its symptoms. Flavonoids, phenolic acids, and iridoids are bioactive substances thought to have anti-inflammatory properties. These substances strengthen the plant's anti-inflammatory properties by blocking numerous inflammatory mediators. anti-inflammatory properties One of the key medicinal attributes of Nyctanthes Arbor tristis is its potent anti-inflammatory effect. Plant extracts have been shown to reduce inflammation and alleviate associated symptoms. This anti-inflammatory effect is caused by bioactive compounds like flavonoids, phenolic acids, and iridoids.[15]

Phytochemical Analysis And Physical Characteristics Of *N.Arbor-Tristis* Bark.

A wide range of chemical constituents was observed in different solvent extracts of the bark of Nyctanthes arbortristis. Saponins, proteins and amino acids, alkaloids, steroids, tannins, glycosides, carbohydrates and flavonoid were present and absent respectively. The findings of this study on the chemical composition of the bark may be useful in future studies on the medicinal and medical use of Nyctanthes arbortristis. The quality and phytochemical properties of N. arbortristis were investigated in terms of the bark. The proportion of acid insoluble ash was very low compared to the stipulated level of 0.30% w/w, the overall proportion of ash was determined to be within the range of accepted level at 9.16% w/w. In addition, the concentration of extractives that dissolved in water did not drop below 16.80% w/w, which was acceptable.[16]

Phytochemical Examination And Physiological Properties Of N.Arbor-Tristis Flower

Several compounds have been identified after the chemical composition of the flowers of Nyctanthes arbortristis was examined by employing different solvent extracts. The aqueous and alcoholic extracts have verified the existence of reducing sugars, alkaloids, tannins, cardiac glycosides, anthraquinone glycosides, proteins, terpenoids, and flavonoids in the flowers. Interestingly, saponins produced only the aqueous extract as a foam, and no starch was observed in all the solvent extracts. The detailed analysis indicates that Nyctanthes arbortristis flowers have a high phytochemical composition, and thus are potentially very important in traditional medicine and other applications. These extracting values depict how the flower composition is soluble. Corolla tubes and petals of flowers also differ significantly, as they both are composed of cellulose, pectin, lignin, lipids, and oils and proteins, but only tannin is present in the corolla tube. There is no mucilage and starch present in both parts. There are some unique features, such as the lack of suberin and the presence of crystals of calcium oxalate in the corolla tube not present in the petals. Their extractive and especially their ash values are analyzed which provides an insight into their properties.[16]

Analysis Of Phytochemicals And Physiological Characteristics Of N.Arbor-Tristis Fruit

The flowers of Nyctanthes arbor tristis have been found to contain many chemical compounds after the analysis of their chemical structure in some of the solvent extracts. The presence of reducing sugars, alkaloid, Tannin, cardiac glycosides, anthraquinone glycosides, proteins, and terpenoids and flavonoids in the flowers have been confirmed by various chemical assays performed on aqueous and alcohol extracts. It is worth noting that only aqueous extract contained saponins, but

none of the solvent extracts contained starch. This detailed discussion indicates the high level of phytochemical profile of the flowers of Nyctanthes arbor tristis, and it is important to note that they can have a great contribution in traditional medicine, as well as other uses. These extracts are soluble as reflected in their extractive values. The differences between the corolla tubes and flower petals are that they both have cellulose, pectin, lignin, lipids, oils and proteins, whereas, tannin occurs only in the corolla tube. The two structures are devoid of mucilage or starch. The distinctions are lack of suberin and calcium oxalate crystals in the corolla tube which are absent in the petals. Their specific characteristics such as their ash and extractive values give an insight into their characteristics. The chemical composition and reaction with different solvents of the fruit of Nyctanthes arbortristis have also been studied. The methanolic extract of the fruit contains alkaloids and glycosides as opposed to the petroleum ether extract. Both extracts lack saponins. The proteins found in the methanolic extract have amino acids, carbohydrates, and flavonoids, but the petroleum ether extract lacks them. Both extracts lack phytosterols, tannins and phenolic substances. Although the triterpenoids, fixed oils and lipids are absent in the methanol extract, they are present in the petroleum ether extract. Both extracts have no gums or mucilage. This data will be important in learning the composition of the Nyctanthes Arbor tristis fruit and its possible uses in different industries.[16]

Phytochemical Nature Of The Nyctanthes Arbor Tristis Leaf

The physio-chemical examination showed that the fat level of N. Arbor tristis leaves was 2.10%. On storing at room temperature, the leaves yielded a viscous, semi-solid substance and were observed to be dark green in colour. The presence of high acid content in the N. Arbor tristis leaves indicated by the value of 76.27 acid in the leaves render the oil unsuitable to be consumed by man. The value of iodine of these leaves is 134.44, which indicates that it is highly unsaturated. In addition, the chemical makeup of these leaves was 13.98% ash, 15.87% lignin, 9.41% crude fibre, 2.10% fat, 15.02% protein, 9.48% carbohydrates and 50.01% moisture.[16]

8. Morphological activity[17]

Morphological Features	Description
Height and Structure	An upright, bushy perennial herb with many branches that can grow up to one meter in height.
Root System	Its extensive, fibrous roots, which can reach a depth of several meters, and its thick, woody rhizome make it essential for absorbing nutrients and water.
Leaves	Compound leaves, which are oval in shape and have a glossy green surface, are made up of four to seven pairs of leaflets and an extra terminal leaflet.
Flowers	Pollination is aided by the small, purplish to pale blue flowers that are produced in axillary spikes, which are characteristic of legume plants.
Fruits	Small, flat pods with several oblong, brown-maturing seeds are produced by the plant.
Aromatic Qualities	The plant's aboveground sections have a subtle scent, but the root is renowned for its sweet, unique flavour because of glycyrrhizin.

9. Formulations methods

9.1. Fast Dissolving Film

Another creative fashion to increase customer development is to use oral presto- dissolving film (OFDF), which dissolves snappily and is easy to take without the need for water or aroma. The film decreases unwelcome taste, is easy to produce, handle, and distribute, and has a clear and usable packaging, making it the ideal intraoral fast- dissolving drug administration system. The film explores either the top or bottom of the language. While at the operation point, the active drug is incontinently released for original and/ or systemic immersion. Many medications, including neuroleptics, cardiovascular medications, analgesics, antihistamines, antiasthmatic medications, and erectile dysfunction medications, may be suitable for this type of dosage. The creation of a fast-dissolving film offers a chance to increase the range of products offered.[18]

9.2. Gel Formulation

Mouth ulcers can be treated with antibiotic or anaesthetic gel formulations, as well as calming/antiseptic mouthwashes as povidone iodine or chlorhexidine mouthwash. Semi-solid formulations include gels with a liquid phase that are later solidified by adding additives. Topical gels are intended to be applied to the skin or certain mucosal surfaces in order to deliver drug formulations locally or through percutaneous penetration. Because they contain a wide range of phytochemical groups, many Indian medicinal plants are believed to offer a variety of pharmacological effects. These natural materials provide an excellent alternative to the numerous issues with conventional produced drugs.[23]

9.3. Chewable Tablet

A chewable tablet is one type of solid pharmaceutical dosage that is intended to be chewed before consumed. These pills are designed especially for kids or those who have trouble swallowing regular prescription drugs. The

oral cavity releases the active substances, which increases their effectiveness for disorders including gingivitis and mouth ulcers by accelerating absorption via the oral mucous membranes54. The two main techniques for creating chewable pills are moist granulation and direct compression. During the direct compression procedure, all extracts and excipients are combined for 10 minutes. After adding a lubricant, the liquid is churned for two more minutes. After evaluating the powder's flow properties, tablets are created via direct compression.[24] [25]

9.4. Mouth wash

Mouthwash is a liquid combination used to rinse the oral cavity. Its primary objectives are to lower oral bacteria, improve breath, and sometimes offer pharmaceuticals to treat ulcers, gingivitis, and dry mouth43. Both alcohol-containing and alcohol-free mouthwashes are available; the latter is less damaging to oral tissues. It may be used often as a necessary part of good oral hygiene. To prevent any adverse effects, customers are urged not to consume the product and to adhere to the recommended usage guidelines44. Each active component extract should be properly measured out and then thoroughly mixed with water. Add the other ingredients one at a time, taking care to thoroughly combine them. Once sterile water has been treated with 1% w/v salt, used.[26] [27]

10. Mouth ulcers

Since the oral cavity is the main entry point for social interaction, communication, and food intake, oral health is vital to human well-being. Oral cavity disorders can cause systemic complications in addition to impairing these vital functions. Mouth ulcers, also known as aphthous ulcers, are among the most common oral mucosal lesions in the world. A sore that develops on the lining of the mouth is called an oral ulcer. These are a common oral cavity condition that can cause painful lesions that have a major negative influence on a person's quality of life.[20] There are numerous underlying causes of these ulcers, each with its own pathophysiology and treatment implications2. Trauma is one of the main causes of oral ulcers. It can be brought on by aggressive tooth brushing, inadvertent cheek biting, or irritation from dental appliances like braces or poorly fitting dentures. Oral ulcers can also develop as a result of bacterial and viral infections. For example, some bacterial infections may cause ulcerative lesions, and the herpes simplex virus can cause painful sores that recur frequently.[21]

11. Future Scope

Despite the fact that the therapeutic potential of Glycyrrhiza glabra and Nyctanthes Arbor-tristis is adequately supported by the current studies, a number of aspects need further research. Their wound-healing and anti-inflammatory effects are due to particular bioactive compounds, which should be isolated and characterized in future studies. They also need well-controlled clinical trials that will confirm their safety, efficacy and optimum dosage to treat mouth ulcers in human population. It also has a lot of room to come up with sophisticated formulations- oral films that dissolve fast, gels, patches that mycobacterium can stick to, and nanoparticles to improve drug delivery, stability, and patient compliance. Normalization of their extraction procedures, quality management criteria, and chronic toxicity will also go further in making these herbal agents valid therapeutic substitutes. The incorporation of the latest pharmaceutical sciences and the long-established medicinal knowledge can provide the new ways of safe, effective and affordable methods of herbal treatment. As further scientific investigations are conducted, G. glabra and N. Arbor-tristis can become promising agents in the future clinical use of these diseases in the management of mouth ulcers and other diseases of the mouth and teeth.

12. CONCLUSION

In summary, both Glycyrrhiza glabra (liquorice) and Nyctanthes dome- tristis (Parijat) have shown remarkable eventuality as natural remedies for treating mouth ulcers. Their rich phytochemical content — especially flavonoids, phenols, tannins, and glycosides gives them strong Antioxidant, Anti-inflammatory, antimicrobial, and mending parcels. These conduct help reduce pain, control infection, and speed up the recovery of oral pains. Liquorice has long been used in traditional drug, and ultramodern studies now support its capability to soothe inflammation, fight bacteria, and cover the mucosal filling. also, N. dome- tristis exhibits emotional antioxidant and Anti-inflammatory goods, along with fresh benefits that make it useful in managing colourful health conditions. When used together or formulated into ultramodern lozenge forms like fast- dissolving oral flicks, these factory excerpts can offer a safer, more accessible, and more patient-friendly approach for managing mouth ulcers.

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