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Preparation and standardization of poly herbal capsule

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Abstract

The traditional system of medicine requires intensive investigation in quality control to compete with the modern medicine globally. The present paper reports the preparation and standardization of a formulated poly herbal capsule which consist of *Smilex chinensis* (Tuberous root), *Embelia ribes* (Dried fruit), *Withania somnifera* (Root), *Elettaria cardomomum* (Dried fruit), *Psoralea corylifolia* (Dried seed), and *Piper longum* (Dried fruit). The standardization parameters such as organoleptic evaluation, powder microscopic analysis of the individual raw material and physical property analysis such as bulk density, tapped density, compressibility index and angle of repose for the formulated capsules were done. The formulated capsule was in the conformity to the properties evaluated and can be used as reference standard for the quality control aspect.

Keywords: Poly herbal capsule, standardization parameter, physical property analysis, quality control

Introduction

Medicinal plants are having greater importance in alternative system of medicine as a source of raw material and also as a potent therapeutic agent ^[1]. Recently, many international authorities and agencies including WHO and European agency recommends to regulate quality control and standardization of botanical medicines. Hence the traditional system of medicine requires intensive investigation to compete with the modern system of medicine ^[2].

Herbal formulation in general can be standardized schematically starting from the raw materials to finished products from different batches ^[3]. The present paper reports the preparation and standardization of raw materials used in the polyherbal formulation based on organoleptic, powder microscopy and physical property standardization.

Materials and methods**(i) Plant Materials**

Following six herbs traditionally claimed for the treatment of vitiligo were chosen such as *Smilex chinensis* (Tuberous root), *Embelia ribes* (Dried fruit), *Withania somnifera* (Root), *Elettaria cardomomum* (Dried fruit), *Psoralea corylifolia* (Dried seed), *Piper longum* (Dried fruit) ^[3]. The above six herbs were botanically identified ^[4] and authenticated ^[5] at Plant Anatomy Research Institute, Thambaram Chennai, India (Herbarium No: PARC/2013/105-111).

(ii) Preparation of Poly Herbal Formulation ^[6]

Poly herbal formulation is done by adding 100 mg of tuberous root of *Smilex chinensis*, 50mg of dried fruit of *Embelia ribes*, 100mg of dried root of *Withania somnifera*, 10mg of dried fruit of *Ellettaria cardamomum*, 50mg of dried seeds of *Psoralea corylifolia* and 50mg of dried fruit of *Piper longum*. The above ingredients mixed together and pass the poly herbal mixer through sieve number 44# to prepare homogenous blend and filled in the empty gelatine capsule.

(iii) Standardization of Prepared Poly Herbal Formulation**Organoleptic evaluation ^[7]**

The organoleptic characters such as colour, odour, and taste were evaluated by spreading the powder on a clean dry sheet and investigated through the magnifying lens by repeated observation.

Powder Microscopy Analysis ^[8]

The powder samples was treated with phloroglucinol (2% w/v) in ethanol (90%) and concentrated hydrochloric acid (1:1) and studied for their components of diagnostic value.

Physical Property Analysis ^[9]**Bulk Density (pb)**

It is determined by measuring the volume of a known mass of powder sample that has been passed through graduated cylinder or through a volume measuring apparatus into a cup.

It is expressed in g/ml and is given by

$$\rho_b = M/V_o$$

Where M is the mass of powder and V_o is the bulk volume of the powder.

Tapped Density (ρ_t)

The tapped density was measured by tapping the powder to constant volume. It is expressed in g/ml and is given by

$$\rho_t = M/V_t$$

Where M is the mass of powder and V_t is the tapped volume of the powder [4].

Compressibility index

The compressibility index has been proposed as an indirect measure of bulk density, size and shape, surface area, moisture content and cohesiveness of materials. All these are closely related to predicting the powder flow characteristics. The compressibility index is determined by measuring both bulk volume and the tapped volume of the powder [4].

$$\text{Compressibility index} = 100 \times (V_o - V_t) / V_o$$

Angle of repose

For determination of angle of repose (θ), the blends were poured through the walls of a funnel, which was fixed at a position such that its lower tip was at a height of exactly 2cm

above a hard surface. The drug or the blends were poured till the time when upper tip of the pile surface touched the lower tip of the funnel. Angle of repose was calculated using following equation. The angle of repose θ , was calculated by the formula,

$$\tan\theta = h/r$$

$$\theta = \tan^{-1} (h/r)$$

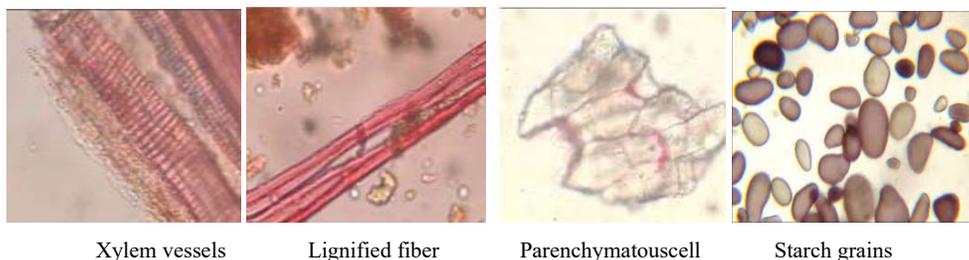
Where θ is the angle of repose, h is the height in cm and r is the radius in cm.

Results and discussion

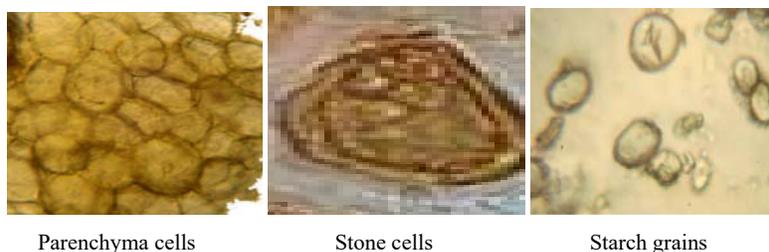
The intensive investigation of the formulation in the alternative system of medicine is the need of the hour to fill the lacuna in the quality control of herbal drugs. The formulated poly herbal capsule is investigated for its organoleptic evaluation. The characters showed pale yellow colour with characteristic odour and bitter taste.

The cell components such as Xylem vessels (spiral), Lignified fiber, Parenchymatous cells, Starch grain is observed for *Smilax chinensis*. Parenchyma cells, Stone cells, Starch grains for *Embelia ribes*, Xylem vessels, Cork cells, Lignified fibers, Starch grains for *Withania somnifera*, Parenchyma cells, Lignified fiber and Sclerenchymatous fibers is observed for *Elletaria cardamomum*. Sclerenchymatous cells, Cork cells, Starch grains and Parenchyma cells for *Psoralea corylifolia*, Fragments of Parenchyma cells, Xylem vessels, Lignified fiber, Starch grains are observed in *Piper longum* (fig.1).

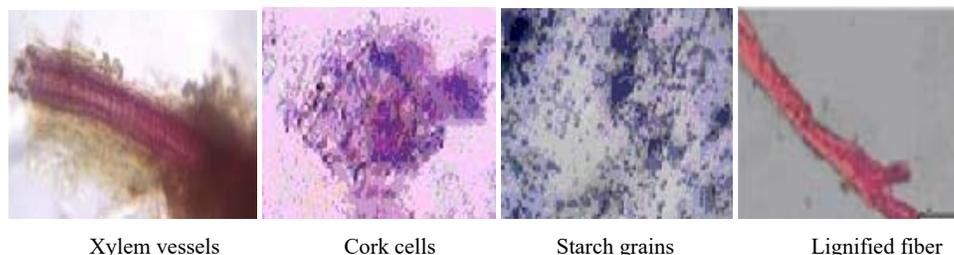
Smilax chinensis



Embelia ribes



Withania somnifera



Elletaria cardamomum

Parenchyma cell

Lignified fiber

Sclerenchymatous fiber

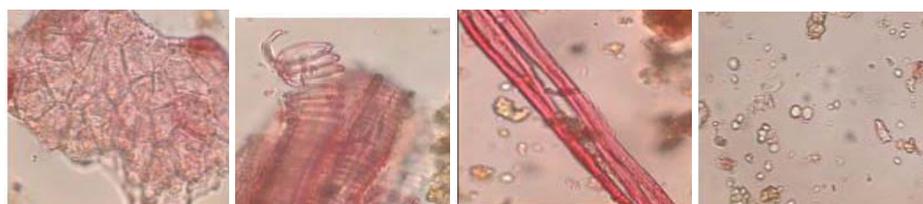
Psoralea corylifolia

Sclerenchymatous cell

Cork cells

Starch grains

Parenchyma cells

Piper longum

Parenchyma cells

Spiral vessels

Lignified fiber

Starch grain

Fig 1: Powder microscopical analysis of raw materials used in the formulation

The flow property is an important parameter in the formulation of solid dosage form. From the flow property

analysis it is observed that the different batch of the formulated capsules has good flow property (Table.1).

Table 1: Flow property analysis/physical property analysis of different batches of the formulated poly herbal capsules.

Sl. no	Various Batches of Capsules	Bulk Density (g/ml)	Tapped density (g/ml)	Compressibility Index	Angle of Repose
1	Batch -I	0.5	0.7	28	21
2	Batch -II	0.51	0.72	29.1	25
3	Batch-III	0.5	0.7	28	23

Conclusion

In the present study it was concluded that the standardization parameter of the formulated poly herbal capsule such as organoleptic evaluation, powder microscopical evaluation of the raw materials used and the physical property analysis of the capsule will provide a standardization protocol for the future drug analyst. The results obtained from the study can be utilized as a reference for setting limits for the reference standards for the quality control and quality assurance of the herbal drugs.

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