International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 6 Nov-Dec 2023, pp: 270-281 www.ijprajournal.com ISSN: 2249-7781

Review On Advanced Herbal Technology

Author- Miss. Pratiksha AmbadasIngale
Guided By- Narote.K.R.
Principal- Dr. Megha Salve mam
Department of Bachelor of Pharmacy
Shivajiraopawar college of pharmacy,pachegaon.
Ahemdnagar-413725

Submitted: 10-11-2023 Accepted: 20-11-2023

ABSTRACT :-
Herbal medicine has become more and more popular these days as it has many benefits. Today, herbal supplements are widely considered to be effective Treatment of various diseases. Although most of these uses are atypical, more than 80% of people use herbal products and medicines to maintain their healthand healthy lifestyle.No negative effects or less side effects than contemporary medications.The increased usage of herbal goods has also led to a variety of product abuses and adulterations, which have disappointed consumers and manufacturers and, in some cases, had disastrous results. Scientists face a significant difficulty in developing reliable analytical techniques that can quantitatively analyze marker/bioactive chemicals and other important ingredients and reliably profile the phytochemical makeup. An essential step for the establishment is standardization.Pharmacognostical analysis of medicinal sauces remains grueling issues for logical druggists, as sauces are a complicated system of fusions. Analytical separation ways for illustration high performance liquid chromatography (HPLC) and High Performance Thin Layer Chromatography(HPTLC)Thin layer chromatography, Paper chromatography, column chromatographyetc. among the most popular styles of preference used for quality control of raw material and finished herbal product.

KEYWORDS :-Authentication, Chromatography, Extraction, Purification, Standardization, Herbal technology, Herbal medicine.

I. INTRODUCTION :-

The use of herbs as medicine is the oldest form of healthcare known to humanity and has been used in all cultures throughout history.[1] Herbal drugs have been used since ancient times as medicines for the treatment of a range of diseases. Medicinal plants have played a key role in world health. In spite of the great advances observed in modern medicine in recent decades, plants still make an important contribution to health care.[2] Herbal medicine is an interdisciplinary branch between herbal medicine and Ayurveda as it covers all fields of herbal medicine related to botany, medicinal plant research, pharmacognosy, phytochemistry, phytotherapy, botanical medicines, Ayurveda, natural chemistry, agriculture science, Unani medicine, biotechnology, and biochemistry. A person who deals with herbs, especially medicinal herbs, is known as an herbalist. Herbal journals deal with the use of plants in the treatment of diseases.[3]There are at least 120 distinct chemical substances derived from plants that are considered as important drugs currently in use in the world, while several other drugs are simple synthetic modifications of the natural products.[4]Finished herbal goods are herbal remedies made from one or more herbs. If more than one plant is utilized, the term "mixed herbal product" may also be used. Along with the active ingredients, finished herbal products and herbal blends may also contain excipients. Completed products or herbal combinations, however, to which chemically defined active elements, such as synthetic chemicals and/or botanical compounds, have been added, are not considered to contain their separated ingredients [5].

HISTORY :-
Today modern drug discovery utilizes several advanced techniques like MST technology which is used to measure molecular interactions. But drug discovery method weren’t always so sophisticated a few hundred year ago medicine were there are derived from plant these substance add know therapeutic properties that were discovered by trail and error and propagated by word by mouth but very little was known about why each performed the way it did.[3]

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 6 Nov-Dec 2023, pp: 270-281 www.ijprajournal.com ISSN: 2249-7781

2. IDENTIFICATION OF PLANT :-

Identification is a fundamental activity and one of the main goals of systematization. Although identification is a distinct activity or process, in practice it involves both classification and nomenclature. Identification is simply determining the similarity or difference between two items, that is, whether the two items are the same or different. Comparing an unknown plant with a named specimen and determining that both are similar also involves taxonomy, that is, when one correctly decides that a plant is unknown. Belongs to the same group (species, genus, family, etc.) as a known specimen, the information stored in the taxonomy will be available and applicable to the material in question.[6]

DIFFERENTMETHODFOR IDENTIFICATION OF PLANT:-

1. Expert Determination: Expert decision is the most dependable and precise way of identification. The relevant group has typically been treated by professionals (monographs, revisions, synopses), and it is likely that the taxa used by specialists are included in more current floras or manuals. Experts are frequently found in botanical gardens, herbaria, museums, colleges, and universities, among other places. Although very effective, this procedure has limitations in that it delays identification and takes up professionals' important time.
2. Recognition: It has a reliability similar to that of expert opinion. Based on the identifier's extensive past knowledge of the questioned plant group, this conclusion was reached.
3.Comparison: A third method compares an unidentified object to known specimens, images, drawings, or descriptions. Although this is a reliable method, the lack of sufficient comparable materials may make it time-consuming or nearly impossible.
4. Making Use of Keys and Similar Instruments (Synopses, Outlines, etc.) This strategy—by far the most widely used one—needs neither the time nor the resources nor the knowledge required for comparison and recognition. [7]

3. AUTHENTICATION OF PLANT :-

Herb authentication is a quality assurance process that ensures the correct plant species and plant parts are used as raw materials for herbal medicines.

The proper authentication of herbal raw materials is critically important to the safety and efficacy of herbal medicines. Morphological, anatomical, chemical and DNA markers solve the problem by differentiating the genuine material from the adulterants, substitutes and spurious drugs.[8]

1. Macroscopy: Macroscopy involves checking external look or sensory characters Like color odor, taste, size, shape, fracture etc. botanic identification of herb is usually done By trained person like biologist. For proper botanic identification, entire plant at the side of root And flower is required. Botanic identification is predicated on morphology that involves checking Various elements of herbs like leaves, flower, root et al.. Leaves and flowers virtually vital Parts that facilitate in identification of plant. Herb will be ascertained for color size, shape and Arrangement of leaves and flower. Arrangement of leaves on stem an branching is termed Phyllotaxy. Differing types of arrangement of leaves like alternate distichous, opposite, Decussate, whorled varieties of leaves arrangement will be useful to spot herb properly. Different types of shapes of leaves like oval, oblong, obovate, spherical linear, lanceolate, Elliptical, speculate, cordate, subdivide one amongst the best tool to spot plants. Even margins Of leaves will be ascertained to spot herbs. Margins like entire, serrate rough, sinuate, ciliate, Spinose facilitate in identification of herb. In some cases, completely different species of plants will be known Only once flowering.
2. Microscopy: Research plays terribly crucial role in identification of drug those are Morphologically similar. Magnifier will be used for checking sections of leaves, root And stem make sure identity of herb. Research will be additionally wont to check stomata, trichome, Calcium salt crystals, which can be distinctive thereto herb. Sure leaf constants like stomatal Index Palisade quantitative relation, vein isle variety avital for proper identification of herb. Indian Senna and bush| Alexandria Senna|Alexandrian Senna true Senna|tinnevelly Senna|Indian Senna|Senna alexandrina| Cassia acutifolia|Cassia augustifolia| senna} will be differentiated by exploitation microscopic parameters. Indian Senna has vain isle variety nineteen.5 to 22.5 whereas tinnevelly Senna has twenty five to twenty nine.5, Alexandrian senna Have stomatal index seventeen to twenty whereas tinnevelly Senna have eleven.4 to 13.3. Likewise several alternative Plants will be known by research. Form of metal salt is beneficial to spotplant for Example- rosette formed crystal is gift in Jamestown weed, needle formed crystal are Presents in German iris, rap aides ar gift in squill, monoclinic prism form Is gift in black henbane,

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 6 Nov-Dec 2023, pp: 270-281 www.ijprajournal.com ISSN: 2249-7781

sand formed gift in deadly nightshade. Research is Especially helpful just in case of fine medication. Starch grains, size and length of fibers, staining Reactions like hard vascular tissue and bast will be studied by exploitation magnifier.[9]

4. DIFFERENT TYPES OF EXTRACTION:-

Extraction of medicinal plants is a process of separating active plant materials or secondary metabolites such as alkaloids, flavonoids, trepans, saponin, steroids, and glycosides from inert or inactive material using an appropriate solvent and standard extraction procedure.[6]The process of extracting natural products includes the following steps: (1) allowing the solvent to permeate the solid matrix; (2) allowing the solvent to dissolve the solute; (3) allowing the solute to diffuse out of the solid matrix; and (4) collecting the extracted solutes. The extraction will be made easier by any component that increases the solubility and diffusivity in the aforementioned phases. The extraction efficiency is influenced by the solvent's characteristics, the raw materials' particle size, the solvent-to-solid ratio, the extraction temperature, and the extraction time [10-14]

Maceration - This is an extraction procedure in which coarsely powdered drug material, either leaves or stem bark or root bark, is placed inside a container; the menstruum (The solvent used for the extraction of medicinal plants) is poured on top until completely covered the drug material. The container is then closed and kept for at least three day.

Infusion - infusion is a chemical process that uses botanical (dried herbs, flowers) that are volatile and release their active ingredients readily in water, oil or alcohol.in this process, a liquid is typically boiled and poured over the herbs.

Digestion - This is a form of maceration in which gentle heat is used during the process of extraction. It is used when the moderately elevated temperature. The solvent efficiency of the menstruum is increased.

Decoction - Decoction involves first drying the plant material; then cutting the material to allow for maximum dissolution; and finally boiling in water to extract oils. [6]

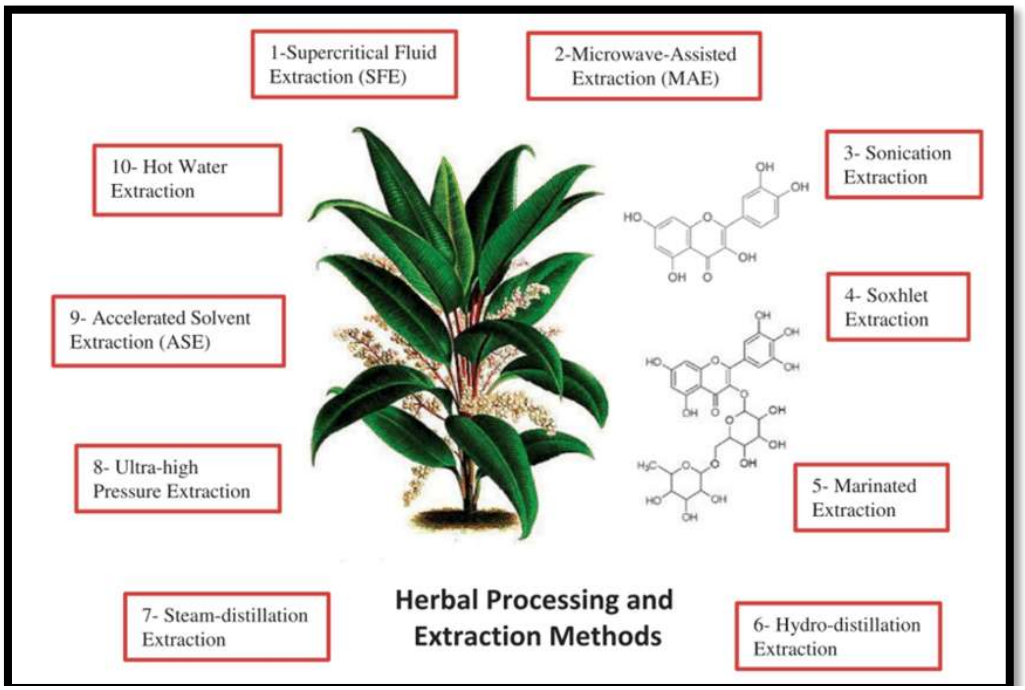

Fig.1-herbal processing and extraction methods

Supercritical fluid extraction (SFE):-

SFE is the process of separating one component (the extractant) from another (the matrix) using supercritical fluids as the extracting solvent. Extraction is usually from a solid matrix, but can also be from liquids.[15] SFE can also be used to clean up pesticides from herb medicines. SFE processes can be modeled to acquire useful information for better understanding of the

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 6 Nov-Dec 2023, pp: 270-281 www.ijprajournal.com ISSN: 2249-7781

extraction, mechanisms and optimization of the extraction procedures.

SFE extraction using CO2 as a solvent is considered a sustainable method for extraction of plant materials with plenty of applications in the food industry and also in pharmacy and environmental engineering . SFE method is rapid, automatable, selective, and avoids the use of large amounts of toxic solvents.[16]

For many years, one of the most common methods for performing analytical separations on complex environmental, pharmaceutical, food and petroleum samples was Based upon extraction of bulk samples with hydrocarbon or chlorinated organic solvents Using a Soxhlet extractor.

Microwave-assisted extraction (MAE) :-

MAE is a process of using microwave energy to heat solvents in contact with a sample in order to partition analytes from the sample matrix into the solvent.[17]

Microwave-assisted extraction (MAE) is a traditional technique for extracting active ingredients from medicinal plants that uses microwave energy to heat the sample-containing solvent, thereby removing the analytes from the sample matrix into the solvent. distribute.

• Principle of microwave assisted extraction

Microwaves are part of electromagnetic spectrum of light with a range of 300 MHz to 300 GHz and wavelengths of these waves range from 1cm to 1m (Mandal et al., 2007). These waves are made up of two perpendicular oscillating fields which are used as energy and information carriers. First application of microwaves includes its interaction with the specific materials which can absorb a part of its electromagnetic energy and can convert it into heat. Commercial microwaves use 2450 MHz of energy for this purpose which is almost equivalent to 600-700W (Afoakwah et al., 2012) [18]

Ultrasound-assisted extraction (UAE)

UAE uses ultrasound energy and solvents to extract target compounds from various plant matrices. Extraction has been used probably since the discovery of fire. Egyptians and Phoenicians, Jews and Arabs, Indians and Chinese, Greeks and Romans, and even Mayas and Aztecs, all possessed innovative extraction and distillation processes used even for perfumes, cosmetics or food.

Ultrasound are the mechanical waves having frequency (>20 kHz) higher than audible frequency range of human hearing (20 Hz to 20 kHz).With the increasing energy costs and the drive to reduce greenhouse gas emissions, food and plant-based chemical industries are challenged to find new technologies in order to reduce energy consumption, to meet legal requirements on emissions, product/process safety and control, and for cost reduction and increased quality as well as functionality. In the last two decades, these shortcomings have led to the consideration of the use of enhanced and efficient extraction techniques amenable to automation such as ultrasound-assisted extraction. Shorter extraction times, reduced organic solvent consumption, energy and costs saved, were the main tasks pursued. Driven by these goals, advances in ultrasound-assisted extraction have resulted in a number of innovative techniques such as ultrasound-assisted Soxhlet extraction, ultrasound-assisted Clevenger distillation, continuous ultrasound-assisted extraction, and combination of ultrasound with other techniques such as microwave, extrusion, and supercritical fluid extraction.[19]

Isolation and purification of techniques :-

1.GENERAL ISOLATION TECHNIQUES:-

● Typical isolation strategies
● Extraction strategies
● The separation of natural plant components and their purification involve the extraction of plant material.
● Plant matrices are inherently complex, including a large range of substances with different physical and chemical characteristics .[20]Therefore, it is essential to thoroughly separate pure chemicals of interest from the rest of the plant in order to characterize them. is classifiable .[21] They have been divided into groups in this chapter according to the temperatures they operate in.
● Methods at low or ambient temperatures
● technique of cold extraction
● Literature has described the procedure. Specifically, samples of dried plant parts (Cut, crushed or milled)[19]

2. Chromatographic technique:-

Chromatography is a method for separating, purifying, and testing different chemicals. The roots of the word “chromatography” are the Greek words Chroma, which means “color,” and graphein, which means “to write.” In this process, the mixture to be separated is applied to a stationary phase (solid orliquid).[22] Then slowly pass through the stationary phase by pure solvents such as water or gases that transport the components separately

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 6 Nov-Dec 2023, pp: 270-281 www.ijprajournal.com ISSN: 2249-7781

depending on their solubility in pure form solvent.

1.Thin Layer Chromatography :-

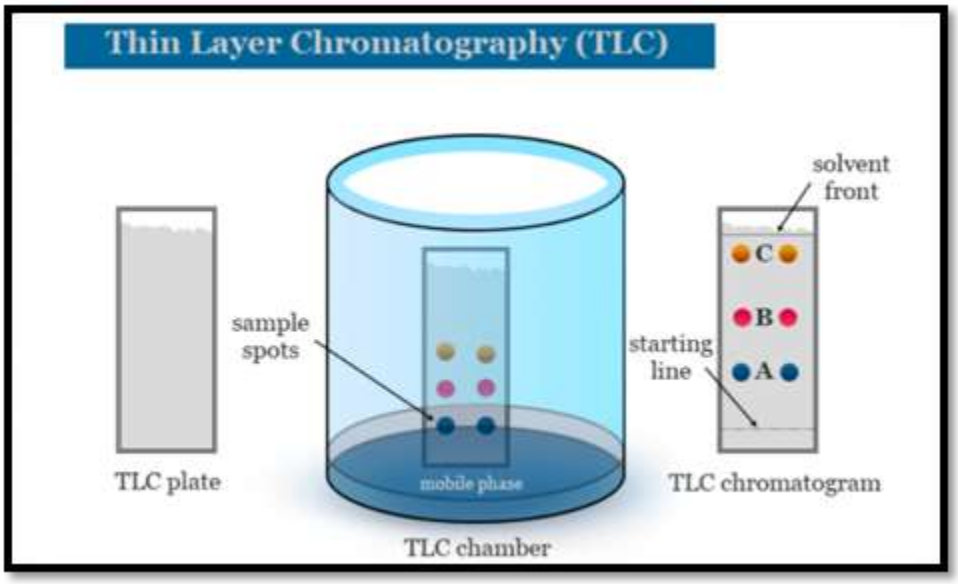

Fig.2- thin layer chromatoghrapy

Using a glass plate coated in a very thin layer of an adsorbent, such as silica gel or alumina, the thin-layer chromatography (TLC) procedure separates the chemical mixture into its component elements. The plate used in this method is known as chrome plate. To start the separation process, a small area of the mixture's solution is placed 2 cm above one end of the plate. The plate is then placed into a container that is tightly closed and filled with an eluent, which causes the plate to rise and raise the various mixture components to different heights. [23]

2.High performance liquid chromatography :-

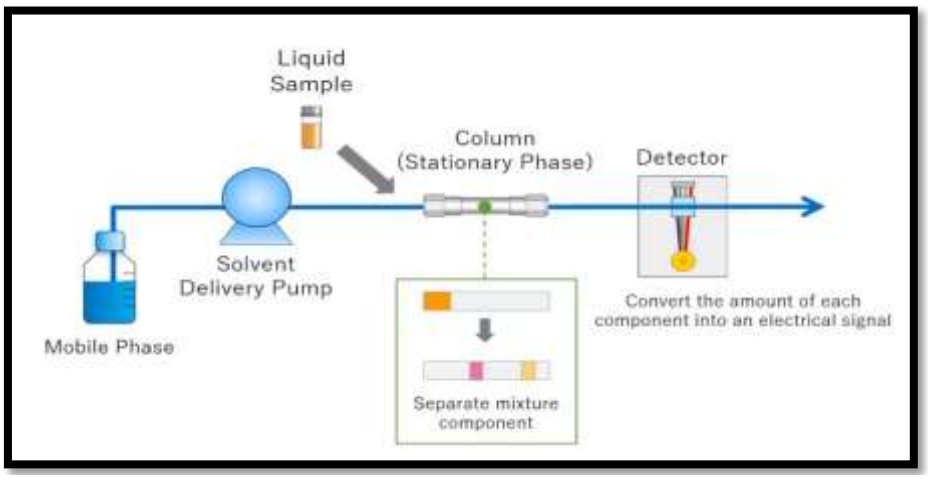

Fig.- 3 high performance liquid chromatography

This chromatography method yields perfect results in the separation and identification of amino acids, carbohydrates, lipids, nucleic acids, proteins, steroids, and other biologically active molecules.[24] It allows for the structural and functional analysis, as well as the purification, of many molecules in a short amount of time. In HPLC, mobile phase moves quickly (0.1–5 cm/sec)

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 6 Nov-Dec 2023, pp: 270-281 www.ijprajournal.com ISSN: 2249-7781

across columns while being compressed to 10-400 atmospheres. With this method, the analysis is finished quickly thanks to the utilization of small particles and the application of high pressure to the rate of solvent flow.[25] A crucial element of an HPLC device Depot for solvents, high-pressure pump Commercially made detector, column, and recording. With the use of a computerized system, the separation's duration is managed, and the materials are precise [26].

3.High performance thin layer chromatography :-

A more advanced type of thin layer chromatography is high-performance thin-layer chromatography (HPTLC) (TLC)[15]HPTLC technique is widely employed in pharmaceutical industry in process development, identification and Detection of adulterants in herbal product and helps in identification of pesticide content, mycotoxins and in quality Control of herbs and health Food.[27]It has also been reported that mobile phases of pH 8 and above Can be used for HPTLC.

The fundamental thin-layer chromatography technique can be improved in a number of ways to automate the various procedures, boost the attained resolution, and enable more precise quantitative measurements. [28]

The solvent from the mobile phase passes through due to capillary action. The components migrate in accordance with their affinities with the adsorbent. The component moving more slowly is the one that is more drawn to the stationary phase. The element that is more fast moving has a lesser attraction for the stationary phase. The components are subsequently separated using a chromatographic plate.[29]

Application of chromatography :-
1.Pharmaceutical Analysis.
2.Herbal Analysis.
3.Quality Control.
4.Forensic Science.
5.Preparative studies.
6.Bioequivalence studies.
7.Biomarker analysis. [30]

4. Column chromatography :-

It is a precursory technique used in the purification of compounds based on their hydrophobicity or polarity. In this chromatography process, the molecule mixture is separated depending on its differentials partitioning between a stationary phase and a mobile phase.[31]

If the sample's molecules are colorless, it is still possible to discern their positions on the chromatogram by utilizing florescence, radioactivity, or a specific chemical to produce a clearly visible, colored reaction. It is possible to detect a recognizablecolor forming under ambient or UV light. The position of each molecule in the mixture can be calculated by dividing the lengths travelled by each molecule by the solvent. Rf is a measurement value that stands for relative mobility. Rf value is used to qualitatively describe substances.

Their movement through the interior column material, which is supported by fiber glass, is ensured. At the device's base, samples are gathered in a volume- and time-dependent way.[32]The technique can be used on scales from micrograms up to kilograms. The main advantage of column chromatography is the relatively low cost and disposability of the stationary phase used in the process.[33]

5.Paper chromatography:-

it is particularly applicable to water soluble plant constituents, namely the carbohydrates, amino acids, nucleic acid bases, organic acids and phenolic compounds.[34]

Paper chromatography is cost-effective, relatively simple to perform, and doesn't require expensive equipment, making it accessible for herbal technology applications.

The basic principle involved in paper chromatography is partition in which the various components get distributed or partitioned between liquid phases. It involves use of aqueous solvent held in pores of filter paper which acts as stationary phase whereas mobile phase travels over the paper [35,36]. Due to differences in their affinity towards water (in stationary phase) and mobile phase solvents, the compounds in the mixture get separated through capillary action of the pores in the paper. The components may also be separated on the basis of principle of adsorption between solid and liquid phases, where solid surface of paper serves as stationary phase and mobile phase is a liquid solvent. Although the main working principle of paper chromatography is partitioning this is employed in many pharmaceutical applications [37]

PURIFICATION TECHNIQUES FOR ISOLATED PHYTOCONSTITUENTS

The separation of phytochemicals is the method of isolating the elements of plant extracts

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 6 Nov-Dec 2023, pp: 270-281 www.ijprajournal.com ISSN: 2249-7781

or active sections one at a time and purifying them into monomer compounds using physical and chemical techniques. Traditional isolation methods include solvent extraction, precipitation, crystallization, fractional distillation, salting out, and dialysis still have a wide variety of modern applications. However, the employment of modern separation methods such high performanceliquid chromatography, ultrafiltration, and high performance liquid drop counter current chromatography is also advantageous for the separation of phytochemicals. This section describes common methods and their particular applications for isolating phytochemicals. Acidic and basic solvent method.[38]

Solvent method:-

The different amounts of acidity and alkalinity present in each component of the mixture are taken into consideration.

Alkaloids and other insoluble in water alkaline organic compounds may react with inorganic acids to form salts that can be used to distinguish them from non-alkaline and water-soluble compounds. Acid components with carboxyl or phenolic hydroxyl groups can be saline by bases and then dissolved in water. Before isolating components with lactone or lactam substructures from other water- insoluble components, it is possible to saponify and dissolve those components in water. Complete extracts can be extracted using acid water or alkali water, and then dissolved in lipophilic organic solvents, respectively (ethyl acetate is frequently employed). Neutral, alkaline, and acidic components. Of course, after adjusting the pH, the entire extract can also be dissolved in water and extracted with organic solvents. The fractions can be further separated by using a pH gradient extraction due to differences in the alkalinity or acidity of the fractions. In order to avoid structural changes of some compounds under harsh conditions or the inability of the chemical structures to be returned to their original state, it is crucial to pay attention to the strength of the acidity or alkalinity, the contact time with the separated components, the heating temperature, and the time when using the acid and basic solvent method.[38]

Polarity gradient extraction method :-

Using this technique, the separation goal is accomplished based on the various polarities of the various plant extract constituents and the various partition coefficients in two-phase solvents. The polarity of the components in plant extracts is typically taken into account when choosing between different two-phase solvent systems. For instance, a water system containing n-butanol can be used to separate components with strong polarity, a water system containing ethyl acetate can be used to separate components with medium polarity, and a water system containing chloroform (or ether) can be used to separate components with weak polarity. The plant extract must first be dissolved in water before the extraction process can begin. A separate organic solvent that is not miscible with water due to polarity differences is then used to extract the solution or suspension in a separating funnel. As shown in the extract was commonly extracted using petroleum ether (also known as cyclohexane), ethyl acetate (often known as chloroform), and water-saturated n-butanol in that order. The petroleum ether layer contains low polarity, lipid-soluble compounds. The ethyl acetate layer contains medium-polar compounds such monoglycerides, flavonoids, and chemicals with more polar functional groups. The n-butanol layer contains oligo glycosides and other highly polar components that are water soluble. Chemicals in the water layer, such as glycosides with more glycosyl groups,carbohydrates, amino acids, proteins, and other water soluble compounds, exhibit the strongest polarity.

Importance of standardization :-

Standardization of herbal formulations:-

Standardization of herbal formulation requires execution of Good Manufacturing Practices (GMP). [39,40]Furthermore, study of various parameters which considered as essential includes pharmacodynamics, pharmacokinetics, dosage, stability, shelf-life, toxicity evaluation, chemical profiling of the herbal formulation.[41] Other equivalently prime factors are pesticides residue, aflatoxin content, heavy metals contamination, Good Agricultural Practices (GAP) in herbal drug standardization.[42]

Need of standardization

To gain the public trust and to bring herbal product or herbal medicines into mainstream of today in health care system the researchers, the manufacturers and the regulatory agencies must apply rigorous scientific methodologies & experimentation to ensure the quality and lot to lot consistency of the traditional herbal products. [43]Experimental data, toxicity studies and human clinical studies are the parameters in which modern system of medicine is based on. However,

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 6 Nov-Dec 2023, pp: 270-281 www.ijprajournal.com ISSN: 2249-7781

Pharmacopeial standards of raw material / finished products are not available yet. cGMP for herbal industry are not well defined nor the simple or essential minimum standards of medicinal plant products are maintained or regulated.

Since deficiency of quality standards has resulted in mild to serious adverse effects ranging from hepato toxicity to death. And due to this reason herbal ingredients require different tools which helps in determining identity, purity and quality of herbal preparations and these tools should be technically sufficient, rapid and cost effective with GMP requirements. For the determination of safety, efficacy and quality of herbal medications, WHO has set specific guidelines. care should be taken starting from the proper identification of plants, season, area of collection, their extraction and purification, in order to obtain quality herbal product. [44]

Need of quality control & standardization of herbal products:

1. When traditional medicines were developed technology and concept of standardization was quite different in manner.
2. During thousand years ago dynamic process of evolution may have changed the identity of plant material.
3. Due to commercialization, supply of genuine raw material has become a biggest challenge.
4. Properties of botanicals may have undergone change due to time variation & environmental factors.[45]

SOME ANCIENT METHODS FOR STANDARDISATION:

Collection time for herbal plant:

Rutu: some drugs are seasonal as well as some parts of herb should collect in specific Rutu.

Desha: Availability of some drugs in specific area like Himalaya, so geographical distribution is important one.

Nakshatra: Collection of some drugs should be done on specific Nakshatra which Indicate using dry drugs & wet drugs.[46]

WHO GUIDELINES FOR QUALITY STANDARDIZED HERBAL FORMULATIONS:

1) Quality control of herbal drug
2) Stability assessment and shelf life
3. Safety assessment
4) Assessment of efficacy by ethno- medical information and biological activity evaluations. Along with the chromatographic fingerprints (TLC, HPTLC, HPLC, and GC), the bioactive extract should be standardized on the basis of active principles or major compounds.

In general, all medicines, whether they are synthetic or of plant origin, should satisfy the basic requirement of being safe and effective.[47,48]

STANDARDIZATION OF POLYHERBAL FORMULATIONS :-

As polyherbal formulations combine more than one herb to achieve the desired therapeutic effect, standardization is crucial for maintaining and evaluating the product's quality and safety. Standardization reduces batch-to-batch variation and ensures the polyherbal formulations' acceptability, safety, efficacy, and quality. The standardization of different herbal and polyherbal products that are sold, such as MadhumehariChurn (Baidynath), which has a blend of eight herbs. Traditional remedy Dashamularishtais used to restore physiological function following childbirth. The identity, purity, and potency of the polyherbal formulation, as well as setting standards for this Ayurvedic formulation, were determined using TLC and HPTLC fingerprint profiles. [49]

SELECTION CRITERIA FOR HERBAL ORIGIN SUBSTANCES APPLICABLE TO STANDARDIZATION AND QUALITY CONTROL OF HERBAL MEDICINE:-

General characteristics of herbal medicine resources, herbal medicine, standardization and quality of herbal medicine Control:

Herbal raw materials, herbal preparations, and finished herbal products are very complex. This can make herbal medicines very difficult to identify and quantify, making their detection very difficult impurities. The use of markers to identify herbal medicines and measure their amounts needs to be clarified. Marker compounds contained in herbal medicines alone do not guarantee the quality of herbal medicines.[7]

Botanical Identity: Ensuring the correct plant species is used in the herbal medicine.

Geographical Origin: The geographic source of the herbal material can impact its quality.

Plant Part: Specify which part of the plant is used (e.g., leaves, roots, seeds).

Harvesting Time: The time of harvesting can affect the content of active compounds.

Processing and Storage: Proper methods for drying, storing, and processing the herbs.

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 6 Nov-Dec 2023, pp: 270-281 www.ijprajournal.com ISSN: 2249-7781

Purity: Ensuring the absence of contaminants like heavy metals, pesticides, and pathogens.
Active Ingredient Content: Quantifying and standardizing the active compounds.
Phytochemical Profile: Analyzing the full spectrum of phytochemicals in the herb.
Microbiological Limits: Setting acceptable levels for microbial contamination.
Residues: Testing for the presence of solvent residues or other processing chemicals.
Packaging and Labeling: Ensuring accurate and informative labeling.
Stability: Assessing the stability of the herbal material over time.
Regulatory Compliance: Meeting legal and regulatory requirements.
Good Agricultural and Collection Practices.[50.ChatGpt]

DRUG FOR ADVANCE TECHNOLOGY :-
1.Jasmine :-

Fig.4-jasmine

Jasmine has been used to treat hepatitis, cirrhosis-related discomfort in the liver, and severe diarrhea-related stomach pain (dysentery). Additionally, it is used as a sedative to relax, an aphrodisiac to increase sex desire, a stroke preventative, and a cancer treatment.

Jasmine is often associated with herbal and traditional medicine practices for its potential therapeutic properties. Some herbal uses of jasmine include:

Relaxation and Stress Reduction: Jasmine is believed to have calming and anxiety-reducing effects. It is used in herbal teas, essential oils, and aromatherapy to promote relaxation and reduce stress.[52]

Improved Sleep: Jasmine is sometimes used to aid sleep. The scent of jasmine essential oil may be diffused in bedrooms to help with insomnia and promote restful sleep.[53]

SkinHealth: Jasmine oil is used in skincare for its potential benefits in improving skin elasticity, reducing the appearance of scars, and hydrating the skin.[54]

Antioxidant Properties: Jasmine may contain antioxidants that can help combat free radicals and reduce oxidative stress in the body.[55]

Pain Relief: In some traditional systems of medicine, jasmine is used to alleviate headaches and other mild pains.

Antiseptic and Anti-Inflammatory: Jasmine extracts are believed to have antiseptic and anti-inflammatory properties, which can be applied topically to soothe minor skin irritations.[56]

Respiratory Health: Jasmine tea and essential oil inhalation may be used to help relieve respiratory issues like coughs and congestion.[57]

It's important to note that while jasmine is used in various herbal and traditional remedies,

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 6 Nov-Dec 2023, pp: 270-281 www.ijprajournal.com ISSN: 2249-7781

scientific evidence supporting all of these potential benefits is limited, and individual responses can vary. As with any herbal remedy, it's advisable to consult with a healthcare professional before using jasmine for medicinal purposes, especially if you have any underlying health conditions or are taking medications.

II. CONCLUSION:-

This topic mainly focuses on herbal extraction techniques. Plants, herbs and ethnic plants have been used since the dawn of humanity. And it is still used around the world to promote health and treat disease. Plants and natural resources form the basis of today's modern medicine and contributes significantly to the commercial drugs manufactured today. Approximately 25% of medicines prescribed worldwide are of plant origin.However, as opposed to pharmaceuticals, plants are commonly used in the healthcare industry.

For some people, herbal medicine is the preferred treatment. For others, the herb is used as add-on therapy to conventional drugs. However, in many developing countries, traditional medicine is the mainstay of herbal medicine. The only healthcare system available or affordable. People who use herbal medicine for any reason need to make sure it is the product they are using. If you purchase them, they are safe and contain certain herbs or certain amounts of certain herbal ingredients that are supposed to be included. for Excellent final product, various extraction methods such as TLC, HPLC, column chromatography, etc.

REFERENCE :-

[1]. Barnes J, Anderson LA, Phillipson JD (2007). Herbal medicine. 3rd Edition, Pharmaceutical Press, London. pp 1-23.
[2]. Kinghorn A.D. The role of pharmacognosy in modern medicine, Expert Opin. Pharma
[3]. International Journal of Research Publication and Reviews Journal homepage: www.ijrpr.com ISSN 2582-7421 Advanced Herbal Technology 1Mr. GangawaneRushikeshMadhav, 2Ms. GaikwadS.C.cother. 2002, 3(2) 77-79
[4]. Farooqi A.A. and Sreeramu B.S. Cultivation of medicinal and aromatic crops. University press, Delhi, 2001, 9-10.
[5]. General guidelines for methodologies on research and evaluation of traditional medicine. Geneva, World Health Organization, 2000 (WHO/EDM/TRM/2000.1)
[6]. International Journal of Research Publication and Reviews Journal homepage: www.ijrpr.com ISSN 2582-7421 Review on Advanced Herbal Technology. 1.Mr. KarandeSankalp Santosh, 2.Ms. Adsul P. S.
[7]. https://1drv.ms/b/s!AhmmDyw7Dow-gTL-TN1h8ZcWhmdS
[8]. Kalpana J, Preetic, Dnyaneshwar W, Bhushan P. Molecular markers in Herbal drug technology. Cur sci 2004 Page No.123 and Indian Herbal pharmacopoeia British herbal medicine Association 1996. Page nNo.448.
[9]. International Journal of Advanced Research in Science, Communication and Technology (IJARSCT) Volume 3, Issue 2, January 2023 www.ijarsct.co.in Review on Advance Herbal Technology Mr. Nikhil Shriram Salunke, Prof. Sarfaraz M. Kazi, Dr. Sanjay K. Bais.
[10]. vC. Manach, A. SC albert, C. Morand. Polyphenols: food sources and bioavailability. Am. J. Clam Nutr., 2004, 79: 727-747.
[11]. N. Venkatesan, B. S. Babu, S. P. Vyas. Protected particulate drug carriers for prolonged systemic circulation–a review. Indian J. Pharm. Sci., 2000, 62: 327-333.
[12]. M. A. Longer, H. S. Ching, J. R. Robinson. Oral delivery of chlorthiazide using a bioadhesive polymer. J. Pharm. Sci., 1985, 74:406-411.
[13]. S. Sharma, M. Sikarwar. Phytosome: a review. Planta Indica, 2005, 1: 1-3. A major pharma giant Indena S. P. A. Milan, Italy. Phytosomes technology, Available at www.indena.com.
[14]. E. Bombardelli, S. B. Curri, R. Loggia Della, et al. Complexes between phospholipids and vegetal derivatives of biological interest. Fitoterapia. 1989, 60: 1-9.
[15]. https://en.m.wikipedia.org/wiki/Supercritical_fluid_extraction
[16]. https://www.sciencedirect.com/topics/food-science/supercritical-fluid-extraction
[17]. https://pubmed.ncbi.nlm.nih.gov/11192157/#:~:text=Microwave%2Dassisted%20extraction%20(MAE),main%20advantage%20of%20this%20technique.

International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 6 Nov-Dec 2023, pp: 270-281 www.ijprajournal.com ISSN: 2249-7781

[18]. Microwave assisted extraction of phytochemicals an efficient and modern approach for botanicals and pharmaceuticals Iqra Akhtar, SumeraJavad, ZubaidaYousaf, Sumera Iqbal and KhajistaJabeen
[19]. Gavali Pratiksha Suresh , GaruteKomalSomnath, SidhirGarje ,GhazaliAartiSanjay.Advance Herbal Technology.(IJCRT) 1 January 2022.
[20]. Ozlem Komal Patel ,Namrata Panchal ,Dr. Pradnya Ingle .Review Of Extraction Techniques .(IJARCS) Vol 6,Issue 3, 2019.
[21]. Md. Golam Rasul . Extraction ,Isolation And Characterization Of Natural Product From Medicinal Plants. December 2018.
[22]. https://www.google.com/amp/s/www.geeksforgeeks.org/chromatography/amp/
[23]. https://www.priyamstudycentre.com/2021/11/thin-layer-chromatography.html
[24]. https://www.longdom.org/open-access/a-brief-notes-on-chromatography-and-separation-techniques-89397.
[25]. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5206469/#:
[26]. Ozlem Komal Patel ,Namrata Panchal ,Dr. Pradnya Ingle .Review Of Extraction Techniques .(IJARCS) Vol 6,Issue 3, 2019.
[27]. Quality control and standardization of herbals. Page no. 132-133
[28]. Pharmaceutical in aquatic environment Edited by - vinod Kumar gark, Ashok pandey
[29]. IJCRT ADVANCED HERBAL TECHNOLOGY Author Name of Guide – Dr. J.P. Lavande Principal -Dr.S.K.Bais Name of Author - Pawar N.D.
[30]. Application of chromatography (Instrumental method of analyses) Niraliprakashan.
[31]. https://byjus.com/chemistry/column-chromatography/#:
[32]. IJRCTUPDATED REVIEW ON ADVANCED HERBAL TECHNOLOGY S. M. Kazi, S.K. Bais, A.S.Lendave*
[33]. https://www.longdom.org/peer-reviewed-journals/column-chromatography-
[34]. Chromatographic Analysis of Phytopharmaceuticals– A Review Aruna M. Garud*, Dr. Varsha M. Jadhav, Dr.Vilasrao J. Kadam.
[35]. N. W. Eigsti, “Paper Chromatography for Student Research,” The American Biology Teacher, pp. 123-134. 1967.
[36]. O. Coskun, “Separation techniques: chromatography,” Northern clinics of Istanbul, vol. 3, no. 2, pp. 156. 2016.
[37]. G. Zweig, and J. Sherma, “Paper Chromatography—Past, Present and Future,” Journal of Chromatographic Science, vol. 11, no. 6, pp. 279-283. 1973.
[38]. https://www.intechopen.com/chapters/68108
[39]. Indian Herbal Pharmacopoeia, Indian Drug Manufacturers ‘Association, Mumbai, 2002.
[40]. Quality Control Methods for Medicinal Plant Materials WHO, Geneva, 1996
[41]. Mosihuzzaman M, Choudhary MI. Protocols on safety, efficacy, standardization, and documentation of herbal medicine. Pure Appl Chem 2008; 80(10):2195–2230.
[42]. Bauer R. Quality criteria and standardization of phytopharmaceuticals: Can acceptably drug standard can be achieved Drug Inform 1998; 32:101-110
[43]. Wani M.S. Herbal Medicine and its Standarization.Pharma info, 5(6),2007, 1-6.
[44]. Archana A, anubha K. Standardization of herbal drugs: an overview. International research journal of pharmacy.2011; 12(2), 56-60.
[45]. Patwardhan B. Ayurveda the designer medicine: a review of ethnopharmacology and bio prospective research. Indian Drugs, 37 (5), 2000,2046-56
[46]. CharakSamhitas, KalpasthanAdhyaya 1, 12 &Vimansthasna 8, English translated by R.K. Sharma and Bhagawan Das, choukhambasnaskrutsanshtan, Varanasi, edition 2009
[47]. WHO, General Guidelines for Methodologies on Research and Evaluation of Traditional Medicine, World Health Organization, Geneva, (2002c)
[48]. EMEA, Guidelines on Quality of herbal medicinal products/ Traditional Medicinal Products, EMEA/ HMPWP/31/99 Review. European Agency for the Evaluation of Medicinal products. (EMEA), London, 2005

[49]. British Herbal Pharmacopoeia, British Herbal Medicine Association, 1996.Page no 448
[50]. https://chat.openai.com
[51]. https://images.app.goo.gl/8hWVo4YPtCh7iNzW6
[52]. https://pharmeasy.in/blog/essential-oils-for-anxiety-a-research-based-holistic-approach/
[53]. https://sleepdoctor.com/best-essential-oils-for-sleep/
[54]. https://shikobeauty.com/blogs/ingredients-showcase/
[55]. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3249911/
[56]. https://www.healthline.com/health/jasmine-essential-oil
[57]. https://pathwayswellnessprogram.com/essential-oils-for-respiratory-health/