Development Validation of UV Spectrophoto Meter Method for Determination of Polyherbal Powder

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Abstract*: The pharmaceutical and consumer healthcare industries have been greatly impacted by artificial intelligence and machine learning. A subfield of computer science called artificial intelligence is able to analyze intricate medical data. The goal of artificial intelligence (AI) is to create intelligent modeling, which facilitates knowledge imagination, problem solving, and decision making. AI is becoming more and more significant in many areas of pharmacy, including drug discovery and formulation of drug delivery, process optimization, testing, and pharmacokinetics/pharmacodynamics (PK/PD) studies growth. This review focuses on the significant applications of AI in various pharmaceutical domains, including drug development and discovery, Many studies are being conducted to enhance the AI technology that is currently available in order to increase the efficiency of the pharmacy profession. Artificial intelligence and system mastery have seen a significant upsurge in recent years. It has lessened the effort required of humans to advance in their extraordinary lives. Numerous drug discovery implementations have been examined, demonstrating the technology's effectiveness in quantitative structure-property relationships (QSPR) and quantitative structure-activity relationships (QSAR).Additionally, they are employed in clinical trials to generate and interpret data gathered from patient information. The pharmaceutical industry is currently having trouble maintaining its drug development programs due to rising R&D expenses and declining productivity. In addition to helping with experimental design, machine learning algorithms can forecast the toxicity and pharmacokinetics of potential drugs. This capability lessens the need for extensive and expensive animal testing by enabling the prioritization and optimization of lead compounds. Artificial intelligence (AI) algorithms that examine actual patient data can support personalized medicine strategies, improving patient adherence and treatment outcomes.*

Keywords: healthcare industries

I. INTRODUCTION

Herbal drugs have been used since ancient times as medicine for the treatment of a range of diseases. In spite of the great advantages asserted in the use of herbal medicines in the development of pharmacopoeia in developing countries, there are real health and safety issues. Higher safety margin has been well developed mainly because the wide biological activities of plant materials on the origin they symbolize during the lesser past. Since herbal medicine is prepared from materials of the same species or from the relative proportion of active constituents that can vary from one plant to another and in different plant parts.

Every herbal formulation must be standardized as per WHO guidelines. WHO Collaborates and assists health ministries in establishing mechanisms for the introduction of traditional plant medicine into primary healthcare programs, in assessing safety and efficacy, and ensuring supplies are of the quality defined as per law and processed materials. Raw materials can be defined as starting material of any intermediate which will be utilized for further processing before finished pharmaceutical dosage or products are ready. Purity and quality of raw material as per specification for testing standard for selected substances must be present with established with use of suitable test method. Lot of analytical

techniques have been developed for refined quality control of drug from plan of origin one quality method is used by selecting a known constituent or a marker compound as the qualitative target to assess authenticity of herbal quality and chromatographic fingerprinting used for consistency of herbal products.

Herbal extract or products are visible observation and standardized specifications on particular defined chemical compounds which are in addition to active biological efficacy. A Biomaraker on the plant is a group of chemical compound which are in addition to being unique for that plant material also correlate with biological efficacy.

Ayurvedic formulation :- Ayurveda is a medical system primarily practiced in India that has been known for nearly 500 years. It older than herbal medicine, while emphasizing the body, mind and inAyurveda, an ancient Indian system of medicine, emphasizes on disease prevention and treatment through a holistic approach that considers the mind, body, and spirit. It is based on the belief that health and wellness depend on a delicate balance between these three elements. There is increasing medical and lay recognition of the health benefits of Ayurvedic practices, such as yoga, massage, and meditation. Additionally,

several Ayurvedic herbs, like turmeric, ginger, and neem, are now recognized for their potential benefits for heart health and as antioxidant boosters.

Ayurvedic formulations offer several advantages, including lower cost, better tolerance, fewer side effects, wider availability, and eco-friendliness. However, they also have certain limitations.For instance, they may not be effective in treating trauma patients and also having risks with self-dosing. Standardization can also be challenging in some cases.One of the concerns regarding Ayurvedic formulations is the presence of heavy metals in some products, which can potentially be harmful. Although rare, arsenic poisoning has been reported due to the use of Ayurvedic products.Despite these issues, Ayurvedic polyherbal formulations are widely used in both developed and developing countries for various ailments, including:Analgesic activity, Anti-inflammatory activity, Treatment of Diabetes mellitus, Treatment of cancer, Treatment of depression, Treatment of psoriasis, Treatment of dental diseases, Treatment of vitiligo, Treatment of aging, Treatment of fertility issues.Several methods were reported for the estimation of curcumin in different pharmaceutical and herbal formulations by using UV,[13] HPLC,[14] UPLC, [15] HPTLC,[16] FT-IR[17] and others hyphenated methods.[18,19] However, these techniques are not suitable for analyzing compounds in combinations of polyherbal formulations like Ayurvedic or Chinese medicinal products, since they contain more than one herb.

UV-spectrophotometric methods are more suitable for this objective, studies on dedicated UV-spectrophotometric methods to quantify the curcumin in polyherbal formulations are very limited.[20] Therefore, in the present study, a simple UV method was developed and validated according to international conference harmonization (ICH) guidelines for the quantitative estimation of curcumin in polyherbal formulations. [21] The method has also been tested by using market available Live-well™, CUMIN capsules. Literature survey also revealed that, to date, no UV method has been proposed using ethyl acetate as solvent for the assay of curcumin in polyherbal formulations.InstrumentsJasco double beam UV-Vis spectrophotometer (Model V-630) with 1.5 nm spectral bandwidth using 10 mm matched quartz cuvettes. Data acqui-sition was performed by using spectra manager software version 2.0. Secom am single beam UV-Vis spectrophotometer (Model: XTD 6) with2 nm spectral band width using 10 mm matched quartz cuvettes. All weights were taken on electronic analytical balance (Mettler Toledo™, USA).

II. DRUG PROFILE

Plant Profile

1. Aamla

Botanical Name: Emblica officinalis Gaertn**.**

Family Name: Euphorbiaceae

Common Name: Aamla

Part used: Fruits

Chemical constituents: Rich in vitamin C, tannins, ellagic acid, lupenol, leucodelphinidin. Seed yields a fixed oil with fatty acids like linoleic, oleic, stearic, palmitic, and myristic.

Uses: Antioxidant, carminative, cerebral and GI tonic, diuretic, diabetes.

Fig. no. 1

2. Hirada
Botanical Name: Terminalia chebula
Family Name: Combretaceae
Common Name: Myrobalan
Part used: Seed
Chemical constituents: Anthraquinone glycoside, chebulic   acid, ,tannins, vitamin C.
Uses: Unripe fruit is used to treat diarrhea and dysentery..

Fig. no. 2

3. Behada
Botanical Name: Terminalia belerica Linn
Family Name: Combretaceae
Common Name: Beheda
Part used: Fruit/seeds
Chemical constituents: Fruit contains 20-30% tannins, 40-50% tannins, gallic acid, ellagic acid, phyllemblin, ethyl gallate, and galloyl glucose. The seed contains non-edible oil. The plant produces a gum and contains most of the time sugar and reported myrobalan.
Uses: Astringent, purgative, property oil is used in the manufacture of soap.

Fig No:3

4.Guggul
Botanical Name: Commiphora weighti
Family Name: Burseraceae
Common Name: Gum guggul, commiphora
Part used: Gum exudate

Fig No:4

Chemical constituents: Gum, resin (a complex mixture of guggul stero and aliphatic esters). The resin does not contain cinnamic acid or benzoic acid, normally found in many oleo-gum-resin of pharmaceutical significance.
Uses: Anti-inflammatory, anti-rheumatic, hypolipidemic.

5. Ajwain
Botanical Name: Trychyspernumsprague
Family Name: Umbelliferae
Common Name: Bishop's weed
Part used: Seeds

Fig.No:5

Chemical constituents: 2-4% of volatile oil, 17% of protein, 25% of carbohydrates, traces of tannin, glycoside, and steroidal substances, 30-35% of pinene and dipentences, and 50-55% of terpinene.
Uses: Antispasmodic, stimulant, and carminative. It is used in preparation and lotion. It is used in antiseptic and antifungal.

III. LITERATURE REVIEW

IJNRD.ORG et al.,2024,
Ayurvedic system of medicine develops enormous formulations of which churna is one of the products. Powder form of drug is mostly preferred and churna being very fine in particle size, they have better absorption and hence good bioavailability. Safety and efficacy of these Ayurvedic preparations are the main parameters to be estimated to ensure the quality of the drug used in formulation. During the last decade, it has become so vital within the scientific community to standardized the quantity of herbal formulation.

Braz. J. Pharm. et al.,2024,
The combination of various herbs (polyherbal) in a particular ratio will give a desirable the rapeutic effect because the potent phytochemical constituents of individual plants are inadequate to achieve the beneficial effect[4, 5]. The polyherbal formulation contains two or more herbs with different phytoconstituents possessing similar or dissimilar therapeutic potential have been collectively producing desirable effects.

Pankaj goyal et al.,2023,
The main purpose of the present article is to provide an extended review on its therapeutic applications across various health conditions of polyherbal powder Based on available evidences this article will also focus on providing safety profile of polyherbal powder.

Shubham sharma et al.,2021,
Ayurvedic system of medicine develops enormous formulations of which churna is one of the products. Powder form of drug is mostly preferred and churna being very fine in particle size, they have better absorption and hence good bioavailability. Safety and efficacy of these Ayurvedic preparations are the main parameters to be estimated to ensure

the quality of the drug used in the formulation. During the last decade, it has become sovital within the scientific community to standardized the quantity of herbal formulation.

Journal of Young Pharmacists et al.,2017,
The popularity of the polyherbal formulation is outstanding because of their wide therapeutic range i.e., effective at a low dose and safe at high dose, though produces fewer side effects whilst misused.

Sneha, et al.,2016,
In herbal formulation research, developing nano sized dosage forms viz., polymeric nanoparticles, liposomes, proliposomes, solid lipid nanoparticles, nano-emulsion is beneficial owing to subsequent motives viz., enhancement of solubility, bioavailability, pharmacological activity and stability; protection from
toxicity; improving tissue macrophages distribution; sustained delivery; protection from physical and chemical degradation.14 Further, nanoparticles are extensively used as a novel drug therapeutic strategies to treat chronic ailments like cancers, AIDS, Nephrotoxicity, diabetes and also for wound healing property.

Subramani Parasuraman1et al.,2016,
Plants have a tremendous impact on disease prevention, disease treatment, and decreasing the side effects of conventional drugs. The creation of contemporary herbal dosage forms can help meet the pressing requirement for standardised and repeatable herbal remedies on the current world wide market.

Bupesh et al., 2014,
There is minute scientific study about the pharmacological activities of the herbal drugs Powder. So this review helps the researcher to explore this formulation for more pharmacological activities of the herbal drugs powder.

Journal of Medicine and Medical Sciences et al.,2010,
Plants have a tremendous impact on disease prevention, disease treatment, and decreasing the side effects of conventional drugs. The creation of contemporary herbal dosage forms can help meet the pressing requirement forstandardised and repeatable herbal remedies.

IV. AIM AND OBJECTIVE
The primary objective of this study was to conduct a physicochemical evaluation of the plant materials used in Ayurvedic polyherbal powder to establish standard parameters for ensuring drug quality.
This involved the following specific aims:

Aim:
- To formulate polyherbal Powder dosage forms.
- To develop a relevant and reproducible method of evaluation that adheres to standard guidelines.

Objective:
We aimed to develop and validate a simple UV-spectrophotometric method relates to the estimation of herbal drugs powder in standardised polyherbal formulations.

The method validation parameters were evaluated as per International Conference on Harmonization (ICH) guidelines. Further, this method was applied for the assay of Aamla, Hirada, Behada, Guggul, Ajwain using UV-spectrophotometric method

Plan of work
- Procurement of Raw material (Crude drug).
- Morphological Screening of Raw material.

- Microscopical Screening of crude drug.
- Transverse section
- Powder microscopy
- Physicochemical Screening
- Ash value
- Extractove value
- loss of drying
- Moisture content
- Foreign Organic matter
- Chromatographic fingerprint
- Extraction of polyherbal drug powder
- Evaluation of Polyherbal Powder by Various Parameter
- UV for determination of Active constituent
- Formulation of Polyherbal Powder by using UV Spectroscopy
- UV visible Screening of various polyherbal powder

EXPECTED OUTCOME

We will formulate and evaluate the polyherbal powder by using UV Spectrophotometer.

The ultimate aim is to produce the formulation which are safe ,effective and quality wise good and stable in all Physical, chemical and biological condition and show better compliance with human individual by means of this it might not be produce any life threatening effect on consumer.

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