e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

PHYTOCHEMICAL INVESTIGATION AND ANTI – MOUTH ULCER ACTIVITY OF JASMINUM GRANDIFLORUM

Kavita Khedade*1, Surbhi Kolhe*2, Dr. Ravi P. Kalsait*3

*1Assistant Professor, Department Of Pharmaceutical Chemistry, Central India College Of Pharmacy, Lonara, Nagpur, DBATU University, Lonare, Raigad, Mumbai, Maharashtra, India.

*2Student Of Pharmacy, Central India College Of Pharmacy, Lonara, Nagpur, India.

*3Principal, Central India College Of Pharmacy, Lonara, Nagpur, India.

DOI : https://www.doi.org/10.56726/IRJMETS49753

ABSTRACT

Traditional medicine, Ayurveda, Siddha, and Unani use the shrub Jasminum grandiflorum Linn. Research on the plant indicates that it has potential benefits as an aphrodisiac, antibacterial, anthelmintic, aromatherapy, cardiotonic, diuretic, hyperdipsia, suppurative, skin problems, thermogenic, and for ulcers and wounds. In addition to the numerous ayurvedic and folk uses, J. auriculatum has been the subject of pharmacognostical, phytochemical, and pharmacological research, not to mention the plant's immense potential. Sterols, carbohydrates, alkaloids, and flavonoids are all present, according to the phytochemical study. A mouth ulcer caused by acetic acid in Wistar Albino rats was used to test the extract's anti-ulcer properties.

I. INTRODUCTION

MOUTH ULCER:

A mouth ulcer is an ulcer that occurs on the mucous membrane of the oral cavity. Mouth ulcers are very common, occurring in association with many diseases and by many different mechanisms, but usually there is no serious underlying cause.[1]

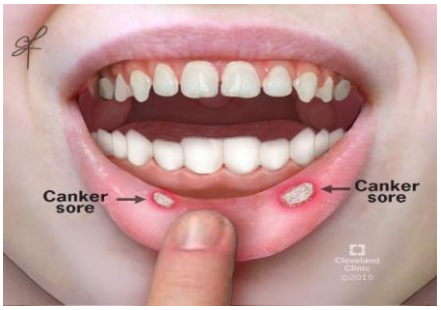


Fig. No. 1: Mouth ulcer (canker sore)

An ulcer is a break in the skin or mucous membrane with loss of surface tissue and the disintegration and necrosis of epithelial tissue. An ulcer is epithelium compared to an erosion or excoriation and involves damage to both epithelium and lamina propria. An erosion is a superficial breach of the epithelium, with little damage to the underlying lamina propria. Excoriation is a term sometimes used to breach of the epithelium which is deeper than an erosion but shallower than an ulcer.[2]

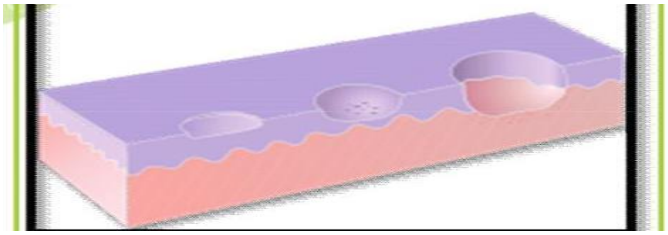


Fig. No. 2: Diagrammatic representation of mucosal erosion (left), excoriation (center), ulceration (right)

Pathophysiology of ulcer:

The etiology of RAS is still unknown; the condition may in fact manifest from a group of disorders of quite different etiologies rather than from a single entity.Despite many studies trying to identify a causal

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

microorganism, RAS does not appear to be infectious, contagious, or sexually transmitted. Immune mechanisms appear to be at play in persons with a genetic predisposition to oral ulceration.A genetic basis exists for some RAS. This is shown by a positive family history in about one-third of patients with RAS; an increased frequency of human leukocyte antigen (HLA) types A2, A11, B12, and DR2; and susceptibility to RAS, which segregates in families in association with HLA haplotypes. RAS probably involves cell-mediated mechanisms, but the precise immunopathogenesis remains unclear. Phagocytic and cytotoxic T cells probably aid in destruction of oral epithelium that is directed and sustained by local cytokine release.Patients with active RAS have an increased proportion of gamma-delta T cells compared with control subjects and patients with inactive RAS. Gamma-delta T cells may be involved in antibody-dependent cell mediated cytotoxicity (ADCC). Compared with control subjects, individuals with RAS have raised serum levels of cytokines such as interleukin (IL)–6 and IL-2R, soluble intercellular adhesion modules (ICAM), vascular cell adhesion modules (VCAM), and E-selectin; however, some of these do not correlate with disease activity.Cross-reactivity between a streptococcal 60- to 65-kd heat shock protein (hsp) and the oral mucosa has been demonstrated, and significantly elevated levels of serum antibodies to hsp are found in patients with RAS. Lymphocytes of patients with RAS have reactivity to a peptide of *Mycobacterium tuberculosis.* Some cross-reactivity exists between the 65-kd hsp and the 60-kd human mitochondrial hsp. Monoclonal antibodies to part of the 65-kd hsp of *M tuberculosis* react with *Streptococcus sanguis.* RAS thus may be a T cell– mediated response to antigens of *S sanguis*, which cross-react with the mitochondrial hsp and induce oral mucosal damage. RAS patients have an anomalous activity of the toll-like receptor TLR2 pathway that probably influences the stimulation of an abnormal Th1 immune response.

Predisposing factors may include any of the following:

- Stress - This underlies RAS in some cases; ulcers appear to exacerbate during school or university examination times.
- Trauma - Biting of the mucosa and wearing of dental appliances may lead to some ulcers; RAS is uncommon on keratinized mucosae.
- Endocrine factors in some women - RAS is clearly related to the progestogen level fall in the luteal phase of the menstrual cycle, and ulcers may then temporarily regress in pregnancy.
- Cessation of smoking - This may precipitate or exacerbate RAS in some cases.
- Allergies to food - Food allergies occasionally underlie RAS; the prevalence of atopy is high.
- Patients with aphthae may occasionally have a reaction to cow's milk and may have been weaned at an early age.

Aphthous-like ulcers may be seen in the following:

- Hematinic deficiency: Up to 20% of patients are deficient of iron, folic acid (folate), or vitamin B.
- Malabsorption in gastrointestinal disorders: About 3% of patients experience these disorders, particularly celiac disease (gluten-sensitive enteropathy) but, occasionally, Crohn disease, pernicious anemia, and dermatitis herpetiformis. HLA DRW10 and DQW1 may predispose patients with celiac disease to oral ulceration.
- Immune deficiencies: Ulcers (aphthous-like ulcers) may be seen in patients with HIV, neutropenias, and some other immune defects.
- Drugs, especially NSAIDs, alendronate, and nicorandil: These may produce mouth ulcers, but the history should distinguish them from RAS.
- Sodium lauryl sulfate (SLS): This is a detergent in some oral healthcare products that may aggravate or produce oral ulceration.

A study by Gülseren et al suggested that food additives may be involved in the etiology of RAS. In the study, patch testing was used to test for reactions o 23 food additives in 24 patients with RAS and 22 controls. The study found hat 21 (87.5%) of the patients with RAS demonstrated positive patch test reactions to one or more allergens, compared with 3 (13.6%) of the controls, with the additives producing the most positive reactions in the RAS patients being cochineal red (15 patients; 62.5%), azorubine (11 patients; 45.8%), and amaranth (6 patients; 25%).

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

A study by Zhang et al indicated that impairment of the enzymatic antioxidant defense system may be key to the pathogenesis of RAS in patients with the condition who have active lesions. The investigators found significantly lower serum levels of superoxide dismutase, catalase, and glutathione peroxidase in active lesion RAS patients than in patients in the remission stage of RAS or in healthy controls. Serum levels did not significantly differ between the remission patients and controls.[3]

Type of mouth ulcer

On the basis of ulcer size and number, mouth ulcer can be classified as Minor, Major, Herpetiform.

The main type of mouth ulcer are:

A) Minor ulcer: These are around 2 -8 mm in diameter and they usually clear up in 10 days to 2 weeks.

B) Major ulcer: These are bigger and deeper, often with a raised of irregular border. These types of ulcer can take several weeks to heal and may leave a scar in a mouth.

C) Herpetiform ulcer: This type of ulcer is a cluster of dozens of smaller sores about the size of pinheads.[4]

- **Factors responsible for mouth ulcer**

1. Viral Infection.
2. Toothpaste and mouthwash that contain sodium lauryl sulfate.
3. Medical trauma.
4. Emotional stress/ psychic stress.
5. Nutritional deficiencies.
6. Allergies and sensitivites.
7. Hormal changes.
8. Genetics.
9. Infectious agents (both bacterial and viral).
10. Medical condition[5].

- **Causes of mouth ulcer :**[6]

Table No.1: Causes of mouth ulcer

Microbial disease	**Malignant neoplasms**
• Herpetic stomatitis	**Blood disorders**
• Chickenpox	• Anaemia
• Herpes zoster	• Leukaemia
• Hand, foot & mouth disease	• Neutropenia
• Herpangina	• Other white cell dyscrasias
• Infectious mononucleosis	**Gastrointestinal disease**
• HIV infection	• Coeliac disease
• Acute necrotizing gingivitis	• Crown's disease
• Tuberculosis	• Ulcerative colitis
• Syphilis	**Rheumatoid disease**
• Fungal infection	• Lupus erythematosus

- **Treatment of mouth ulcer:**

Mouth ulcer are extremely painful a number of treatment can decrease pain and healing time.

These are include-

1. Rinse of saltwater and baking soda.
2. Milk of magnesia on the mouth ulcer.
3. Covering mouth ulcer with baking soda powder.
4. Using over-the-counter benzocaine (topical anaesthetic) product like orajel or anbesol,other synthetic treatment like dentogel, emergel, hexigel. .

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

5. Applying ice to cancer sores .
6. Damp tea bags on your mouth ulcer .
7. Taking nutritional supplement like folic acid, vitamin B6 , vitamin B12 and zinc.
8. Natural remedies such as Chamomile tea, Murray[7]

- **Drawback or limitation of current synthetic treatment:**
- Due to synthetic drug various side effects on the human health condition.
- Large dose or regular used of synthetic medication cause;

Oragel-
1. Bluish colored lips, fingernails, or palm
2. Dark urine
3. Difficulty breathing

Dentogel-
1. Blistering and peeling of skin
2. Swelling and redness at application site

Emergel-
1. Application site irritation
2. Burning sensation

To overcome these drawback herbal treatment can be use.

HERBAL MEDICINE:

Nature always stand as a golden mark to exemplify the outstanding phenomenon of symbiosis. The history of herbal medicines is as old as human civilization. Herbal medicine (also Herbalism) is the study of pharmacognosy and the use of medicinal plants. Plants have been the basis for medical treatments through most of human history, and such traditional medicine is still widely practiced today. Modern medicine makes use of many plant-derived compounds as the basis for evidence-based pharmaceutical drugs. Although herbalism may apply modern standards of effectiveness testing to herbs and medicines derived from natural sources, few high-quality clinical trials and standards for purity or dosage exist. The scope of herbal medicine is sometimes extended to include fungal and bee products, as well as minerals, shells and certain animal parts. The World Health Organization (WHO) estimates that 80 percent of the population of some Asian and African countries presently use herbal medicine for some aspect of primary health care. Nature has provided a complete store-house of remedies to cure all ailments of mankind. In past, almost all the medicines used were from the plants, the plant being man's only chemist for ages.[8]

USE OF HERBAL MEDICINE:

It is important not to limit this to proprietaries, which is sometimes done with- out even mentioning the plant derivation. Physicians are often given the name of the pure principle and are hardly aware that it is of plant origin. Another aspect is that physicians should be able to make up their own formulations, plant drugs being particularly suitable for this. Finally, the aim must be to link every proprietary product and every formulation with a definite concept of the plant on which it is based, not only as regards its actions, but also its the medicinal plant has a specific image, and knowledge is required of the plant drug and its uses.

It is also necessary for medical students to learn more about plant drugs in their pre- clinical as well as clinical years. Knowledge of medicinal plants should be conveyed as part of preclinical studies, particularly since our native plants, ranging from digitalis and bella- donna, as powerful drugs, to chamomile, peppermint, melissa and many others of the gentle drugs, will later play an important role in their practice. This is no less important than theoretical knowledge.

During the clinical years, information should be given not only on digitalis, belladonna and other powerful drugs which are essential in serious and acute conditions, but also on medicinal plants with gentle action, with full discussion of recent research findings relating to them. This would be the function of outpatient clinical teaching, where one sees more of the chronic cases that are the main field for gentle herbal drugs. The problem is that a major precondition is lacking: our teaching staff have themselves learned practically nothing of this in their training and are therefore unable to pass on such know- ledge. The solution will be to provide teaching appointments in practical herbal medicine, similar to the way it is now done in 'general medicine'.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

There is no need for large new institutes, as happened in the case of psycho- somatic medicine. What matters is that a start is made, particularly since such teaching appointments require only minimal finance. Herbal medicine has in the meantime become a separate field of knowledge, research and teaching, and can no longer be ignored. It requires specific knowledge and special training, and this cannot be done as a side line in medical training appearance and the part used, whether leaf, flower or root, and so on. Where a chemical product has its structural formula.[9]

ADVANTAGES OF HERBAL MEDICINE:

1) Herbal medicine have a long history of use and better patient tolerance and public acceptance.
2) Medical plants have a renewable source, so that we can have sustainable supplies of cheaper medicine for the world's growing population.
3) Because of the rich agro-climatic, culture and ethnic biodiversity of developing countries like India availability of medicinal plants is not a problem.
4) The cultivation and processing of medicinal herbs are eco-friendly.
5) Prolong and apparently uneventful use of herbal medicines is safe and efficacious.

IMPORTANCE OF HERBAL MEDICINE:

Herbal medicine represents a synthesis of many fields- botany, history, ethnomedicine, pharmacology. Plants may contain many dozens of chemical constituents. In earlier times, a single herbs that was appropriate for a particular condition was called a simple. herbal medicine is used in ways that differ from the ways conventional pharmacologic drugs are used. Because herbs have nutritional elements, and because pharmaceutical elements interact with one another. Treatment with medicinal plants is considered very safe as there is no or minimal side effects. Recently, WHO estimated that 80 percent of people worldwide rely on herbal medicines for some aspect of their primary health care needs. According to WHO around 21,000 plant species have the potential for being used as medicinal plants.[10]

Over the past two decades, there has been a tremendous increase in the use of herbal medicine; however, there is still a significant lack of research data in this field. Therefore since 1999, WHO has published three volume of the WHO monographs on selected medicinal plants.

- Herbs such as black pepper, cinnamon, myrrh, aloe, sandalwood, ginseng, red clover, burdock, bayberry and safflower are used to heal wounds, sores and boils.
- Some herbs are also having antibiotic properties. Turmeric is useful in inhibiting the growth of germs, harmful microbes and bacteria. Turmeric is widely used as a home remedy to cut and wounds.
- Some herbs like aloe, sandalwood, turmeric, sheetraj hindi and khare khasak are commonly used as antiseptic and are very high in their medicinal value.
- Ginger and cloves are used in certain cough syrup.
- A wide variety of herbs including giloe, golden seal, aloe and berberry are used as tonics.

As our lifestyle is now getting techno-savvy, we are moving away from nature. While we cannot escape from nature because we are part of nature. As herbs are natural products they are free from side effects, they are comparatively safe, eco-friendly and locally available. Traditionally there are lot of herbs used for the ailments related to different seasons. There is a need to promote them to save the human lives. These herbal products are today are the symbol of safety in contrast to the synthetic drugs, that are regarded as unsafe to human being and environment.[11]

HERBAL PREPARATION FOR TREATMENT OF MOUTH ULCER:

Fig. No. 3: Smyle gel

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

Smyle is a mouth ulcer gel for topical application with astringent and anti-inflammatary properties. It provide instant relief from mouth ulcer pain. This smyle gel is made up of 100% natural blends of 9 powerful herbs. It is ayurvedic medicine. The ingredient in smyle gel are khadir, irimed, tagar, rasana, kushtha, lodhra, yashtimadhu, karpoor, and sharkara. It is very safe and they have no side effects.

Fig. No. 4: Khadiradi vati

Khadiradi vati is a tablet, used in ayurvedic treatment of oral ulcer. It is advised to keep this tablet in mouth and swallow its pieces slowly. The content in khadiradi vati are khairsar, javitri, kankol, supari and Kapoor.

Fig. No. 5: Hiora SG gel

Himalaya hiora SG gel is an ayurvedic medicine that is primarily used for the treatment of mouth ulcer. They are 100% ayurvedic medicine. The ingredient of Himalaya hiora gel are jasmine, liquorice root, hogweed, triphala. They are also useful in relieves teething pain, relieves pain and irritation caused by dentures.

Fig. No. 6: Oracare gel

Oracare gel it it the herbal mouth ulcer gel helps to relief from mouth ulcer. Ingredient use in oracare gel aloe vera, curcumin, menthol, ginger, ajwain, clove oil. Aloe vera reduce the pain and inflammation, curcumin help in healing of ulcer, menthol help provide soothing effect on ulcer and helps in reducing minor pain, ginger, ajwain and clove oil helps cure ulcer and relief pain.

They applied twice/thrice a day on the ulcer area to get quick relief. The various components involved make it complete herbal leaving behind no side effects.[12]

II. REVIEW OF LITERATURE

The literature review encompasses the systematic information on studies of the leaves of *Jasminum grandiflorum Linn.*

1. Gill Y et.al. (2007) studied, to investigate where the public seek advice about mouth ulcers and to what extent the public approach the community pharmacy for advice.
2. Krishna P et.al. (2017) studied, to estimate the Indian population aged 17-30 who have been affected by mouth ulcer and to detect the possible causes of mouth ulcer. Also estimate on number of people who are aware of the treatment for the same.

3. Sivapathasundharam B et.al. (2018) studied, ulcer is break I continuity of the epithelium brought about molecular necrosis. Ulcer are most common in the oral region for which the patient seeks help from their physician/dental surgeon. The presenting complaint are usually redness, burning sensation and pain.
4. Mittal S et.al. (2019) studied, the mouth ulcer often caused pain and discomfort and may alter the person choice of food while healing occurs. This study focuses on the causes of mouth ulcer, factor responsible for the mouth ulcer. Herbal medicine is the main stay of primary healthcare because of better culture acceptability, better compatibility with human body and lesser side effects.
5. Gill Y et.al. (2007) studied, to investigate where the public seek advice about mouth ulcers and to what extent the public approach the community pharmacy for advice.
6. Krishna P et.al. (2017) studied, to estimate the Indian population aged 17-30 who have been affected by mouth ulcer and to detect the possible causes of mouth ulcer. Also estimate on number of people who are aware of the treatment for the same.
7. Sivapathasundharam B et.al. (2018) studied, ulcer is break I continuity of the epithelium brought about molecular necrosis. Ulcer are most common in the oral region for which the patient seeks help from their physician/dental surgeon. The presenting complaint are usually redness, burning sensation and pain.
8. Gill Y et.al. (2007) studied, to investigate where the public seek advice about mouth ulcers and to what extent the public approach the community pharmacy for advice.
9. Krishna P et.al. (2017) studied, to estimate the Indian population aged 17-30 who have been affected by mouth ulcer and to detect the possible causes of mouth ulcer. Also estimate on number of people who are aware of the treatment for the same.
10. Sivapathasundharam B et.al. (2018) studied, ulcer is break I continuity of the epithelium brought about molecular necrosis. Ulcer are most common in the oral region for which the patient seeks help from their physician/dental surgeon. The presenting complaint are usually redness, burning sensation and pain.
11. Mittal S et.al. (2019) studied, the mouth ulcer often caused pain and discomfort and may alter the person choice of food while healing occurs. This study focuses on the causes of mouth ulcer, factor responsible for the mouth ulcer. Herbal medicine is the main stay of primary healthcare because of better culture acceptability, better compatibility with human body and lesser side effects.
12. Bhowmik D et.al. (2005) studied to evaluate analgesic activity. Methanol extract of root of Jasmine was given in dose 200 and 400 mg/kg in Wister Albino rat and mice of either sex in tail flick and acetic acid induced writing method respectively.
13. Mittal SB et.al. (2010) studied wound healing activity of *Jasminum grandiflorum* in rat models at an active dose of 250 mg/kg. The extract treated animals showed 65% reduction in wounds as compared to 54% in control treated.
14. Kalaiselvi M et.al. (2011), *Jasminum sambac* Linn (family: Oleaceae) is commonly known as “mogra”. The Plant is considered as cool and sweet; it is used as remedy in case of insanity, weakness of sight and affections of mouth. J.sambac flowers contain major phytoconstituents as glycosides, saponins, flavonoids and terpenoids. In this study, the phytochemical screening and anti-lipid peroxidation effect of J.sambac was evaluated using the standard antioxidants BHT, Vitamin C, Vitamin E and Rutin. The preliminary study shows the presence of alkaloids, flavonoids, terpenoids, carbohydrates, proteins, phenols, tannins, saponins and phytosterols. The methanolic extract of the J.sambac flowers shows anti-lipid peroxidative effect which is similar to that of all standards. Results of this study suggests that the methanolic extract of J.sambac can be used as therapeutic agents to treat against various diseases caused by free radicals and other chemical agents.
15. Mittal A et al. (2011) *Jasminum auriculatum* is a shrub used in traditional medicines, Ayurveda, Siddha and Unani Studies conducted on it show that it possess beneficial effects as aphrodisiac, antiseptic, anthelmintic, aromatherapy, cardiotonic, diuretic, hyperdipsia, leprosy, suppurative, skin diseases, thermogenic, ulcers and wounds . The present review highlights the various folk, ayurvedic uses, pharmacognostical, phytochemical and pharmacological studies conducted on J. auriculatum and also the unexplored potential of the plant.
16. Dhere MD et. al. (2017) was studied formulate & evaluate antiulcer mouth gel containing *Jasminum grandiflorum* L. extract. The gel formulation was designed by using 70% methanol extract of *Jasminum*

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

Grandiflorum L. & evaluated for various parameters. The study reveals significant acceptability of gel formulation of *Jasminum grandiflorum* L. since evaluation parameters lie in range.

17. Cavalcante GM et al. (2011) studied that traumatic ulcer in rat cheek mucosa for utilization in future alternative therapy they result shows that the animal lost their weight, the ulcerated area receded linearly over time.

18. Hitomi S et.al. (2014) studied, to develop two new methods to apply direct stimulation to the oral mucosa for traditional behaviour pain assay in conscious rats. Measurements of facial grooming behaviour used intraoral dropping method enable evaluation of chemically induced nociception in oral mucosa. Measurements of head used intraoral opening method enable evaluation of mechanical induced nociception in oral mucosa.

19. Mittal S et al. (2016) studied that mouthwash made with traditional Japanese medicine hangeshashinto exibits anti-inflammatory action and alleviates oral mucositis scores, including pain complaints result shows that topical application of hangeshashinto in ulcerative oral mucosa suppressed mechanical pain hypersensitivity over 60 min.

20. Miao M et al. (2019) studied that clinical drug shuangjin Lian mixture on rats with oral ulcer and its mechanism result shows that the low, middle, high dose of drug can inhibits the accumulation of WBC and reduce edema and hyperaemia around ulcer tissue and improve ulcer healing probability.

21. Mehatre D (2013) studied that pharmacognostical and preliminary phytochemical evaluation of jati patra and there result show that pharmacognostical result show leaf are in transverse section,10 to 14 stomatal cells,16.5 m stomatal index, maximum solubility show in 90% ethyl alcohol. preliminary phytochemical result show presence of carbohydrate, tannins, sterol, flavonoids, alkaloids

22. Bharathi PR et al. (2020) studied that patents on compound and medicinal composition of *Jasminum grandiflorum.*

Based on exhaustive literature survey the herb *Jasminum grandiflorum* is selected for this study.

III. RATIONALE, AIM AND OBJECTIVE

RATIONALE OF STUDY

Now a day's lots of herbal plants are being upgraded by validating the traditional claims and establishing its medicinal value. Various plants are yet to be scientifically proven for their therapeutic efficacy.

- Synthetic drugs have various side effects, whereas herbal drugs show minimal or no side effect.
- Herbal medicine have long history of use and better patient tolerance and public acceptance.
- From the literature review we have selected *Jasminum grandiflorum,* which is a very common ornamental plant found easily in various households.
- *Jasminum grandiflorum* is having huge therapeutic potential, but the anti-mouth ulcer activity of leaves of this plant is not reported yet.
- Discovery of a new biological activity from this plant will be beneficial to society.

AIM

- The main aim of present work was to carry out phytochemical investigation and anti-mouth ulcer activity of *Jasminum grandiflorum* Linn

OBJECTIVE

The main objective of present study are :

- Collection, authentication and Extraction of *jasminum grandiflorum* Linn
- Phytochemical screening and TLC study of extract
- Evaluation of anti-mouth ulcer activity of extract

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

IV. PLANT PROFILE

Fig. No. 7: Jasminum grandiflorum Linn

PLANT PROFILE[13]

Synonyms : Jati, chameli, sumama
Biological source : *Jasminum grandifloru*
Family : Oleaceae

TAXONOMICAL CLASSIFICATION:

Kingdom : Plantae- plants
Subkingdom : Tracheobionts-vascular plants
Division : Magnoliophyta-flowering plant
Class : Magnoliophyta-Dicotyledons
Order : Scrophulariales
Family : Oleaceae-olive family
Genus : *Jasminum*
Species : *grandiflorum*

GEOGRAPHICAL SOURCE:

Chameli is native of Kashmir, Asia, Afghanistan and ascending in altitude ofn700-2700 m.It is grows up to 10 to 15 m high.

It is cultivated in India, North-west Himalayas, Western ghats, France, Japan, China, Italy, Egypt.

CLIMATE, SOIL, PROPAGATION:

It is cultivated in loamy soil and also variety of soil like black, lateritic and clay loam. Plant is highly water logging. In this plant propagated by shoot tip culture method. The month of May to December (in South India) and July to November (in North India) harvesting of flower is done.[14]

MACROSCOPIC CHARACTER:

Macroscopical study were perform with the help of sense organs. The leaf colour was pale green. The leaves give no odour. The taste of leaves was slightly bitter and astringent. The leaves was ternate or pinnate venation. Nature of leaf was glabrous. There touch was smooth and unctuous. The leaf size was measure 7.5 cm in length and 2.5 cm in width. The leaf shape was ovate-lanceolate, Oblong-rhomboid, Midrid-it is prominent on ventral surface, divided into vein, vein lets, Apex-it is acuminate, Margin- there margin was wavy.

CHEMICAL COMPOSITION:

Leaves- 2”-epifraxamoside, demethyl-2”-epifraxamoside, jasminanhydride, oleacein, 2-(3,4- dihydroxy phenyl)-ethanol, isoquercitrin, ursolic acid, resin, salicylic acid, jasminine, indole oxygenase , 3,4-dihydroxy benzoic acid, 2-hydroxy-30, 40-dihydroxyacetophenone and oleanolic acid.

Flowers: Cis-3-hexenol, 2-vinyl pyridine, indole, myrcene, linalool, geranyl linalool, αterpineol, geraniol, linalyl acetate, nerolidol, phytol, isophytol, farnesol, eugenol, benzyl alcohol, p-cresol, methyl benzoate, benzyl cyanide, benzyl acetate, methyl dihydrojasmonate, methyl anthranilate, jasmone, methyl- N-methyl anthranilate, vanillin, cis-3-hexenyl benzoate, benzyl benzoate, methyl palmitate, methyl linoleate, jasgranoside, jaspolyoside, 8-epi-kingiside, 10- hydroxy- oleuropein, 10-hydroxy ligstroside, oleoside-7,11-dimethyl ester,3-

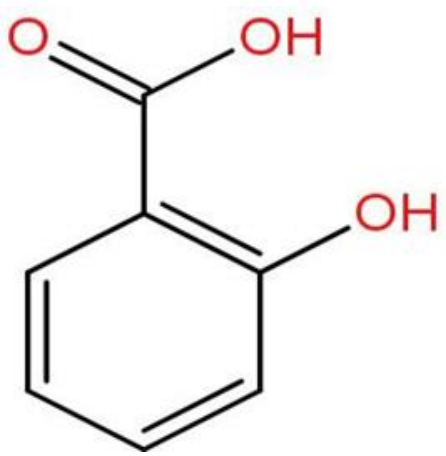
e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

O-α-Lrhamnopyranosyl (1→2)-β-D-xylopyranosyl-hederagenin-28-O-β-D-galactopyranosyl (1→6)-βD-galactopyranosyl ester, hederagenin-3-O-β-D-glucopyranosyl (1→3)-α-L-arabinopyranoside, 2- α,3β,23-trihydroxyolean-12-en-28-oic –O-β-D-glucopyranosyl ester, hederagenin-3-O-β-Dxylopyranosyl (1→3)-α-L-rhamnopyranosyl (1→2)-α-L-arabinopyranoside, 2α,3β,23- trihydroxyolean-12-en-28-oic –O-α-L-rhamnopyranosyl (1→4)- β-D-glucopyranosyl (1→6)- β-D-glucopyranosyl ester, hederagenin-3-O-α-L-rhamnopyranosyl (1→2)-α-L-arabinopyranoside, kaempferol-3-O-α-L-rhamnopyranosyl (1→3)-[α-L-rhamnopyranosyl (1→6)-β-D-galactopyranoside, kaempferol-3-O-rutinoside, 7-ketologanin, oleoside-11-methyl ester, 7-glucosyl-11- methyl oleoside, ligstroside and oleuropein.

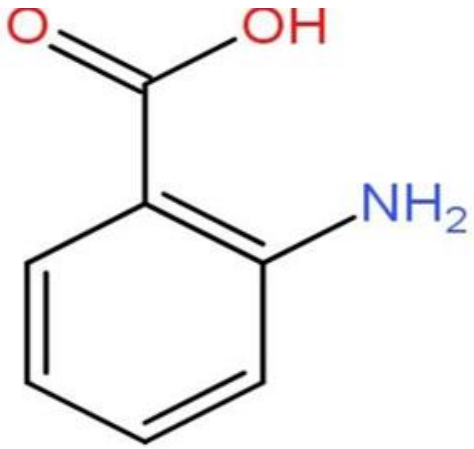
Jasmine oil: Methyl jasmonate, benzyl benzoate, linalool, linalyl acetate, benzyl alcohol, indole, jasmone, methyl anthranilate, P-cresol, geraniol, racemic (5-pent-2-enyl)-5,1-pentanolide, benzyl benzoate, nerol, 1-α-terpineol, d and dl-linalool, γ-jasmolactone, farnesol, nerolidol and eugenol.[15]

CHEMICAL CONSTITUENTS:

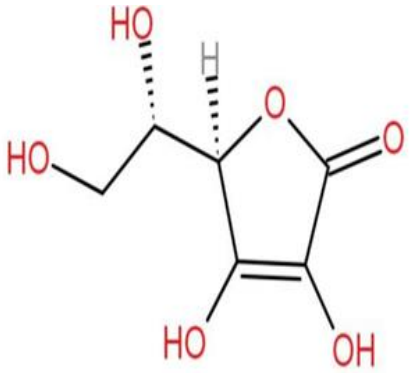
1. Salicylic Acid



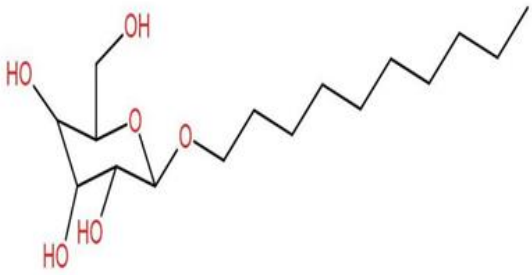
2. Anthranilic acid



3. Ascorbic Acid



4. Glucoside



MEDICINAL USE:

whole plant are use. The plant is bitter, astringent, acrid, thermogenic, aphrodisiac, antiseptic, anodyne, depurative, emmenagogue, emollient, diuretic, anthelmintic, deobstruant, dentrifrice, suppurative and tonic.

Roots: They are useful in cephalalgia, vitiated condition of vata, paralysis, facial paralysis, mental debility, chronic constipation, flatulence, strangury, sterility, dysmenorrhoea, amenorrhoea, ringworm, leprosy, skin diseases and giddiness.

Leaves: They are useful in odontalgia, fixing loose teeth, ulcerative stomatitis, leprosy, skin diseases, ottorhoea, otalgia, strangury, dysmenorrhoea, ulcers, wound and corns.

Flowers: They are useful in stomatopathy, cephalopathy, odontopathy, ophthalmopathy, leprosy, skin diseases, pruritis, strangury, dysmenorrhoea, ulcers, as refrigerant, ophthalmic and vitiated conditions of pitta.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

ETHNOBOTANICAL USES:

Practitioners recommend jasmine for liver complaints, dysentery, various types of pain including painful menstruation, skin disease like leprosy.

When Jasmine oil apply externally they are useful for soften and smooth the skin, heart disease, cancer.

Jasmine oil it is also useful for antidepressant, calming agent to soothe stress, pain, anxiety.[16]

AYURVEDIC USES:

जातियुगतिक्तमूष्णंतुवरंलघुदोषजित् ।
शिरोऽक्षिमुखदन्तार्तिविषकुष्ठानिलास्त्रजित् ॥ 28 भा.प्र. नि. पुष्पवर्ग

चम्बेलीतुवरातिक्ता व्रणकुष्ठविषस्त्रजित् ।
शिरोऽक्षिमुखदन्तार्तिहरात्वग्दोषनाशिनी ॥ घ. नि

मालतीतुवरातिक्ता कटूष्णादोषनाशिनी ।
शिरोक्षिमुखदन्तार्ति विषकुष्ठव्रणास्त्रजित् ॥1474॥ कै. नि.

Leaves are chewed in aphthae, stomatitis, toothache, ulcer in the mouth and leaf juice or oil obtained from it is dropped in to the ear (Bhavaprakash).

It is also used for gargles (Bhavaprakash and varindamaadhava).

There cooked oil with juice are useful for purulent discharge from the ear (Varindamaadhava and Bangasena)

The leaves are fry with ghee it is very useful for toes (Chakradatta).

The plant is used in scorpion string (Mahomedan).

The roots of chameli cooked in goat milk and sugar, it gives relief in pain for retention of urine and expelling calculus (Raaja Maarttanda).[17]

- Leaves-treatment of swollen spongy gums, ulcers, loose teeth, toothache, pain in ear, pus in ear, painful period.
- Flowers-Eye diseases, itching, disease of teeth.
- Jasmine oil-Anti-depressant, anti-Septic, anti-inflammatory, aphrodisiac.
- Ulcers in group in mouth/tongue, stomatitis-leaves can be chewed.
- Skin disease, psoriasis-Topically apply jasmine oil, apply leaves of paste.
- Swelling, wound-apply leaves paste.
- Pus discharge from the ear, pain in ear, pus discharge from wound- Oil of leaves, paste of leaves.
- Corns on feet, corns on toes- leaves juice apply externally.
- Eye pupil outgrowth- grind flower petals and apply
- Paralysis- root paste is apply.

Colicarmin drops-it is syrup of ayurvedic medicine useful to treat digestive disorders and act as carminative.
Malatyadi taila- Ayurveda herbal oil for hair care. Also useful in Alopecia, hair fall and dandruff problem.[18]

V. PLAN OF WORK

1. **Collection and Authentication of plant.**
2. **Phytochemical invetigation :**

- Extraction with appropriate solvent.
- Phytochemical examination and TLC study.

3. **Pharmacological screening:**

- Acute toxicity studies

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

- Evaluation of the extract for anti-mouth ulcer activity using acetic acid induced mouth ulcer in Wistar Albino rats.

VI. MATERIAL AND METHODS

PHARMACOGNOSTICAL STUDIES

Pharmacognostical evaluation helps to screen the commercial varieties, substitutes, adulterants and any other quality control of the drugs. It is a simple and reliable tool, helps to obtain information about biochemical and physical properties of crude drug. The application of pharmacognostic protocols such as macromorphology, microscopy, organoleptic tests, ash value study will help in identifying genuine drugs because these tests result in specific results for a particular drug.

Collection and authentication of plant

The fresh and healthy leaves of *Jasminum grandiflorum* Linn were collected. The plant was identified and authenticated.

Macroscopy

Macroscopical characters include organoleptic characters and morphological features of leaves were studied.

Microscopic Studies

Section method:

A fresh, non infected leaves of *Jasminum grandiflorum* Linn was selected.It was cut at its midrib and then taken small square section of potato, hold the sample vertically in between the thumb and fore finger sufficient 10 to 15 transverse section were take with help of blade.

Then with the help of mountain brush, thin selected section were transferred to watch glass containing water.

Staining method:

Selected thin transverse section of the sample was taken and transferred it on a slide with help of mountain brush. Add drop of water. Added few drops of choral hydrate solution and allowed to heat for 2 to 3 min. Added equal portion of phloroglucinol and concentration HCL, warm gently on flame and cool it. Finally added a drop of glycerin and covered the section avoiding air bubble carefully with cover slip.

Focused the section under microscope and the arrangement of cells were studied.[19]

Physicochemical constant:

Shade dried powdered leaves of *Jasminum grandiflorum* Linn was used for the determination of physicochemical constants.

Ash value

It is used to determine quality and purity of a crude drug and to establish the identity of it. Ash contains inorganic phosphate, carbonate and silicates of sodium, potassium, magnesium, calcium, etc. these are present in definite amount in a particular crude drug hence, quantitative determination in terms of various ash values helps in their standardization.

Total ash value

Sometimes, inorganic variables like calcium oxalate, silica, carbonate contents of the crude drug affects " Total ash value". such variable are removed by treating with acid and acid insoluble ash value is determined. It is used to determine foreign inorganic matter present as an impurity.

Formula-

Total ash value of sample= 100 (z-x) / y %

Where, x= weight of silica crucible
y = weight of drug taken
z = weight of silica crucible + ash (after complete incineration)

Procedure : Weigh the silica crucible. 2 gm of powdered drug was weighted with silica crucible. Then they was ignited at a temperature not exceeding 600ºC. cooled in desiccator for 30 min and then was weighted. The % of total ash was calculated.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

Water soluble ash: In this water soluble ash value, the total ash was boiled with 25 ml of water for 5 min. the insoluble matter was collected in an ashless filter paper, washed with hot water and ignited for 15 min, at a temperature not exceeding 450oC, cooled and weighed. The percentage of water soluble ash was calculated.

Acid insoluble ash: Acid insoluble ash value used for the determination of earthy matter present on roots, rhizomes, and also on the leaves, crude drug contain calcium oxalate crystals the amount may varies depending on the environmental condition.

Formula-

Acid insoluble ash value of sample= 100 x a / y %

Where, a= acid insoluble ash weight

y = weight of drug taken

Procedure

Using 25 ml of dil. HCL, wash the ash from the dish used for total ash into a 100 ml beaker. Boil for 5 min. filter through an ashless filter paper, wash the residue twice with hot water. Ignite a crucible in the flame, cool and weigh. Put the filter paper and residue together into the crucible, heat gently. Cool in desiccator. Weigh the residue. The percentage of ash insoluble ash was calculated.[20]

Determination of extractive value:

These are useful for the evaluation of crude drug. They gives an idea about the nature of the chemical constituents present in the crude drug. It is very useful for the estimation of constituents extracted with the solvent used for extraction. Extraction values by different solvents are used to assess quality, purity, and to detect adulteration due to exhausted and incorrectly processed drugs.[21]

Determination of water-soluble extractive value:

Accurately weighed powder (5gm) of JGL was taken and macerated with 100ml of distilled water for 24hr in conical flask. The content were frequently shaken during the first 6hr and allowed to remain for 18hr. after 24hr, the extract was filtered and the filtrate was evaporated, finally, the extract was dried at 105oC to constant weight and value was calculated as percent (w/w).[22]

Formula-

% of water-soluble extractive value=weight of extract x 100 x 100 / 25 x weight of sample taken

Determination of chloroform soluble extractive value: Accurately weighed powder (5gm) of JGL was taken and macerated with 100ml of chloroform for 24hr in conical flask. The content were frequently shaken during the first 6hr and allowed to remain for 18hr. after 24hr, the extract was filtered and the filtrate was evaporated, finally, the extract was dried at 105oC to constant weight and value was calculated as percent (w/w).[23]

Determination of petroleum ether extractive value: A suitably weighed quantity of the drug was transferred to an extraction thimble and extracted with pet. Ether in a soxhlet apparatus for 6hr. the extract was filtered into evaporating dish, evaporated and dried at 105oC to constant weight. The percentage of petroleum ether extractive value was calculated as percent (w/w).

PHYTOCHEMICAL STUDY

Phytochemical study by first extracting and isolating compounds from the origin plant, followed by defining their structure or testing in laboratory model system, such as cell cultures in vitro experiments, or in vivo studies using laboratory animals.

Phytochemical study determine the nature of phytoconstituents present in the plants.

These constituents are essential for pharmacological activities of plant.[24]

Solubility of *Jasminum grandiflorum* Linn

Material: funnel, beaker, filter paper, test tube, fine powder of JGL.

Solvents: Ethanol, petroleum ether, chloroform, distilled water, acetone, benzene, toluene, carbon tetrachlorid.

Methodology: 5gm of fine powder of JGL was added to the different solvent taken in a test tube and mixed well and allowed to stand for certain period. Then the mixture was filtered through filter paper kept in different funnels. The filter paper which contain fewer residues considered as more soluble in that solvent.[25]

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

EXTRACTION:

SOXHLET EXTRACTION

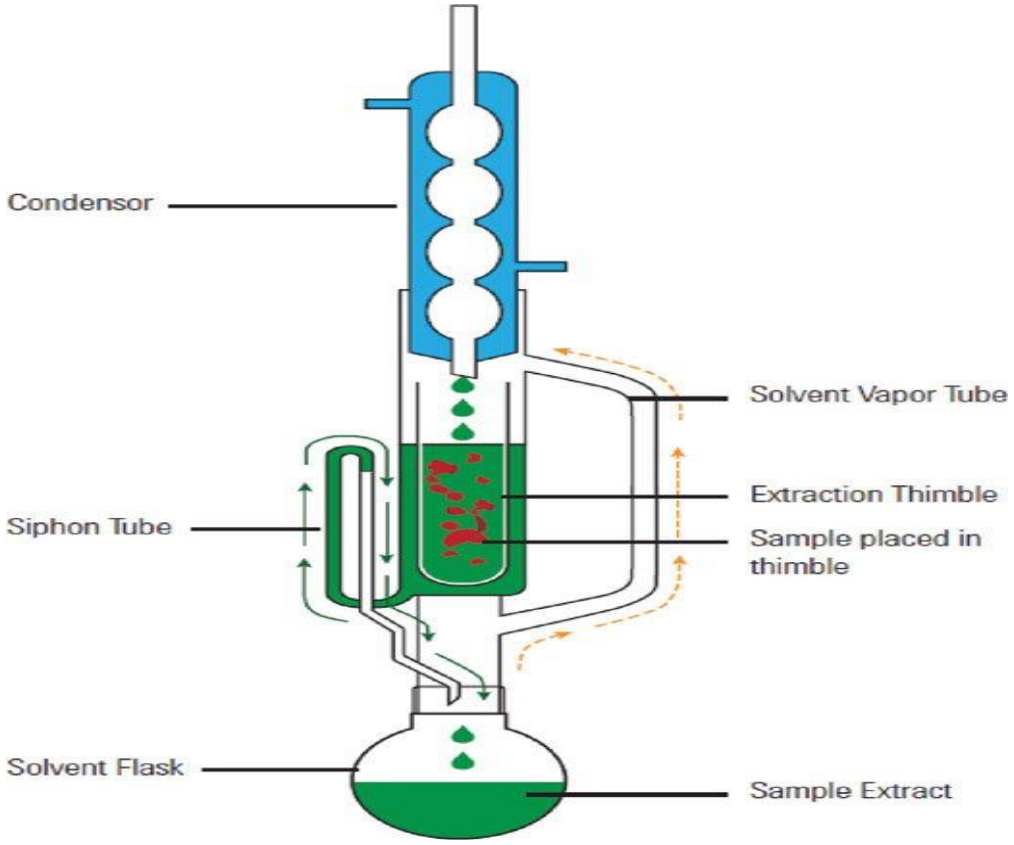


Fig. No. 8: Soxhlet extraction apparatus

Soxhlet extraction technique are easy to perform. They are employing organic solvent are techniques commonly used to extract polyphenolic compounds from natural sources because they gives good result.[26]

Traditionally it is used for solid sample with limited solubility in solvent in presence of insoluble impurities.[27]

Procedure:

In this extraction method, small amount (20gm) of crude drug was placed in thimble, which is placed in chamber of the soxhlet apparatus. The solvent ethanol (80%) was added. And then extracted solvent flask was heated and its vapors condense in condenser.

The condensed extractant drips into the thimble containing the crude drug, and extracts it by contact.

When there was a overflow, the solution of the thimble holder is aspirated by siphon, unload the solution back into distillation flask.

This solution carries the extracted solutes into the bulk liquid.In this process the solute stay in distillation flask and solvent again passes in to the condenser and the that (50 cycle) continue. The process is repeated until complete extraction takes place. The solid extract was weighted.[28]

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

MACERATION

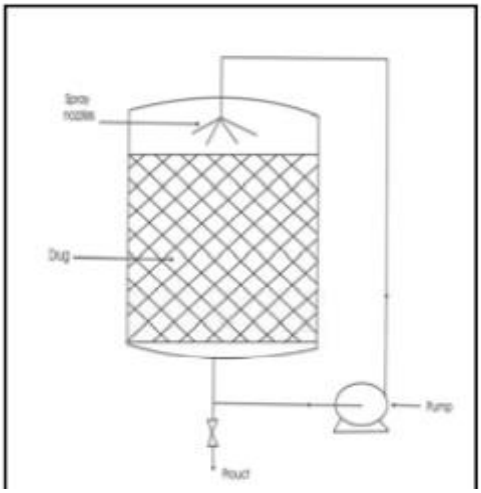


Fig. No. 9: Maceration apparatus

This is an extraction method.[29] This term derived from latin word "macerare" meaning to soak.[30]

The process in which small sized drug or substance is soaked in solvent for specific time the cellular structure is softened and penetrated by solvent and soluble constituents are dissolved and extracted out.

Maceration are divided in three types-

a) Simple maceration
b) Double maceration
c) Triple maceration[31]

Procedure:

In this maceration process, 20gm of coarse powdered of crude drug was put in stoppered container added ethanol (80%) solvent. This container allowed to stand for atleast 3 days at room temperature. This are frequent agitation and dissolved the soluble matter.

The mixture is strained the marc (the damp solid material) was pressed and the combined liquids were clarified by filtration and evaporated.

The weight of solid extract was taken and yield was measure.[32]

PRELIMINARY PHYTOCHEMICAL EVALUATION:

Preliminary screening of phytochemical is a valuable step, in the detection of the bioactive principles present in medicinal plants and subsequently may lead to drug discovery and development.

The chemical test for phytochemical in extracts of leaves of JGL were carried out as described below and result were recorded.[33]

- **Test for Alkaloids :**

a. Mayer's test

2ml of extract was mixed with 0.2ml of 1% HCL. Then 1ml of Mayer's reagent was added. The precipitate or turbidity indicated the presence of alkaloids.

b. Wagner's test

2ml of extract was mixed with 0.2ml of 1% HCL. Then 1ml of Wagner's reagent was added. The precipitate indicated the presence of alkaloids.

c. Dragendorff's test

2ml of extract was mixed with 0.2ml of 1% HCL. Then 1ml of Dragendorff's reagent was added. The precipitate indicated the presence of alkaloids.

- **Test for Carbohydrate:**

a. Molisch's test

2ml of aqueous extract, add few drops of Molisch's reagent, shaked well and added few drops of H_2SO_4 from the side of test tube.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

b. Benedict's test

Mixed equal volume of test solution and Benedict reagent in a test tube and heated for 5 min in water bath.

c. Fehling's test

1 ml of Fehling's A and 1 ml of Fehling's B solution, boil for 1 min. add equal volume of test solution. Heat in boiling water bath for 5 min.

- **Test for Glycoside:**

a. Borntrager's test

2ml of extract, add dil. H_2SO_4 boil and filter. To cool filtrate, add equal volume chloroform. Shake well, separate the organic solvent. Add ammonia.

- **Test for Flavonoid's:**

a. Shinoda test

2ml of extract in test tube added 5ml of 95% ethanol and few drops of conc. HCL and 0.5gm magnesium turning.

- **Test for Tannins:**

a. Ferric chloride test

2ml of extract added few drops of 5 % $Fecl_3$ solution in a test tube.

b. Lead acetate test

2ml of extract in a test tube added few drops of lead acetate.

c. Bromine water test

2ml of extract was added in few drops of Bromine water.

- **Test for Saponin's:**

a. Foam test

2ml of extract was added with water and shake vigorously.

- **Test for sterols:**

a. Salkowski's test

2ml of extract was added in 2 ml of chloroform and 2 ml conc. H_2SO_4 shake well.

b. Liebermann-Burchard reaction

2ml of extract few drops of chloroform and 2 ml of acetic anhydride and 2 drops conc. H_2SO_4 from side of test tube.

- **Test for protein:**

a. Biuret test

2 ml of test solution added 4% sodium hydrate and few drops of copper sulphate solution.

- **Test for terpenoid:**

2ml of extract in a test tube, added 2ml acetyl chloride and pinch of zinc chloride, boiled in water bath.[34]

CHROMATOGRAPHY

The term chromatography "A method used primarily for the separation of the components of a sample, in which the components are distributed between two phases, one of which is stationary while the other mobile.

The stationary phase may be a solid or liquid supported on a solid or a gel, and may be packed in a column, spread as layer or film.

Mobile phase may be liquid or gaseous.

Chromatographic methods are important analytical tool in the separation, identification and estimation of components present in the plant.[35]

THIN LAYER CHROMATOGRAPHY

Thin layer chromatography (TLC) technique was 1st introduced by Izmailov and Shraiber in 1938.

TLC used to separate and isolate mixtures that are non-volatile in nature.

Principle

TLC based on given compounds relative affinity towards mobile and stationary phase.

In this TLC process moving mobile phase over the stationary phase surface.

During this step, the higher affinity compound gain less speed as compared to the lower affinity compounds.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

This step is completed, we can be found spots on stationary surface at distinct levels, reflecting various elements of the mixture.

Sample preparation for TLC-

Few ml of extract was dissolve in 10ml of methanol, and sonicated as required for spotting in TLC.

Preparation of plate-

The absorbent used for TLC was silica GF254 (Merck Chemical, Mumbai). About 25 g of silica gel GF254 was taken in glass mortar and about 35 ml of distilled water was added to it. The mixture was stirred using glass pestle until it became homogenous. Then an additional 15 ml of distilled water was added to it with stirring. This suspension was transferred to 150 ml glass flask fitted with plastic stopper and was shaken vigorously for about 2 minutes. The suspension was then spread immediately on TLC plate by pouring technique.

Drying and Storage of Plates-

The freshly coated plates were air dried until the transparency of the layer was disappeared. The plates were then dried in hot air oven and were activated at 110-120°C for 30 minutes prior to sample application. This removes the water and frees active sites of absorbents which should react with the sample to be separated. Thus, better resolution and separation can be achieved.

Application of Sample-

Capillaries were used to apply the samples to the TLC plates. Samples were applied in the form of spots.

Chromatographic Chamber, Condition of Saturation and Development of TLC-

Chromatographic rectangular glass chamber (16.5 cm × 29.5 cm) was used in the experiment. To avoid insufficient chamber saturation and the undesirable edge effect, smooth sheet of filter paper approximately of 15×40 cm size was placed in the developing chamber in U shaped and allowed to be soaked in the developing solvent. After being thus moistened, paper was then pressed against the wall of chamber so that it adhered to the walls. The experiment was carried out at room temperature in diffused daylight.

Rf value determination-

The Rf values formula:

$$\text{Rf value} = \frac{\text{Distance travelled by the Solute}}{\text{Distance travelled by the solvent front}}$$

Application:

1) The qualitative testing of various medicines such as sedatives, local anaesthetics, anticonvulsant tranquilisers, analgesics, antihistamines, steroids, hypnotics is done by TLC.
2) TLC is extremely useful in biochemical analysis such as separation or isolation of biochemical metabolites from its blood plasma, body fluids, serum, etc.
3) Thin layer chromatography can be used to identify natural products like essential oils or volatile oils, fixed oils, glycosides, waxes, alkaloids, etc.
4) It is widely used in separating multicomponent pharmaceutical formulations.
5) It is used to purify of any sample and direct comparison is done between the sample and the authentic sample.
6) It is used in food industry, to separate and identify colours, sweetening agent, and preservatives.
7) It is used in the cosmetic industry.
8) It is used to study if a reaction is complete.

COLUMN CHROMATOGRAPHY

A chromatography column is a device used in chromatography for the separation of chemical compounds. A chromatography column contains the stationary phase, allowing the mobile phase to pass through it. Chromatography column of different types are used in both gas and liquid chromatography.

Principle:

In this method, the mixture to be separated is dissolved in a suitable solvent and allowed to pass through a tube containing the adsorbent. The component which has greater absorbing power is adsorbed in the upper part of the column. The next component is adsorbed in the lower portion of the column which has lesser adsorbing

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

power than the first component. This process is continued. As a result the material are partially separated and adsorbed in the various parts of the column. The initial separation of the various components can be improved by passing either the original or some other suitable solvent slowly through the columns. The various bands present in the column become more defined. The banded column of adsorbent is termed a chromatogram, and the operation is spoken of as the development of chromatogram. The portion of a column which is occupied by a particular substance is called its zone. The narrower the zones, the longer the number of substances which can be separated in a column of a definite length, and the more concentrated are the elutes.

Sample Preparation for Column-

50 g of hydroalcoholic extract were weighed and taken for column chromatography. The extract was mixed with petroleum ether to make the slurry which was poured into column.

Preparation of Column-

A small precleaned and dried glass with asbestos column (about 60×3.5 cm) was used for the column chromatography. Silica gel 60-120 mesh size (Merck Chemicals, Mumbai) which was preactivated at 110-120°C was placed at the bottom and then silica gel was taken and mixed with extract and poured. This was allowed to settle down in column.

Sample Application-

For sample application, cotton plug were placed over the layer of packed stationary phase to avoid disturbances of column.

Application:

1. Analytical uses-

Capillaries made of glass or copper, of 0.05-2 mm internal diameter and 1-20 m length, are used for analytical purpose. The internal surface of the narrow tubing serves as adsorbent or support for the liquid phase. Glass capillaries whose internal surface is treated with conc. Ammonia at 3000C can separate amino acid using butanone/pyridine/dilute acetic acid (5:5:1) or xylose/glucose/maltose/ using butanone/acetic acid/water (3:1:6).

2. Separation of geometrical isomer-

Winterstein reported the first chromatographic separation of cis/trans isomers of bixin and crocetin dimethyl ether. Later, zechmeister separated cis/trans isomers carotenoids on calcium carbonate, aluminium oxide and other adsorbents. Similarly, diphenyl/octatetraene have been separated into all trans, trans-cis-trans and trans-cis-cis-trans isomers. Also, cis/trans isomers of carboxylic acid have been separated on charcoal and silica gel.

3. Separation of diaseteromers-

In some cases, a derivatives having an optically active partner cannot be separated from the later. However, such separations have been realised by column chromatography on various adsorbent.

4. Separation of tautomeric mixture-

As the separation of tautomeric mixture requires high temperature, gas chromatography is rarely used. However, the separation of these could be done by column chromatography.

5. Separation of racemates-

The first successful separation of racemates using organic solvents were achieved on lactose.[36]

ULTRAVIOLET-VISIBLE ABSORPTION SPECTROSCOPY

The technique of ultraviolet-visible spectrophotometry is one of the most frequently employed in pharmaceutical analysis. It involves the measurements of the amount of ultraviolet (190-380 nm) or visible (380-800 nm) radiation absorbed by a substance in solution.

Instrument which measure the ratio, or a function of the ratio, of the intensity of two beams of light in the ultraviolet-visible region are called ultraviolet-visible spectrophotometers.

Absorption of light in both the ultraviolet and visible region of the electromagnetic spectrum occurs when the energy of the light matches that required to induce in the molecules an electronic transition and its associated vibrational and rotational transitions. It is thus convenient to consider the techniques of ultraviolet spectrophotometry and visible spectrophotometry together.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

Procedure:

About 10 mg of the isolated fractions from column chromatography was dissolved in 100ml of solvent,1 ml from the resulting solution was pipette out and diluted up to 10ml with solvent and analyzed using Ultraviolet and Visible Spectroscopy (UV-1800 UV Spectrometer, Shimadzu) in the range of 200-400nm. solvent was used as a blank. Similarly, dilution were made for all the isolated fractions and analyzed.

Application:

1) Detection of impurities-

UV absorption spectroscopy is one of the best methods to determine the impurities in organic molecules. Additional peaks can be observed due to impurities in the sample and it can be compared with that of standard raw material. By also measuring the absorbance at specific wavelength, the impurities can be detected.

2) Quantitative analysis-

UV absorption spectroscopy can be used for the quantitative determination of compound that absorb UV radiation. It is determined by beer's law.

3) Qualitative analysis-

UV absorption spectroscopy can characterise those type of compounds which absorbs UV radiation. Identification is done by comparing the absorption spectrum with the spectra of known compounds.

4) Chemical kinetics-

Kinetics of reaction can also be studied using UV spectroscopy. The UV radiation is passed through the reaction cell and the absorbance changes can be observed.

5) Detection of functional groups-

This technique is used to detect the presence or absence of functional group in the compound. Absence of band particular wavelength regarded as an evidence of absence of particular group.

6) Quantitative analysis of pharmaceutical substances-

Many drugs are either in the form of raw material or in the form of formulation. They can be assayed by making a suitable solution of the drug in a solvent and measuring absorbance.

INFRARED ABSORPTION SPECTROSCOPY

The infrared (IR) region of the electromagnetic spectrum extends from 0.8μm (800nm) to 1000 μm (1nm) and is subdivided into near infrared (0.8 to 2μm), middle infrared (2 to 15 μm), and far infrared (15 to 1000 μm).

The fundamental region between 2 and 15 μm is the region that provides the greatest information for the elucidation of molecular structure and most IR spectrophotometers are limited to measurements in this region.

Absorption of IR radiation causes changes in vibrational energy in the ground state of the molecule. The transition from vibrational level 0 to vibrational level 1 gives rise to the fundamental absorption of the molecule, and overtones or harmonics are caused by the transitions 0-2, 0-3, and so on, though the intensity of absorption for these overtones is very much less than that for the fundamental frequencies. For energy to be transferred from the light source to the molecule the frequency of vibration of each must coincide and, moreover, must be accompanied by a change in the dipole movement of the molecule. Certain symmetrical molecules, e.g. ethane, show no change in dipole moment during a stretching vibration and such vibrations do not result in the absorption of IR radiation.

Molecular vibration are classified into stretching and bending vibrations.

The different types of bending vibration, which involves a change in bond angles, there are 4 types of bending vibration,

- Scissoring
- Rocking
- Wagging
- Twisting[37]

Application:

1) Identification of organic compound-

The identity of an organic compound can be established from its fingerprint region (1400-900 cm-1). The identity of an organic compound is conformed of its fingerprint region exactly matches with the known

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

spectrum of the compound. The compounds containing same functional group may have similar absorption above 1500 cm-1 but they differ in the fingerprint region.

2) Structural determination-

This technique helps to establish the structure of an unknown compound.

All major functional groups absorbs at their characteristic wave numbers.

3) Qualitative analysis of functional group-

The presence or absence of absorption bands help in predicting the presence of certain functional group in the compound.

4) Distinction between two types of hydrogen bonding-

It is known that in H-bonding the electron clouds transfer from a hydrogen atom to the neighbouring electronegative atom. The strength of H- bonding is maximum when the proton donor group and the axis of lone pair orbital are collinear and varies inversely to the distance to the distance between hydrogen and oxygen.

5) Quantitative analysis-

The estimation of the compound of the mixture can be done by:

Measuring the intensities of absorption bands characteristics of each compound.

Knowing the optical density of the absorption band for a pure component.

6) Study of a chemical reaction-

Reduction of a standard aliphatic ketone to form a stronger bond at about 1710 cm-1 when it is subjected to reduction, it forms butan-2-ol which absorbs at 3300 cm-1 due to –O-H.

IR spectroscopy is also used to predict the products formed in a photochemical reaction.

7) Study of Keto- enol Tautomerism-

Diketones and keto esters exhibites keto- enol tautomerism.

They have α-H atom in them. The IR spectrum of such compound contains bands due to C=O, O-H, C=C bonds.

8) Study of complex molecules-

This technique is also useful to establish the structure of complex molecules

9) Conformational analysis-

Useful for conformations of cyclic compound cyclohexane exists in boat form and chair form.

There are 18 IR active C-C structure and CH2 rocking and twisting vibration for boat form whereas there are only five for the chair form.

The spectral examination of cyclohexane in the region 1350-700 cm-1 reveals five bands expected for chair form.

This shows the greater stability for chair conformation over boat conformation.

By IR spectroscopy, axial and equatorial substituents in cyclohexane substituents in cyclohexane can be distinguished.

10) Detection of impurity in compound-

IR spectroscopy is also useful in the detection of impurity in compound by comparing its spectrum with the spectrum of the authentic sample of the compound.

Pure sample always consists of poor bands and also some additional bands.[38]

PHARMACOLOGICAL STUDY

ACUTE TOXICITY STUDY

Acute toxicity study was designed as per the OECD guidelines 423. (Acute toxic class method).

Principles and purposes

Acute toxicity testing determines the toxicity of a chemical or drug substances after single administration. The main purpose of acute toxicity study is to evaluate the degree of toxicity in a quantitative and qualitative manner.

The method of determination has changed in the last three decade mainly for animal welfare reasons producing mortality in animals in order to determine LD 50 is no longer the main purpose of acute toxicity testing. The test is based on stepwise procedure with use of minimum number of animals per step. Sufficient information is obtained on the acute toxicity of the substance to enable its classification. The substance is administered orally

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

to a group of experimental animals at one of the defined dose. The substance is tested using a stepwise procedure, each step using three animals or a single sex (normally females). Absence or presence of compound related mortality of the animals dosed at one step will determine the next step i.e.

- No further testing is needed
- Dosing of three additional animals with the same dose
- Dosing of three additional animals with the next higher (or) the next lower dose levels[39]

METHOD:

Selection of dose of the extract-

LD50 done as per OECD guidelines for fixing the dose for biological evaluation. The LD50 of the extract as per OECD guidelines falls under class four values with no signs of acute toxicity at 2000 mg/kg. The biological evaluation was carried out at doses of 100 and 200 mg/kg body weight.

Experimental animal-

Healthy Swiss albino mice either sex weighing between 18-22g selected for the study.

Total 3 animal used which received a single oral dose (2000 mg/kg b.w.) of JGL extract and food withheld overnight prior to dosing.

Observation-

The animal observed individually at least once during the first 30 min. after dosing, periodically during first 24 hr. (special attention during 24 hr.).

Toxic signs-

All mice observed for any toxic signs.

Body weight-

Individual body weight recorded for all the animals.

Cage side observation-

The faeces colour, faeces consistency, change in skin and fur, eyes, mucus membrane (nasal) of the animals observed.

Physical Examination-

Physical observation included changes in respiratory system (rate), cardiovascular system (heart rate), autonomic nervous system (salivation, lacrimation, piloerection, urinary incontinence and defecation), central nervous system (drowsiness, convulsions, motor activity, writhing, motor in coordination, righting reflex, pinna reflex, corneal reflex and tremors recorded.[40]

ANTI-MOUTH ULCER ACTIVITY

Animal-

Wistar albino rats weighing 150-200gm used. They housed in standard laboratory condition, in a temperature (25±2ºC). The animal divided into experiment and control group.

Table No. 2: Grouping of animals

Sr. No.	Group	Animal	No. of animals
1.	Group-I (control)	Wistar albino rat	6
2.	Group-II (dose 1)	Wistar albino rat	6
3.	Group-III (dose 2)	Wistar albino rat	6
4.	Group-IV (dose 3)	Wistar albino rat	6
5.	Group-V (standard)	Wistar albino rat	6

Chemical-

Jasminum grandiflorum Linn extract use.

Oral ulcer induction method-

Animal study carried out using acetic acid induced model. Wistar albino rat used for the study. Firstly animal anesthetized with anesthesia. Then animal treated with 15µl 50% acetic acid soaked in filter paper (Whatman, 3 x 3mm) in the labial fornix region of the inferior incisors for 30 sec.[41]

Evaluation parameters-

1) Measurement of ulcer area:

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

Measurement of ulcer area done by Motic instrument, by this instrument the reduction in the size of ulcer determined.

2) Visual observation:

A photograph of the ulcer area taken by good quality camera and the photograph analysed to determine that in how much amount the ulcer area has reduced or the ulcer has cured.

3) Haematological parameter:

The W.B.C., R.B.C.,Hb determine.

VII. RESULT AND DISCUSSION

COLLECTION OF PLANT

Fig. No. 10: *Jasminum grandiflorum* Linn plant

The leaves were collected from the home garden of Koradi village, Kamptee dist., Nagpur, India. During the month of December 2020.

AUTHENTICATION OF PLANT

The plant was identified and authenticated by Dr. N.M. Dongarwar, Associate professor at Botany, Department of Rashtrasant Tukdoji Maharaj Nagpur Univercity.

Fig. No. 11: Authentication of JGL plant

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

MACROSCOPY

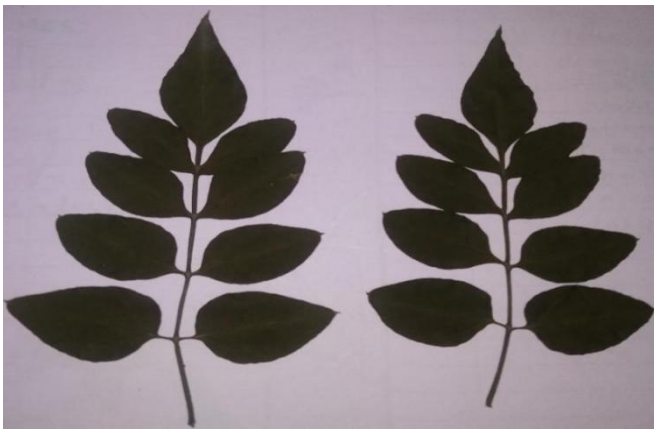


Fig. No. 12: *Jasminum grandiflorum* Linn leaves

Fig. No. 13: Dried leaves of JGL

Macroscopy of the leaves of JGL were determined.

Table No. 3: Morphological observation of JGL leaves

Margin	wavy
Taste	Bitter
Colour	Pale green
Size	Length 7.5 and width 2.4
Shape	Ovate-lanceolate Rhomboid-oblong
Odour	No odour

MICROSCOPY

Epidermis

Epidermal cells have two surfaces. They are polygonal in shape. Leaves are epidermis having unicellular trachoma cells.

Upper cuticle

It is thick, unicellular, glandular. They are cylindrical in shape. Collenchyma around the midrib.

Lower cuticle

They was rounded clustered cells.

Parenchyma

4-6 layers parenchyma present lower epidermis. It is thin, simple type, intracellular spaces.

Sclerenchyma

They was roundly isodiametric. They found in bundles covering the vascular bundles on side.

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

Collenchyma

They are made up of cellulose. 2-5 layered, small fiber group. They found in lower surface of midrib.

Xylem

There arrangement was vertically in series. Xylem show pink in colour after staining.

Phloem

They shows reddish brown in colour after staining. They are also arrange vertically in series. Phloem are oval and small.

PHYSICOCHEMICAL CONSTANT

Fig. No. 14: Ash value

Various physicochemical parameter were evaluated and the observed value for physicochemical constant are given in table

Table No. 4: Physical constant of JGL

Sr. No.	Parameters	% w/w
A)	**Ash value**	
1)	Total ash value	13.8%
2)	Water soluble value	5.60%
3)	Acid insoluble value	3.75%
B)	**Extractive value**	
1)	Pet ether extractive value	2.60%
2)	Chloroform extractive value	3.55%
3)	Water-soluble extractive value	12.12%
4)	Alcohol-soluble extractive value	11.59%

EXTRACTION-

Fig. No. 15: Soxhlet extraction

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

Table No. 5: Percent yield of methods of extraction

Sr. No.	Method of extraction	Weight of plant material (gm)	% yield
1)	Soxhlet extraction	20	5%
2)	Maceration	20	12%

MORPHOLOGICAL CHARACTERISTICS OF HYDROALCOHOLIC EXTRACT-

The Table shows that the colour, odour and taste of the ethanolic extract. Morphological properties of the extract did not change throughout the experimentation.

Table No. 6: Morphological observation of Hydroalcoholic extract

Sr. No.	Test	Characteristics of Hydro Alcoholic Extract
1	Color	Dark green
2	Odour	Characteristic
3	Taste	Bitter

Fig. No. 16: Hydroalcoholic extract of JGL

SOLUBILITY-

Solubility of extract in various solvent were determined.

Table No. 7: Solubility

Sr. No.	Solvent	Solubility
1	Distilled water	Sparingly soluble
2	Petroleum ether	Sparingly soluble
3	Acetone	Insoluble
4	Benzene	Sparingly soluble
5	Toluene	Insoluble
6	Chloroform	Sparingly soluble
7	Ethyl alcohol	Soluble
8	Carbon tetrachloride	Insoluble

PRELIMINARY PHYTOCHEMICAL SCREENING-

Qualitative phytochemical analysis for the extracts were carried out,

1) Test for alkaloids-.

Table No. 8: Test for alkaloid

Sr. No.	Test	Result
1)	Mayer's test	+ve

e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
(Peer-Reviewed, Open Access, Fully Refereed International Journal)
Volume:06/Issue:02/February-2024 Impact Factor- 7.868 www.irjmets.com

2)	Wagner's test	+ve
3)	Dragendorff's test	+ve

2) Test for carbohydrate-

Table No. 9: Test for carbohydrate

Sr. No.	Test	result
1)	Molisch's test	+ve
2)	Benedict's test	+ve
3)	Fehling's test	+ve

3) Test for flavonoids-

Table No. 10: Test for flavonoid

Sr. No.	Test	Result
1)	Shinoda test	+ve

4) Test for tannin-

Table No. 11: Test for tannin

Sr. No.	Test	Result
1)	Ferric chloride test	+ve
2)	Lead acetate test	+ve
3)	Bromine water test	-ve

5) Test for saponin

Table No. 12: Test for saponin

Sr. No.	Test	Result
1)	Foam test	+ve

6) Test for sterols-

Table No. 13: Test for sterol

Sr. No.	Test	Result
1)	Salkowski's test	+ve
2)	Libermann-Burchard test	-ve

7) Test for protein

Table No. 14: Test for Protein

Sr. No.	Test	Result
1)	Biuret test	+ve

8) Test for terpenoid

Table No. 15: Test for terpenoid

Sr. No.	Test	Result
1)	Terpenoid test	+ve

Note: (+ve) indicate positive result, (-ve) indicate negative result.

VIII. DISCUSSION

In this pharmacognostical studies authenticity of plant material was done. Botanical study of leaf was done by morphological, autonomical features. The macroscopy of the leaves of JGL were done. The microscopical characters showed the presence of epidermis, xylem, phloem, collenchyma, parenchyma, sclerenchyma. Physicochemical parameters are useful for the purity and quality of the crude drug.

Ash value of drug give inorganic elements and other impurities present with drug.

The total ash value was found to be 13.8% w/w.

The water soluble ash value was found to be 5.60% w/w.

The acid soluble ash value was found to be 3.75% w/w.

Extractive value parameters are useful for the nature of constituents.

The petroleum ether extractive value was found to be 2.60% w/w.

The chloroform soluble extractive value was found to be 3.55% w/w.

The water-soluble extractive value was found to be 12.12% w/w.

The alcohol-soluble extractive value was found to be 11.59% w/w.

Phytochemical studys were done. The extraction method was done. The soxhlet extraction percentage yield was found to be 5%. The maceration percentage yield was found to be 12 %.

The morphological characters of extract were done. The color of hydroalcoholic extract was found in dark green in color. The odour of extract was found in characteristics. The taste was bitter.

The solubility of extract, extract was maximum soluble in ethyl alcohol, and sparingly soluble in distilled water, petroleum ether, benzene, chloroform.

The preliminary phytochemical evaluation was tested quantitatively by specific chemical tests.

IX. CONCLUSION

So many years, The Ayurvedic medicine is very useful for various ailments. Jasmine is one of them. The *Jasminum grandiflorum* Linn it is the one of the easily available and economical drug. *Jasminum grandiflorum* leaves are useful in various diseases like, anti-ulcer, wound healing, anti-acne, fixing loose teeth, anti-mouth ulcer, etc. This are safe for human use. The phytochemical analysis shows the presence of alkaloids, flavonoids, sterols, carbohydrate. In conclusion extraction of leaves of *Jasminum grandiflorum* Linn useful for anti-mouth ulcer activity.

X. REFERENCE

[1] Dhere MD, Kumbhar RB, Holan MR, Extraction, phytochemical study, formulation and evaluation of anti ulcer activity of *Jasminum grandiflorum Linn,* (IJPRS), 2017 May 30;6(2):111-119.

[2] Available on www.wikipedia.com

[3] Available on http://mdicine.mdscape.com/article/867080-overview#a5

[4] Mittal S, Nautiyal U, Herbal remedies used for the treatment of mouth ulcer- A review, (IJHCR), 2019 Jan 20; 2(1): 17-23.

[5] Teresa A, K.K., Kumar D, John A, herbal remedies for mouth ulcer- A review, J.Bio.innovo, 2017 July 21;6(4): 521-527.

[6] PJ, Pharmaceutical journal, 2019 March, volume 302, No-7923;302.

[7] https://www.healthline.com.

[8] Kokate CK, Purohit AP, Gokhale SB, textbook of pharmacognosy,46th edition, 1; 1.1.

[9] Kamboj VP. Herbal medicine. Current science. 2000 Jan 10;78(1):35-9.

[10] Wynn SG, Fougere BJ, Chapter-1 (introduction- why use herbs?), page: 1-4.

[11] Available on https://www.chamberswellnesscenter.com

[12] Available on www.1mg.com

[13] Maury PK, Jain SK, Nand lal and Alok Shashi, Anti ulcer activity-A review, (IJPSR), 2012 July 27;3(8):2487-2493.

[14] Sachan S, Pharach P, *Jasminum grandiflorum Linn* (Chameli): Ethanobotany, phytochemistry and pharmacology-A review, 2009;2:586-595.

[15] Dr. Prashanth MD, Jasmine- chameli: benefits, remedies, research, side effects , https://www.easyayurveda.com.

[16] Umamaheswari M, Ashok kumar K, Rathi devi R, Divas hanuman AT, Shubhadradevi V, Ravi TK, antiulcer and in vitro antioxidant activities of Jasminum grandiflorum Linn, journal of ethanopharmacology 2006 Oct 12; 464-470.

[17] Dr. Shukla R. Rakesh, International journal of Ayurvedic and Herbal medicine, 2013 Jan;3(1):1114-1119.
[18] https://www.bimbima.com.
[19] Mehatre D, Pharmacognostical and preliminary phytochemical evaluation of *Jati patra* (*Jasminum grandiflorum* Linn.), (IJAM), 2013;4(4):342-351.
[20] Khandelwal KR, Sethi V, practical pharmacognosy, 1st edition, Pune: Pragati books Pvt. Ltd. 2004: 23.8.
[21] Chaudhari RK, Girase NO, Determination of soluble extractives and physico-chemical studies of barks of sesbania sesban (L) merr,
[22] Kondalkar A, Kondalkar SA, Kumar V, Mangal AK, Subhose V, Effect of proportion composition variation on physicochemical parameters of triphala (IJPSR), 2018 October 1; 9(10): 4280-4285.
[23] Mallappa SH, Chandrashekhar VM, Muchchandi IS, Physicochemical and phytochemical screening of convolvulus pluricaulis collected from bagalkot, Karnataka (IJGP), 2018 September 18; 12(3): 625-632.
[24] Available on www.wikipedia.com
[25] Radha R, Aarthi CK, Santoshkumar V, Thangakamatchi G, pharmacognostical, phytochemical and anthelmintic activity on flowers of Jasminum grandiflorum Linn.(Oleaceae) (IJP), 2016 October 31; 3(10): 455-460.
[26] Solange IM, Generating biomedical polyphenolic compounds from spent coffee or silverskin, chapter-11, 2015.
[27] Kim J, Chol K, Chung DS, (sample preparation for capillary electrophoretic application) comprehensive sampling and sample preparation, 2012;3:701-721.
[28] Khandelwal KR, practical pharmacognosy, 1st edition, Pune: Pragati books Pvt. Ltd. 2004:page no.23.13.
[29] Srivastava N, Kharwar RN, Advances in extraction technologies: isolation and purification of bioactive compounds from biological materials, chapter-21, 2021, page 409-433.
[30] Dr Sattar M, extraction, maceration, percolation ,http://pharmacy.uobasrah.edu.iq,2016
[31] Sajid A, https://www.coursehero.com
[32] Handa SS, Khanuja SP, Longo G, Rakesh DD, Extraction technologies for medicinal and aromatic plants (ICSHT), 2008;CH-1,Page-22.
[33] Available on https://innovareacademic.in
[34] Hari N, Nair VP, Preliminary phytochemical evaluation and HPTLC fingerprint profile of Jasminum azoricum L (IJSRSET), 2018 February 8; 4(1): 791-795.
[35] Dr. Kasture AV, Wadodkar SG, Mahadik KR, More HN, Pharmaceutical anlysis instrumental methods book, volume-II, Page no-2.1-2.6.
[36] Chatwal GR, Anand SK, Instrumental methods of chemical analysis book, vol-2
[37] Beckett AH, Stenlake JB, Practical pharmaceutical chemistry book, edition 4th ,
[38] Skoog A, Holler FJ, Crouch S, instrumental analysis book,
[39] Prabakaran KD, pharmacognostical, phytochemical and anticancer activity of the leaves of asparagus racemosus Willd (IJMRD), 2015; 2(1): 332-335.
[40] Hunasagi BS, Kalyane NV, Somashekhar M, Phytochemical investigation and anti-ulcer activity of Jasminum grandiflorum (JPP), 2018; 7(4): 2201-2203.
[41] Hitomi S, Ono K, Yamaguchi K, Terawaki K, Imai R, Kubota K, Omiya Y, Hattori T, Kase Y, Inenaga K, the traditional Japanese medicine hangeshashinto alleviates oral ulcer- induced pain in a rat, oral biology, 2016 February 1: 30-37