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Evaluation of Anti-Aging and Antiwrinkle Formulation for Some Medicinal Plants of India

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Abstract: *According to studies, continuous deterioration process is the result of skin aging because protein & cellular DNA damage. The main purpose of this work is to formulate an anti-aging Herbal cream by using natural ingredients. The natural ingredients are pomegranate, curcuma Longa, amla, hibiscus, green tea, vitamin E, coconut oil, olive oil, aloe vera, basil oil, mint oil. Oil based cream is formulated using natural ingredient. The creams were created in various Concentrations, ranging from F1 to F4. During stability trials, the creams was stable.*

According to ICH criteria. For 1 months, 30± 20C / 45±5 percent RH and 40±20C / 75±5% RH were used. It can be determined that multi-herbal creams are beneficial with multiple effects and excellent spreadability and minimal irritancy. Herbal anti-aging and anti-wrinkle formulations have gained significant attention in the cosmetic and pharmaceutical industries due to their safety, effectiveness, and minimal side effects compared to synthetic products. Medicinal plants such as Saliva officinalis, Neem, Aloe vera, Turmeric, and Sandalwood possess important phytoconstituents including antioxidants, flavonoids, curcumin, vitamins, and essential oils that help protect the skin from oxidative stress, premature aging, and wrinkle formation.

Aging is a natural process by which organisms experience physiological decline leading to susceptibility to morbidity and mortality. There are no known antiaging drugs but there is a myriad of medicinal foods and plants that have been used in managing the state. Several studies have also been conducted on the antiaging properties of medicinal plants and foods, but these pieces of information are scattered. This paper attempts to integrate available information on medicinal foods and plants as well as isolated chemical compounds with antiaging potential..

Keywords: Anti-aging, Saliva officinalis, spreadibility, effectiveness, phytoconstituents.

I. INTRODUCTION

Background of the study:

India has an ancient heritage of traditional medicines. Indian traditional medicine is based on various systems including Ayurveda, Siddha, Unani and Homeopathy. With the emerging interest in the world to adopt and study the traditional system and to exploit their potentials based on different healthcare systems, the evaluation of the rich heritage of f the traditional medicine is essential. Medicinal plants play an important role in the Discovery of novel and useful drugs in the modern medicine. Through several new drugs were discovered from time to time, the contribution from higher plants in the discovery f new drugs is hardly 2% despite the fact that several new drugs are discovered either Synthetic or of natural origin[1].

A large portion of individuals might want to be delightful, sound and gorgeous. The worldwide world we are living in sets generalizations that become models. Models are displayed boundless surrounded us in everyday life, for example, on the television, in the advertisement, in the magazines, announcement, in the design appears, on the roads and nd even at school or at work environment. People are similar, a smooth and brilliant skin with a perfect body shape for a great life [2]. This craving and patterns are developing and seen as a gold dig for the magnificence care advertises.

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As indicated by Blanchin et al., 2007, their past investigations clear up the association among male and excellence care as beneath, "The connection among men and magnificence care can be viewed as a basic connection to his appearance. They need to like themselves, to be in amicability and to achieve a psychological physical balance.Men need to be glad for their bodies. This is the reason why they use items to decorate themselves".

Along these lines, for research purpose, it is concerned fundamentally to comprehend and realize which factors have the effect of basic leadership toward acquiring healthy skin items.

• Aging :

Fig. 1.1 External and Internal factors of skin aging

Aging is an inescapable procedure for every living creature. Connective tissues, especially skin, experience huge changes and maturing. These changes are portrayed by epidermal diminishing and presence of facial lines and wrinkles. Two kinds of skin aging exist: age-subordinate/sequential maturing and untimely maturing/photograph maturing [4]. The last is brought about by extraneous factors and incorporates signs, for example, a rough appearance, dull/light pigmentation and profound wrinkles.

The progressive regression and deleterious changes dramatically decline the functioning capacity of organs (such as the heart, kidney and lungs), biological systems (such as the nervous, digestive and reproductive system) and ultimately the organism as a whole. Consequently, system is unable to fight and respond against various age-related diseases and disorders. Both genetic and environmental factors affect the aging process.

Anti-aging and anti-wrinkle effects, focusing on natural antioxidants and collagen-boosting agents. Top plants include Aloe vera, Turmeric, Amla, and Centella asiatica. These botanical ingredients reduce fine lines and improve skin elasticity by stimulating fibroblasts and fighting free radical damage.

• Neem: - (Azadirachta indica) is a powerful Ayurvedic medicinal plant featuring potent anti-aging and anti-wrinkle properties due to high antioxidant, flavonoid, and vitamin E content.

• Aloe vera: - (Aloe barbadensis Miller) is a premier medicinal plant used globally for anti-aging and anti-wrinkle formulations due to its deep hydration, collagen-stimulating, and skin-repairing properties.

• Turmeric: - (Curcuma longa) is a premier medicinal plant widely utilized in modern cosmeceuticals for anti-aging and anti-wrinkle formulations.

• Sandalwood: - (Santalum album), traditionally known as Chandan, is an authoritative botanical asset in advanced anti-aging and anti-wrinkle formulations.

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Fig.1.2: Medicinal Plant

Every individual possesses own unique genetic profile, which is more dominant than environmental factors to affect aging process. Environmental dry and wrinkled. In skin, fibroblasts are the cells which synthesize collagen along with other GAGs [5]. Skin flexibility and elasticity decrease with age due to reduction of collagen, elastin and hyaluronic acid levels in the body that results In visible wrinkles.

• Disorder of aging process

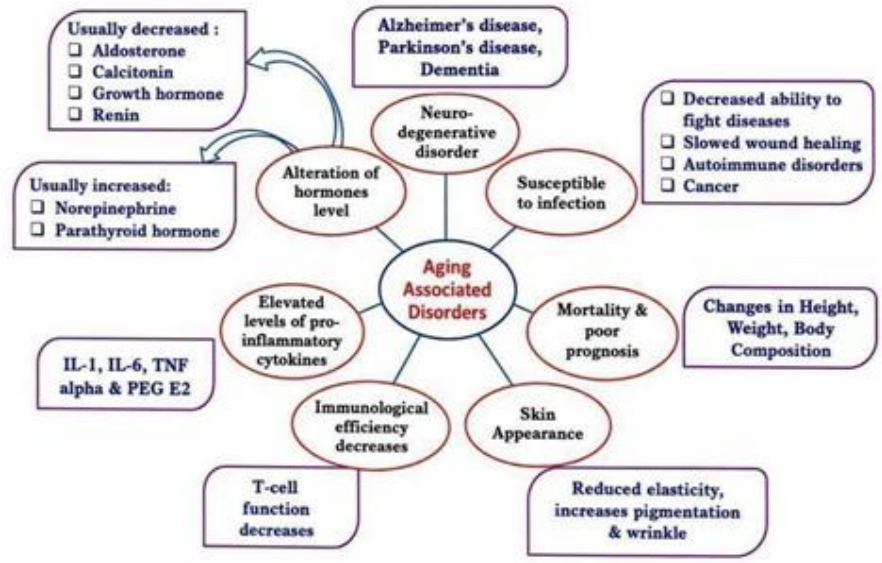

Fig .1.3: Disorder of aging process

Aging is a natural biological process that causes gradual decline in body functions. It affects the skin, immune system, hormones, nervous system, and overall health. Aging is associated with wrinkles, loss of skin elasticity, reduced immunity, and increased risk of chronic diseases.

• Wrinkle

Wrinkle evaluation refers to the standardized systems and technologies used to measure the severity, depth, and type of skin wrinkles. This process is essential for clinical trials, cosmetic product development, and dermatological research.

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Dermatologists and researchers rely on validated visual scales to grade wrinkles consistently. Fitzpatrick Wrinkle Scale: Classifies wrinkles into three classes (I, II, III) based on depth, from fine lines to deep, overlapping wrinkles with prominent skin sagging

Glogau Classification: Evaluates photoaging and wrinkles by age group, ranging from Type I (no wrinkles, usually ages 20–30) to Type IV (only wrinkles, usually age 60+).

Lemperle Scale: A comprehensive 0-to-5 visual scoring system specifically designed for facial wrinkles, where 0 represents no wrinkles and 5 represents deep folds.

• Mechanism of wrinkle formation

Wrinkle formation is a complex biological process caused by intrinsic aging (natural aging) and extrinsic aging (environmental damage). Wrinkles develop due to structural and functional changes in the skin, especially in collagen, elastin, and hydration levels.Wrinkle formation, or rhytidosis, is a complex, multifactorial process involving the degradation of skin structural integrity due to intrinsic (natural aging) and extrinsic (environmental) factors, primarily resulting in dermal atrophy and reduced elasticity.

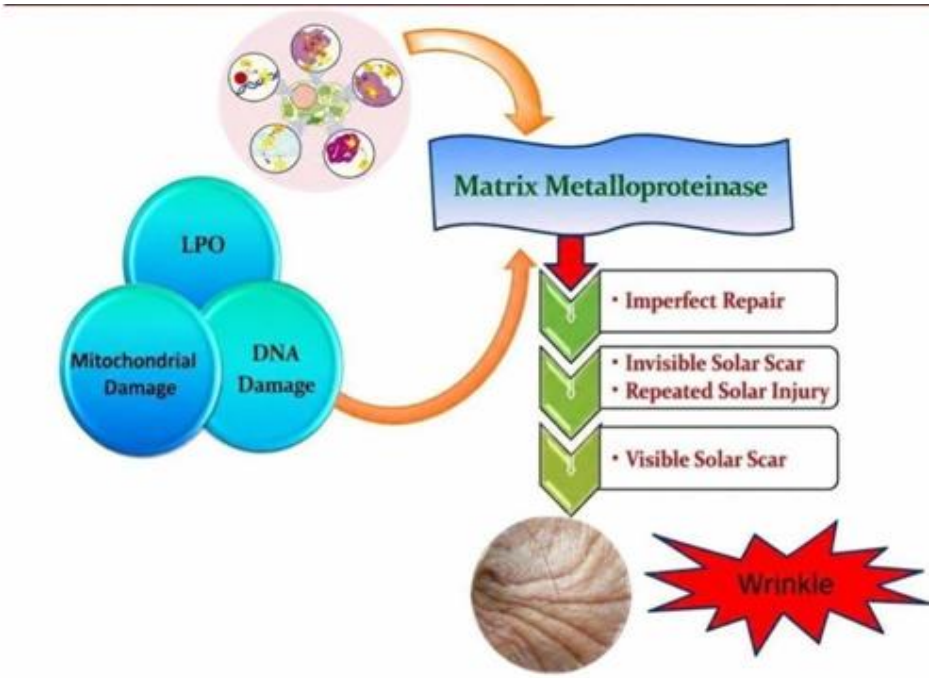

Fig 1.3: Mechanism of Wrinkle Formation

• Aging: Skin's collagen and elastin production slows down
• Sun damage: UV rays break down skin's structure
• Repetitive movements: Facial Expressions, like smiling or frowning
• Loss of hydration: Skin gets drier and less plush
• Overview of the skin

Skin is a soft outer covering of the integumentary system in our body, made up of several layers of ectodermal tissue and protects the underlying muscles, ligaments, bones and internal organs. Skin is the first line of defense to play a key role in protecting the body against pathogens, external injuries and excessive water loss. The skin is the largest organ of human body covers surface area of between 1.5-2.0 square meters (16.1-21.5 sq ft.). Its thickness varies at different parts of the body. An example is the skin on the Forearm which is on average 1.3 mm in the male and 1.26 mm in the

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female [48]. The average square inch (6.5 cm²) of skin holds 650 sweat glands, 60,000 melanocytes, 20 blood vessels and more than 1,000 nerve endings [49]. The diameter of human skin cell is about 30 micrometers. Skin has mesodermal cells called melanocytes that absorb dangerous ultraviolet radiation (UV) in sunlight. Skin is made up of three primary layers: the epidermis, the dermis and the hypodermis . shows structure of human skin.

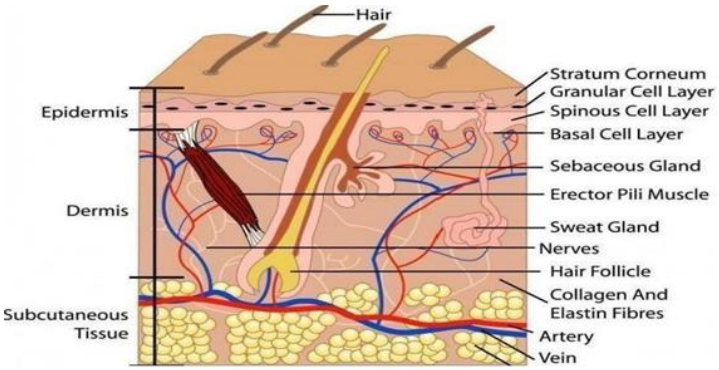
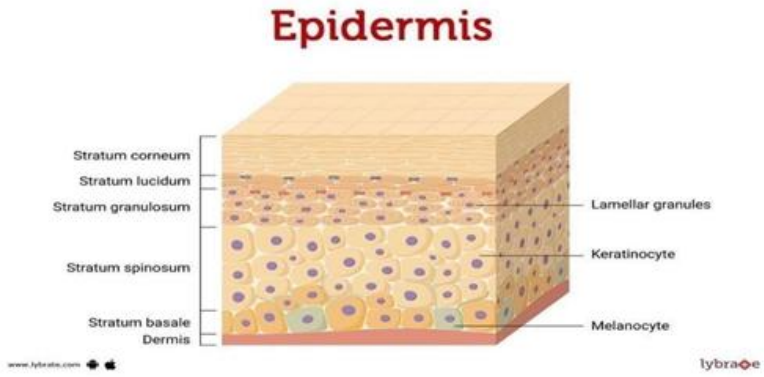


Fig 1.4: Structure of Human skin

• Epidermis

The word epidermis is derived from Greek word "Epi" meaning "over" or "upon", is the outermost layer of the Skin. Skin forms a waterproof covering over the body surface and acts as a barrier to infection. It is made up of stratified squamous epithelium with an underlying basal lamina. The epidermis do not contain blood vessels and cells in the deepest layers, that are nourished exclusively by diffused oxygen from the surrounding air and blood capillaries present to the outer layers of the dermis. Merkel cells, keratinocytes, with melanocytes and Langerhans cells are the major types of epidermis.



The epidermis can be divided into different layers i.e. strata corneum, strata lucidum. Strata granulosum, strata spinosum and basale. These layers help in regulation of body temperature. It also consists 25 to 30 layers of dead cells.

• Dermis

This layers located beneath the epidermis that consists of connective tissue and protects the body from stress and strain. It is connected to the epidermis by a basement membrane and harbors several nerve endings that provide the sense of touch and heat. These layers contain sweat glands, hair follicles, apocrine

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• **Salvia officinalis**

Fig 1.5: Flowers of Saliva officinalis

Salvia is one of the major geniuses of Lamiaceae family This genus includes about 900 species which is cultivated in many countries due to its traditional usefulness in folk medicine and for domestic applications. This plant is historically well known from the early 1960s till now by its therapeutic and domestic applications due to its high economic value. Morphology of plant including flowers, leaf and seeds is representing domestic applications due to its high economic value. Morphology of plant including flowers, leaf and seeds is represent.

Fig 1.6: Leaf of saliva officinalis

Fig1.7: Seeds of saliva officinalis

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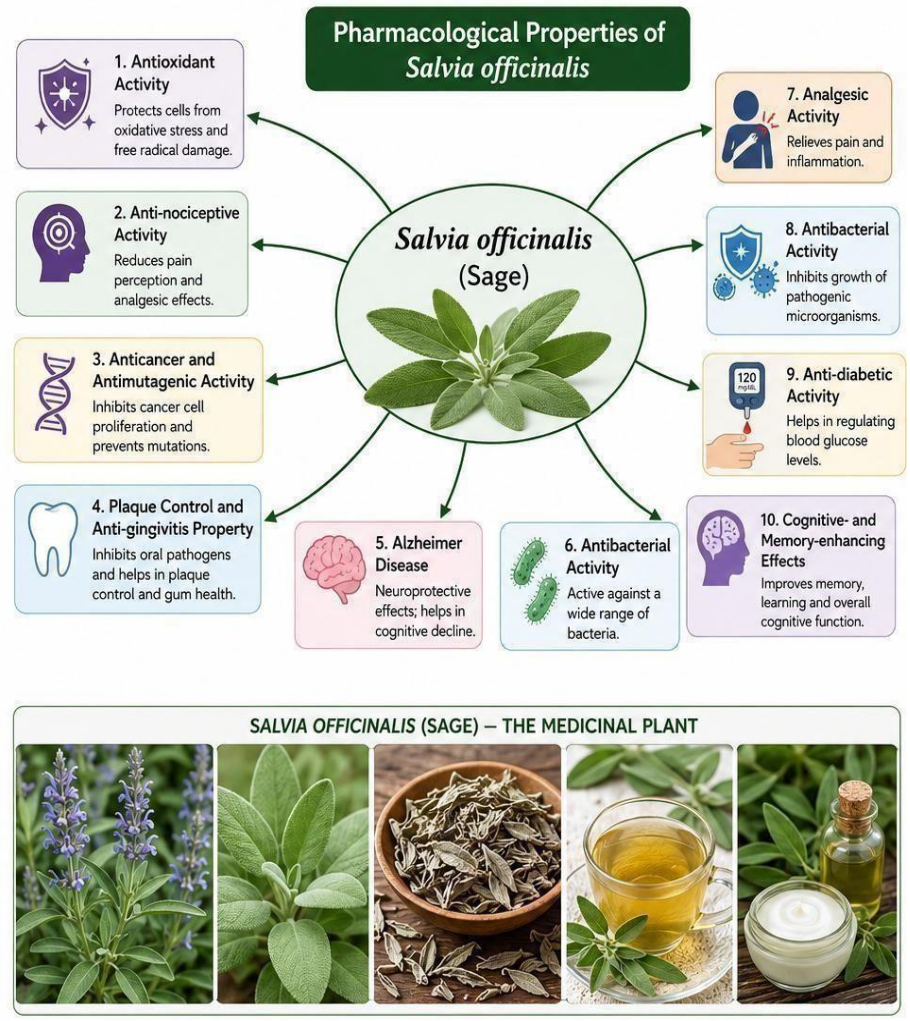

Fig 1.8: Pharmacological properties of saliva officinalis

• Antidiabetic Activity

Baddar N.W. and co-workers investigated the anti-diabetic potential of Salvia species. In 2011, they were observed that the main active constituent responsible for antidiabetic activity is thujone and found it to correct the lipid profile e.g. cholesterol and triglyceride in diabetic rats .

Sage extract helps lower blood glucose levels by improving glucose metabolism and insulin sensitivity.

II. REVIEW OF LITERATURE

Aging is a process of progressive loss physiological integrity that leads to impairment of body functions and increased vulnerability to death. Aging is the major risk factor for human pathologies such as diabetes, cancer, cardiovascular disorders and neurodegenerative disorders. Skin aging is a continuing process related to the declined skin function and alterations in its appearance. There are several factors that affect the rate of ageing, that includes Diet, exercise, lifestyle and genetics all plays role in influencing the ageing trajectory and longevity.

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III. AIM OF THE STUDY

Natural products have the properties to rejuvenate protect the skin .
the skin from environmental pollution, fluctuation in atmospheric temperature chemicals, Ultraviolet radiation, hyper pigmentation, wrinkling and inflammations. They have been used since ancient times and still playing a major role in modern cosmetics.
The aim of the current work is to identify some medicinal plants and it's Phytoconstituents as anti-aging and anti-wrinkle agents and prepare herbal cream containing plant extracts for the management of photo-aging.

• Objectives of the study

The following objectives were aimed as a part of my current work:
• To identify the plants which may have anti-aging and anti-wrinkle activity and develop herbal cream formulation.
• To extract the collected plant material from the successive solvent process by Soxhlet apparatus and estimate the phytoconstituents qualitatively and quantitatively.

IV. RESEARCH ENVISAGED

Herbal medicines have been used widely for thousands of years in many asian countries, including Korea, Japan, China and they provide a largely unexplored source for the development of new drugs. Indeed, the potential use of traditional herbal medicines as a basis for new skin-care products as recently received increased attention. It is therefore always area of interest to know whether cosmetic preparations traditionally used in folk medicine have bioactivity that might be useful in modern formulations.
Skin aging is the biggest problem, commonly allied with changes of pigmentation, dry/flaky skin, laxity shallowness, deep wrinkling like visual results due to intrinsic and extrinsic factors. Ultrasonic and microwave radiation from sunlight, as well as ionizing factors are leading cause of multiple reactions and provoke oxidative stress by free radicals. Over exposure to UV radiations, resultant oxidative stress trigger the synthesis of dermal enzymes hyaluronidase, elastase, MMP-1 etc. and obstruct the skin's ability to repair it by weaken the synthesis of new collagen and eventually causes cell damage. In another way, UV radiations degrade elastin fibers that decrease the skin flexibility. The therapeutic potential of plants depends on particular type of bioactive compounds present in the specific species. The variability with collection of

V. MATERIAL AND METHODS

Season of crude drug collection plays a vital role in the determination of the quality of drug. Various organoleptic characters, morphological and microscopical examination would help in the identification of the crude drug. Unknown drugs were identified by the help of Botanical gardens and herbarium.
• Selection, collection and authentication of plant material
Salvia officinalis and Fumaria officinalis were selected on the basis of leads available from folk usage and recent experimental as well as wide distribution in India to Asia Plant selected for study

Sr.No	Plant	Family	Parts used
1.	Saliva officinalis	Lamiaceae	Leaves
2.	Fumaria officinalis	Papaveraceae	Leaves

The leaves of Salvia officinalis and Fumaria officinalis plant were collected from the nearby area of Bhopal, Madhya Pradesh, India. The plant was identified and authenticated by Dr. Zia Ul Hasan, Professor & Head-Department of Botany, Safia college of Science, Bhopal. A voucher specimen number 124/Bot/Saf/17 and 125/Bot/Saf/17 were kept in Department of Botany, Safia college of Science, Bhopal for future reference.
• Chemicals: All the chemicals used were of analytical grade and were obtained from Merck, Sigma and S.D. Fine Chemicals.
Generally, three methods are employed in the extraction of plant materials as:

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• Maceration
• Percolation
• Soxhlet Extraction.

Maceration and percolation may be employed in the extraction of thermolabile constituents. Soxhlet extraction is rapid and continuous process used for the extraction of sparingly soluble constituents due to repeated extraction, which cannot be done by either maceration or percolation methods. Soxhlet extraction method was used in present study because of its various advantages over the maceration and percolation.

The dried plant materials were often subjected to the selective solvent extraction in their ascending order of polarity. In this process, the substance which is soluble in a solvent with a particular range of polarity was extracted in the solvent. The constituents which are soluble in both polar and non-polar solvents can be extracted separately. About 100 gm powdered material was extracted with 600 ml of petroleum ether (60-80°C) for 72 h. petroleum ether was used for defatting of plant material. The extract was concentrated to ¼ of its original volume by distillation as it was adapted to recover the solvent, which could be used again for extraction. The flow diagram of extraction process .

• Preparation of Chloroform extract: After petroleum ether extraction, the Remaining dried marc was extracted with chloroform to get chloroform extract.

• Preparation of methanolic extract: After chloroform extraction, the remaining Dried marc was extracted with methanol to get methanolic extract. All the above extract was concentrated by distillation of the solvent and evaporating them to dryness at room temperature. The extract obtained with each solvent was weighed to a constant weight and percentage w/w was calculated as percentage yield.

• Determination of Percentage Yield

$$\text{Percentage yield} = \frac{\text{Weight of extract}}{\text{Weight of powder drug}} \text{ X } 100$$

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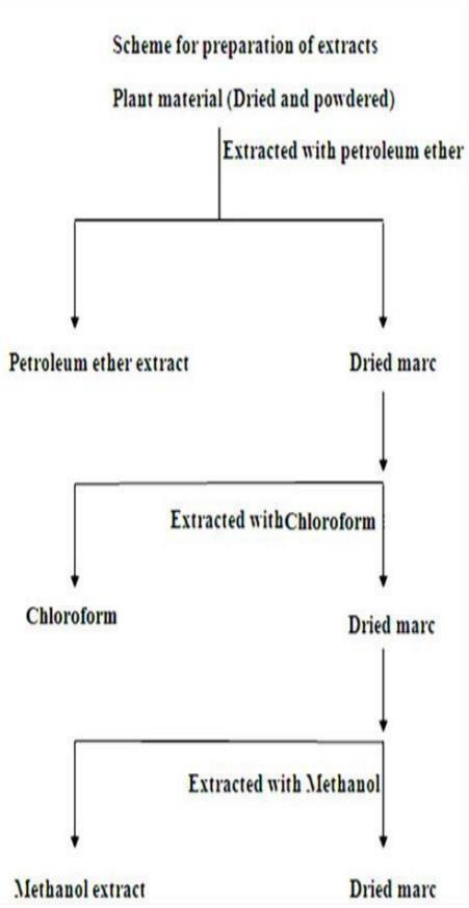

Fig 5.2:Flow diagram extraction process Phytochemical analysis

The phytochemical analysis of the medicinal plants are very important and have a commercial interest in research centers for the manufacturing of the new drugs and in the treatment of several diseases. Extract of Salvia officinalis and Fumaria µm film thicknesses in a temperature program initially 50 to 256°C with a rate of 4°C/ min with 2 min hold. The injector was at 260°C and the flow speed of the carrier gas helium was 1 ml/min. The El mode JMS 600 H JEOL mass spectrometer had ionization volt of 70 Ev, electron emission of 100 Ma, ion source temperature of 250°C and analyzer temperature of 250 deg * C The chloroform extract and methanolic extract of both plants injected 1 µL. manually in split mode with the ratio of sample in split mode were 20:1. GCMS detection of phytoconstituents of an extract of plants were based on the computer evaluation of mass spectra of samples through National Institute Standard and Technology (NIST), through comparison of peaks and retention time and computer matching as well as by following the characteristic fragmentation patterns of the mass spectra of a particular class of compounds.

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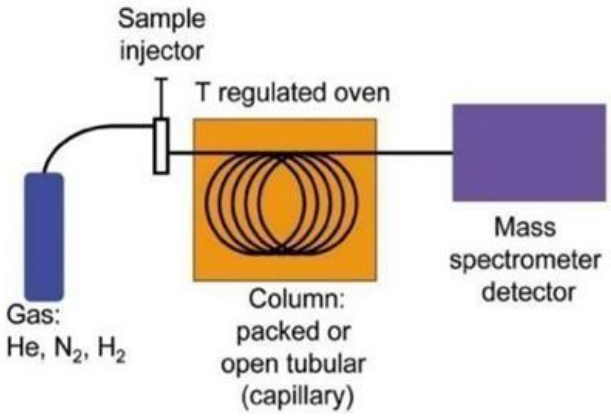

Fig 5.3: Gas Chromatography

• Physico-chemical evaluation parameters pH measurement

Cream might have a variety of pH mostly ranging from 5 to 9. Hazelton reported that there is little correlation between pH and irritancy. The electrode must be washed and free from any residue of acid and alkali to ensure an accurate reading. All the formulations were oil in water semisolid emulsions. The pH of the cream formulation was determined by making 10% dilution in distilled water and measured with pH meter. pH measurement of the cream was carried out using a digital pH meter (Thermo Scientific C Orion 2-Star pH Bench Top Meter) by dipping the glass electrode completely into the cream to cover the electrode. The measurement was carried out in triplicate and the average of the three readings was recorded .

• Viscosity

Viscosity of cream was determined using Brookfield viscometer (S-62, model LVDV-E) at 25°C with a spindle speed of the viscometer rotated at 12 rpm .The rheological property was determined to know the flow behavior of formulation. Sample volume was 50 g and speed of rotation of stirring element was 500-1000 rpm. The specified volume of prepared formulation was transferred in a sample cell which was placed carefully within the adaptor. The guard leg was placed around the adaptor and the volume of the sample was stirred slowly using a motor driven stirring element. The rate of shear was. Increased and the corresponding dial reading was noted. The data was plotted for theogram between percent torque and viscosity to determine the type of flow. . The viscosity is determined by the following formula:

Viscosity= Dial Reading ×Factor [For LV-4 at 6 RPM Factor is IM (1000)]

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Fig.5.4: Brookfield viscometer

• Appearance and Homogeneity

Physical appearance and homogeneity of the prepared gels were evaluated by visual perception. The appearance of the cream was also judged by its color, pearlescence, roughness and graded.

• Colour:

Colour is a very important physical parameter for evaluating the cream formulation by visually. Colour was observed after immediate preparation of

VI. RESULTS AND DISCUSSION

The potential use of traditional herbal medicines as a basis for new skin-care products recently has received increased attention. It is therefore of interest to know whether cosmetic preparations traditionally used in folk medicine have bioactivity that might be useful in modern formulations [51]. Antioxidants are biologically active components that plays role in formulation of topical application of herbal drugs. Antioxidants are differing greatly in each plant due to structural diversity.

The plants from traditional and other resources need to be evaluated based on utilization and assessment to find effective leads from natural resources useful in the treatment of skin aging Consequently efforts were taken to look for new skin-care ingredients from natural resources, which have inhibitory potential on the dermal enzymatic activities. They can also be used as ingredient in skin aging On the basis of literature review, it was found that some plants from Indian system of medicine showed specific skin care effects.

Therefore, this works was encouraged to evaluate the aging inhibitory activity of selected medicinal plants being used in our traditional system for therapeutic potential and also to develop a formulation with them including its evaluation.

The present study was performed to determine anti-wrinkle and anti-aging potential of F. officinalis and S. officinalis. The work was divided into several major section including collections and authentication of the plant materials; extract preparation; biological assessment followed by standardization using marker components through GC-MS and HPTLC

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analysis; preparation and characterization of herbal cream formulation; skin irritancy test of prepared cream formulation and evaluation of formulation against the wrinkles.

VII. CONCLUSION

Medicinal plant–based anti-aging and anti-wrinkle formulations have emerged as promising alternatives to synthetic cosmetic products due to their safety, biocompatibility, antioxidant activity, and therapeutic potential.

Natural ingredients such as Aloe vera, Curcuma longa, Azadirachta indica, and Salvia officinalis contain bioactive compounds including flavonoids, phenolics, tannins, vitamins, and essential oils that help reduce oxidative stress, improve collagen synthesis, maintain skin hydration, and protect the skin from premature aging.

The evolution of anti-aging and anti-wrinkle herbal formulations has progressed from traditional herbal remedies to advanced topical dosage forms such as creams, gels, serums, lotions, nanoemulsions, and herbal masks. Modern pharmaceutical and cosmetic technologies have enhanced the stability, penetration, efficacy, and patient acceptability of these formulations.

Scientific evaluation methods including antioxidant assays, skin hydration studies, viscosity determination, pH analysis, spreadability testing, and stability studies have further improved the quality and effectiveness of herbal anti-aging products.

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