STANDARDISATION OF AYURVEDIC POLYHERBAL FORMULATION NIMBADI CHURNA

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ABSTRACT

Ayurveda is one among the traditional systems of medicine in India. Now a days an exponential growth in the usage of herbal medicines has been observed universally. Eventhough traditional system of medicine was found to be effective, it’s usage is limited because of lack of quality assurance. The main objective of present study is to perform standardization and phytochemical screening of Nimbadi churna a poly herbal ayurvedic formulation. Nimbadi churna was procured from market and standardised for the parameters like organoleptic characters, physical characters and Physico chemical properties. Phytochemical screening of Methanolic extract of Nimbadi churna also been performed and the results obtained showed that the values exist within limits.

KEYWORDS: Churna, Polyherbal, Standardisation.

INTRODUCTION

In Ayurveda the term Churna refers to a fine powder of a single drug or two or more drugs which can be prepared by mixing clean, finely powdered and sieved drugs.\(^1\) Nimbadi churna is a classical Ayurvedic formulation mentioned in “The Ayurvedic Formulary of India” for the treatment of diseases of abdomen, diseases of skin, Rheumatism, Gout.\(^2\) It consist of about 21 ingredients. In present study an attempt was made to standardize Nimbadi churna since standardization of herbal formulation is essential in order to assess the quality, purity, safety and efficacy of the drug.\(^3\)
MATERIALS AND METHODS

Procurement of Nimbadi churna
Nimbadi churna was procured from Vyas pharmaceuticals, India and evaluated for organoleptic, physicochemical and physical properties. Methanolic extract of Nimbadi churna was prepared by cold maceration and phytochemical screening of the extract was carried out.

Standardisation of Nimbadi churna

Organoleptic evaluation\(^2\)
The colour, odour and taste of Nimbadi churna was evaluated manually and compared with Ayurvedic pharmacopial standard.

Table 1: Organoleptic analysis of Nimbadi churna.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Parameters</th>
<th>Observation</th>
<th>Ayurvedic pharmacopial Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Colour</td>
<td>Yellowish brown</td>
<td>Yellowish brown</td>
</tr>
<tr>
<td>2.</td>
<td>Odour</td>
<td>Pungent</td>
<td>Pungent</td>
</tr>
<tr>
<td>3.</td>
<td>Texture</td>
<td>smooth</td>
<td>smooth</td>
</tr>
<tr>
<td>4.</td>
<td>Taste</td>
<td>Bitter and salty</td>
<td>Bitter and salty</td>
</tr>
</tbody>
</table>

Physicochemical evaluation\(^2\)

Determination of total ash
To determine total ash about 2 to 3g of Nimbadi churna was incinerated at a temperature not exceeding 450°C in a tarred silica crucible until free from carbon then cool and weigh. Then the percentage of total ash was calculated.

Determination of Acid-Insoluble Ash
To determine acid-insoluble ash the residue of ash obtained in total ash was added with 25ml of dil Hcl and boiled for 5mins. Then this was filtered using ashless filter paper and ignited again to determine the acid insoluble ash. The content of acid-insoluble ash was calculated with reference to the air-dried drug.

Determination of Alcohol Soluble Extractive
5g of churna was macerated with 100ml of alcohol in a closed flask for twenty-four hours (shaking frequently during first six hours and allowing to stand for eighteen hours). It was then filtered and the filtrate was evaporated until constant weight was obtained. The percentage of alcohol-soluble extractive was calculated with reference to the air-dried drug.
Determination of Moisture Content (Loss on Drying)

10g of the churna was accurately weighed and transferred into a tarred evaporating dish. This was dried at 105°C for 5hrs with regular check of weight for every interval. Drying was continued until difference between two successive weighing corresponds to not more than 0.25 percent. Constant weight is reached when two consecutive weighing after drying for 30 minutes and cooling for 30 minutes in a desiccator, showed not more than 0.01 g difference.

Determination of pH Value

pH value of the churna was determined using pH meter by dispersing 10% w/v churna in water.

Table 2: Physico-chemical parameters of Nimbadi churna

<table>
<thead>
<tr>
<th>S.No</th>
<th>Parameters</th>
<th>Observation</th>
<th>Ayurvedic pharmacopial limits</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Loss on drying (%)</td>
<td>5±0.12</td>
<td>NMT 8%</td>
<td>within limit</td>
</tr>
<tr>
<td>2.</td>
<td>Total ash value (% w/w)</td>
<td>11.46±0.27</td>
<td>NMT 12%</td>
<td>within limit</td>
</tr>
<tr>
<td>3.</td>
<td>Acid-insoluble ash (% w/w)</td>
<td>9.46±0.27</td>
<td>NMT 10%</td>
<td>within limit</td>
</tr>
<tr>
<td>4.</td>
<td>Alcohol-soluble extractive (% w/w)</td>
<td>23.47±0.98</td>
<td>NLT 18%</td>
<td>within limit</td>
</tr>
<tr>
<td>6.</td>
<td>pH 10% aqueous solution</td>
<td>4.16±0.06</td>
<td>4-5</td>
<td>within limit</td>
</tr>
</tbody>
</table>

Values are expressed in Mean ± S.E.M

Physical Characters [4]

Bulk density and Tapped density

Bulk density refers to a measure used to describe the packing of particles or granules. It was determined by taking 10g of churna in a graduated measuring cylinder and tapped on a wooden surface. The initial volume and the tapped volume was noted. The bulk density and tapped density was calculated using the formula.

\[
\text{Bulk density} = \frac{\text{weight taken}}{\text{Bulk volume}}
\]

\[
\text{Tapped density} = \frac{\text{weight taken}}{\text{Tapped volume}}
\]

Angle of Repose

Angle of Repose has been used as an indirect method of quantifying powder flow ability because of its relationship with interparticle cohesion. It was determined by using funnel method. The powder was allowed to flow through a funnel fixed on a stand to form a heap and the angle of repose was calculated using the formula.
Angle of repose, \( \theta = \tan^{-1} \frac{h}{r} \)

Where,

\( h \) = Height of heap
\( r \) = Radius of heap

**C) Hausner’s Ratio**

Hausner’s ratio is related to inter particle friction and as such can be used to predict the powder flow properties. It can be calculated using formula

\[
Hausner’s \text{ Ratio} = \frac{Tapped \text{ density}}{Bulk \text{ density}}
\]

**D) Compressibility/Carr’s Index**

Carr’s index is an indirect method of measuring the powder flow from bulk density. It was calculated using the formula

\[
Carr’s \text{ Index} = \frac{Tapped \text{ density} - Bulk \text{ density}}{Tapped \text{ density}} \times 100
\]

**Table 3: Physical evaluation.**

<table>
<thead>
<tr>
<th>S.No</th>
<th>Parameters</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bulk density (g/ml)</td>
<td>0.311±0.001</td>
</tr>
<tr>
<td>2.</td>
<td>Tapped density (g/ml)</td>
<td>0.38±0.005</td>
</tr>
<tr>
<td>3.</td>
<td>Angle of repose (( \theta ))</td>
<td>27°61’±0.65</td>
</tr>
<tr>
<td>4.</td>
<td>Compressibility index (%)</td>
<td>18.39±1.48</td>
</tr>
<tr>
<td>5.</td>
<td>Hausner’s ratio</td>
<td>1.23±0.02</td>
</tr>
</tbody>
</table>

Values are expressed in Mean ± S.E.M.

**PHYTOCHEMICAL ANALYSIS**

About 100g of churna was macerated by cold maceration with 50% methanol for 72 h, with occasional shaking. Then the macerate was decanted, filtered, concentrated and kept in a vacuum desiccator for complete removal of solvent.\[^{5,6}\] Then the extract was subjected to various chemical tests for detection of phytoconstituents\[^{8,9}\] like Alkaloids(Mayer’s test), Phenol(Ferric chloride test), Glycosides (Borntrager’s test), Terpenoids(Salkowski test), Reducing sugar(Fehling’s test), Saponins(Foam test), Tannins, Flavonoids and the results obtained are are illustrated in Table 4.
### Table 4: Phytochemical screening of Nimbadi churna

<table>
<thead>
<tr>
<th>S.no</th>
<th>Chemical constituent</th>
<th>Nimbadi churna</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Alkaloids</td>
<td>+</td>
</tr>
<tr>
<td>2.</td>
<td>Flavonoids</td>
<td>+</td>
</tr>
<tr>
<td>3.</td>
<td>Reducing sugar</td>
<td>+</td>
</tr>
<tr>
<td>4.</td>
<td>Glycosides</td>
<td>+</td>
</tr>
<tr>
<td>5.</td>
<td>Phenolic compounds</td>
<td>+</td>
</tr>
<tr>
<td>6.</td>
<td>Tannins</td>
<td>+</td>
</tr>
<tr>
<td>7.</td>
<td>Saponins</td>
<td>+</td>
</tr>
<tr>
<td>8.</td>
<td>Proteins and amino acids</td>
<td>+</td>
</tr>
<tr>
<td>9.</td>
<td>Terpenoids</td>
<td>+</td>
</tr>
</tbody>
</table>

**NOTE:** (+) Present (-) Absent

### RESULTS AND DISCUSSION

In present study standardization of Nimbadi churna was carried out. Among these total ash value indicates the amount of inorganic material present in the churna and it helps to detect the contamination and adulteration like sand or unwanted part mixed with crude drug.\(^3\)\(^9\) whereas the acid insoluble ash value is an indicative of silicate impurities, which might have arisen due to improper washing of drug.\(^3\)

The loss on drying value obtained indicates moisture content present in the drug. The moisture content of drug should always exist below the critical level because excess moisture may results in spoilage of drug due to growth of microbes.\(^9\)

The alcohol soluble extractive value indicates the amount of active constituent in given quantity of churna when extracted.\(^3\) The pH value conventionally represents the acidity or alkalinity of an aqueous solution. In Ayurvedic pharmacopoeia standard limit of pH have been provided for particular substances in which hydrogen-ion activity plays a major role in stability of substance.\(^9\) The values obtained for Nimbadi churna has been found to be within limits.

Physical evaluation of Nimbadi churna was performed mainly to determine its flow property. As a general guide, powders with angle of repose greater than 50° have unsatisfactory flow properties, whereas minimal angle close to 25° correspond to very good flow properties as well as the flow character of powder was categorized as fair if it exhibit carr’s index value and Hauner’s ratio in the range of 16-20% and 1.19-1.25 respectively.\(^10\) The angle of repose, compressibility index (%) and hausner’s ratio of Nimbadi churna was found to be
27°61′±0.65, 18.39±1.48, 1.23±0.02 respectively. From the results obtained it can be concluded that Nimbadi churna possess good flow property.

The practical yield of Nimbadi churna on maceration using methanol as a solvent was found to be 29.2% w/w and results obtained from phytochemical screening of methanolic extract indicates the presence of alkaloids, flavonoids, reducing sugar, Glycoside, phenolic compound, tannins, saponin, Protein and amino acids, terpenoids.

CONCLUSION

Organoleptic, Physico chemical and physical characters of Nimbadi churna had been evaluated and the results obtained indicates that the values were found within the standards. These preliminary tests can be used in routine analysis of the formulation and also be used to perform quality control test in the laboratory.

REFERENCE


