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Review article

Development of Quality Control Parameters for Herbal Churna

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ABSTRACT

To evaluate the quality of medications by measuring the quantity of their active ingredients, standardization of herbal formulation is crucial. The standardization of triphala powder Amalaki (Emblica officinalis), Haritaki (Terminalia chebula), and Bibhitaki (Terminalia belerica) is the subject of this paper. Four commercially available samples of triphala powder were obtained for this study and standardized based on the organoleptic characteristics, physical attributes, physico-chemical properties, preliminary phytochemical analysis, and thin-layer chromatography (TLC) methods as per the guidelines of the W.H.O. and the Ayurvedic Pharmacopoeia of India. These criteria were determined to be adequate for assessing the triphala powder and can serve as benchmarks for quality assurance and control procedures.

Keywords: Thin Layer Chromatography, Triphala, Phytochemicals, Standardization, Phytochemical analysis.

INTRODUCTION

The demand for items generated from plants has increased recently in wealthy nations. As pharmaceuticals, neutraceuticals, and cosmetics, these goods are becoming more and more in demand [1]. The standardization and examination of the chemical marker in Ayurvedic and other polyherbal formulations is a persistently significant issue [2]. Uniformity across all plant medicines sold, given the wide range of variations amongst medicine batches [3]. The term "standardization" refers to all actions performed throughout quality assurance and manufacturing that result in a repeatable level of quality [4].

Evaluation" of a medicine refers to verifying its identity, assessing its quality and purity, and identifying any adulteration [5]. Since different commercial formulations exhibit dose, content, and lack of standardization variations that impact their efficacy and activity, it is critical to develop quick, sensitive, and precise analytical techniques for ayurvedic formulations [6]. The quality control procedures and parameters of four samples of various brands of triphala powder, designated as TRFP-1, TRFP-2, TRFP-3, and TRFP-4, are evaluated in this research. It is a well-known herbal mixture with just three main herbal constituents. Different manufacturing companies prepare their products using different active ingredients, which are not disclosed on the label or pack because it is impossible to determine their exact efficacy [7]. Triphala powder finds application in cosmetics and as a coloring agent. As a result, established criteria and the Indian Ayurvedic Pharmacopoeia were used to analyze the current triphala powder standardization study.

MATERIALS AND METHODS

For the evaluation effort, four commercial formulations of triphala powder (identified as TRFP-1,

TRFP-2, TRFP-3, and TRFP-4) were obtained from various manufacturers.

Chemicals

Methanol, ethanol, toluene, ethyl acetate, conc. H2So4, and screening agents for phytochemicals.

Instruments

Density equipment and hot air oven

Organoleptic properties of triphala powder

Four samples of triphala powder were examined for their organoleptic qualities using the previously described methodology [8, 9].

Extractive values

Powdered triphala Using cold maceration and ethanol and water separately, 5g of each batch was extracted for individual extraction. Their extractive values were calculated using the procedures outlined in the Indian Pharmacopoeia [10]. and W.H.O. [11] Recommendations.

Physical characteristics

In accordance with conventional technique, the bulk density, tapped density, Carr's index, Hausner's Ratio, and angle of repose of the triphala powder were determined for HP-1, HP-2, HP-3, and HP-4 [12].

Loss on drying

All four batches' drying losses were calculated using standard protocol [10, 13].

Phytochemical screening

All four commercially available triphala powders' alcoholic extract was utilized for this assessment, and established techniques were followed to do the phytochemical analysis [2, 14].

Table 1: Organoleptic properties of different formulation of Triphala Powder

Triphala	Appearance	Color	Taste	Odor
TRFP-1	Powder	Light Brown	Aromatic bitter	Characteristic
TRFP-2	Powder	Light Brown	Aromatic bitter	Characteristic
TRFP-3	Powder	Brownish	Aromatic bitter	Characteristic
TRFP-4	Powder	Blackish Brown	Aromatic bitter	Characteristic

Chromatographic study

Using the usual protocol outlined in the Indian ayurvedic pharmacopoeia, thin layer chromatographic analysis was conducted using the alcoholic extract of all commercially available triphala powder. Using silica gel-coated mobile phase and toluene:ethyl acetate (9:1) as mobile phases, Thin Layer Chromatography was used to assess the alcoholic extract of several batches of triphala powder. Utilizing 5% methanolic sulfuric acid as a spray agent [15].

Table 2: Extractive values of Triphala Powder

Extractive	TRFP-1	TRFP-2	TRFP-3	TRFP-4
Water	27.25	24.23	27.20	26.41
Alcohol	17.12	17.28	18.06	19.43

Table 3: Physical characteristics of different formulations of Triphala Powder

Parameters	TRFP-1	TRFP-2	TRFP-3	TRFP-4
Bulk density	27	21	25	25
Tapped density	18	17	18	19
Carr's index	50	23.52	42.22	31.57
Hausner's ratio	0.667	0.8095	0.72	0.76
Angle of repose	22.17	31.50	28.42	32.71

Table 4: Loss on drying of Triphala Powder

Triphala powder sample	Loss on drying
TRFP -1	1.75
TRFP -2	1.20
TRFP -3	1.51
TRFP -4	1.67

Table 5: Phytochemical evaluation of Triphala Powder

Phyto constituents	TRFP-1	TRFP-2	TRFP -3	TRFP -4
Alkaloids	+	+	+	+
Glycosides	+	+	+	+
Carbohydrates	-	-	-	-
Steroids	+	+	+	+
Tannins	+	+	+	+

RESULT

The physicochemical and phytochemical features of the top brands of triphala powder on the market—designated as TRFP-1, TRFP-2, TRFP-3, and TRFP-4 were standardized. The triphala powder samples meet the specifications for thin layer chromatography, phytochemical screening, and loss on drying, physical properties, and extractive value. The triphala powder's color and smell were indicative of its active ingredient. The TRFP powder's bulk density falls between 20 and 28, while each batch's tapped density falls between 17 and 19. Alkaloids, steroids, tannins, and glycosides are all included in triphala powder. The triphala powder alcoholic extract chromatogram displays three spots under visible light and five spots when methanolic sulphuric acid (5%) reagent is sprayed under ultraviolet light.

CONCLUSION

Following investigation using several characteristics, samples of triphala powder exhibit good resemblance with one another. Similar TLC profiles further substantiate the identification and authenticity of triphala powder, which is determined by organoleptic and physicochemical investigations. Pharmacognostic characteristics created for the raw materials may be utilized

for routine analysis as well as quality control requirements for assessing the material's identity.

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