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STANDARDIZATION OF HERBAL DRUGS WITH SPECIAL EMPHASIS ON HERBAL CREAM: A REVIEW RESEARCH ARTICLE

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ABSTRACT
Herbal medicines have been widely used for centuries in traditional systems of medicine such as Ayurveda, Siddha, and Unani. In recent decades, the increasing global acceptance of herbal formulations has highlighted the necessity for proper standardization, quality control, and scientific validation of herbal products. Herbal creams are among the most commonly used topical formulations because of their ease of application, patient compliance, and therapeutic efficacy. However, variability in phytochemical constituents, lack of standard manufacturing procedures, and contamination issues create challenges in maintaining consistency and quality. The present review article focuses on the standardization of herbal drugs with special emphasis on herbal cream formulations. It discusses pharmacognostic evaluation, physicochemical analysis, phytochemical screening, methods for preparation and evaluation of herbal creams, and modern analytical techniques used in herbal standardization. The article also highlights the importance of chromatographic techniques such as TLC and HPTLC in ensuring the identity, purity, and efficacy of herbal formulations. The study concludes that standardization of herbal creams using modern scientific tools is essential for ensuring safety, quality, therapeutic effectiveness, and global acceptance of herbal products.

KEYWORDS: Herbal drugs, Herbal cream, Standardization, Phytochemical screening, Pharmacognostic evaluation, HPTLC, Ayurveda.

1. INTRODUCTION

Herbal medicine has played a significant role in human healthcare since ancient times. Ayurveda, one of the oldest systems of medicine, originated in India and emphasizes the maintenance of health through natural remedies derived from plants, minerals, and animal products. According to the World Health Organization (WHO), nearly 80% of the world's population depends upon herbal medicines for primary healthcare. Herbal formulations are gaining popularity because they are considered safer, economical, and associated with fewer side effects compared to synthetic drugs. Among various dosage forms, herbal creams are widely used for cosmetic and therapeutic purposes such as moisturizing, anti-inflammatory, antimicrobial, anti-aging, and wound healing applications. Despite their popularity, herbal formulations often suffer from lack of standardization due to variation in geographical source, cultivation conditions, harvesting methods, storage, and processing techniques. Therefore, standardization of herbal drugs is necessary to ensure identity, purity, safety, efficacy, and quality consistency. The present article provides a comprehensive review of standardization procedures

used in herbal formulations with special emphasis on herbal cream preparations.

2. Herbal Medicine and Ayurvedic
Ayurveda is a traditional Indian system of medicine that focuses on balancing the three fundamental energies of the body known as Vata, Pitta, and Kapha. Ayurvedic medicines are mainly prepared from medicinal plants possessing therapeutic properties. Medicinal plants contain various bioactive compounds such as: Alkaloids, Glycosides, Flavonoids, Tannins, Phenolic compounds, Saponins, Steroids, Volatile oils etc.

These phyto-constituents are responsible for the pharmacological activities of herbal medicines.

Advantages of Herbal Medicines
1. Natural origin and better patient acceptance.
2. Fewer side effects compared to synthetic drugs.
3. Economical and easily available.
4. Environmentally friendly.
5. Suitable for chronic disease management.

Limitations of Herbal Medicines
1. Lack of proper standardization.
2. Variation in phytochemical composition.
3. Possibility of contamination and adulteration.
4. Insufficient scientific evidence.
5. Poor quality control measures.

3. Standardization of Herbal Drugs
Standardization refers to the process of establishing consistent quality, purity, safety, and efficacy of herbal drugs and formulations. WHO defines herbal medicines as finished labeled medicinal products containing active ingredients obtained from plant materials?

The major objectives of standardization include:
- Authentication of raw materials
- Detection of adulterants
- Maintenance of batch-to-batch consistency
- Determination of active constituents
- Ensuring safety and efficacy

Parameters Used in Standardization
3.1 Pharmacognostic Evaluation
Pharmacognostic studies involve macroscopic and microscopic examination of crude drugs.

Macroscopic Evaluation
The following parameters are evaluated: Color, Odor, Taste, Shape, Size, Texture.

Microscopic Evaluation
Microscopic studies help identify:
- Epidermal cells
- Trichomes
- Starch grains
- Calcium oxalate crystals
- Oil globules
- Fibers and vessels

Powder Microscopy
Powdered drugs are stained with different reagents such as:
- Phloroglucinol and HCl
- Ruthenium red
- Sudan red III
- Iodine solution

These staining methods help identify structural components of the herbal drug.

4. Physicochemical Analysis
Physicochemical parameters are important for evaluating the quality and purity of herbal drugs.

4.1 Foreign Matter Analysis
Foreign organic matter such as soil, dust, and extraneous materials are removed to maintain purity.

4.2 Moisture Content and Loss on Drying
Excess moisture promotes microbial growth and degradation of active constituents. Loss on drying is determined by heating the sample at 105°C until constant weight is obtained.

4.3 Ash Values: Ash values help determine inorganic impurities and adulteration.

Types of Ash Values
- Total ash
- Acid-insoluble ash
- Water-soluble ash
- Sulphated ash

4.4 Extractive Value: Extractive values indicate the quantity of active constituents soluble in different solvents.

Solvents Used: Petroleum ether**,** Ethyl acetate**,** Methanol **a**nd Water.

4.5 Fluorescence Analysis: Certain herbal drugs exhibit fluorescence under ultraviolet light when treated with reagents. This characteristic helps in authentication and detection of adulteration.

5. Preliminary Phytochemical Screening: Phytochemical screening identifies various classes of bioactive compounds present in herbal drugs.

Tests for Carbohydrates: Molisch test**,** Benedict's test**,** Fehling's test and Barfoed's test.

Tests for Proteins and Amino Acids: Ninhydrin test**,** Biuret test**,** Millon's test and Xanthoproteic test.

Tests for Alkaloids: Dragendorff's test**,** Mayer's test**,** Wagner's test and Hager's test.

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Tests for Glycosides: Legal's test, Baljet test and Keller-Killiani test.

Tests for Flavonoids: Shinoda test and Lead acetate test
Tests for Tannins and Phenolic Compounds: Ferric chloride test and Phenazone test.

Tests for Saponins: Foam test **and** Hemolysis test.

Tests for Volatile Oils: Sudan III staining **and** Tincture alkana test.

These tests help establish the chemical profile of herbal formulations.

6. Preparation of Herbal Cream
Herbal creams are semisolid formulations intended for external application. They are generally prepared as oil-in-water (O/W) or water-in-oil (W/O) emulsions.

Materials Used in Herbal Cream Formulation
Oil Phase Ingredients: Stearic acid, Liquid paraffin, Lanoline, Glyceryl monostearate and Sunflower wax.

Aqueous Phase Ingredients: Glycerin, Propylene glycol, Triethanolamine, Borax, Water and Preservatives.

Method of Preparation
1. Oil phase ingredients are melted at 70–80°C.
2. Water phase ingredients are heated separately.
3. Both phases are mixed with continuous stirring.
4. Perfume is added after cooling.
5. Homogeneous cream is obtained.

7. Evaluation of Herbal Cream: Evaluation of herbal creams ensures stability, quality, and therapeutic efficacy.

7.1 pH Determination: The pH of cream is measured using a calibrated pH meter to ensure skin compatibility.

7.2 Spreadability: Spreadability determines the ease of application of cream on the skin.

7.3 Viscosity: Viscosity is measured using a Brookfield viscometer to evaluate flow properties.

7.4 Homogeneity: The cream should possess smooth texture and uniform appearance.

7.5 Dye Test: Used to identify whether the cream is O/W or W/O type.

7.6 Irritancy Test: The formulation is applied on the skin and observed for irritation, redness, or edema.

7.7 Thermal Stability: Cream formulations are evaluated at different temperatures for stability.

7.8 Accelerated Stability Studies: Formulations are stored under accelerated conditions to predict shelf life and stability.

7.9 Occlusivity Test: Occlusivity determines the moisture retention capacity of the cream.

8. Modern Analytical Techniques in Herbal Standardization: Modern analytical tools are essential for accurate standardization of herbal formulations.

Thin Layer Chromatography (TLC)
TLC is widely used for: Identification of phytoconstituents, Detection of adulteration and Quality control.

High Performance Thin Layer Chromatography (HPTLC)
HPTLC provides: Fingerprint profiling, Quantitative analysis and Better sensitivity and reproducibility.

Other Advanced Techniques: HPLC, GC-MS, UV-Visible Spectroscopy, FTIR and LC-MS.

These techniques improve quality assurance and reproducibility of herbal products.

9. Challenges in Standardization of Herbal Creams
1. Variability in plant constituents.
2. Lack of authenticated raw materials.
3. Absence of universal standards.
4. Microbial contamination.
5. Stability issues.
6. Difficulty in identifying active principles.
7. Batch-to-batch variation.

10. Future Perspectives
Future research in herbal standardization should focus on:
- Development of validated analytical methods
- Identification of bioactive markers
- Standard cultivation practices
- Clinical evaluation of herbal formulations
- Regulatory harmonization
- Nanotechnology-based herbal formulations

The integration of traditional knowledge with modern scientific approaches can significantly improve the global acceptance of herbal medicines.

11. CONCLUSION
Herbal medicines continue to play an important role in healthcare systems worldwide. However, lack of standardization remains a major challenge affecting their quality, safety, and therapeutic efficacy. Standardization of herbal drugs and herbal creams through pharmacognostic evaluation, physicochemical analysis, phytochemical screening, and modern analytical techniques is essential for ensuring consistency and reliability. Herbal cream formulations possess promising

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therapeutic and cosmetic applications due to their moisturizing, protective, and medicinal properties. Application of modern analytical tools such as TLC and HPTLC can help establish proper quality standards for herbal formulations. Scientific validation and standardization will ultimately enhance consumer confidence and promote the worldwide acceptance of herbal medicines.

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