PHYSICOCHEMICAL AND PHYTOCHEMICAL ANALYSIS OF SIDDHA POLYHERBAL FORMULATION “MADHUMEGA NIVARANI CHOORANAM”

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Abstract

Aim: The aim of the study was to assess the Physicochemical and Phytochemical analysis of Siddha herbal formulation “Madhumega Nivarana Chooranam”, used for the management of Madhumega (Type-II Diabetes mellitus)

Materials and Method: The Siddha Polyherbal formulation Madhumega Nivarani Chooranam was prepared in accordance with good manufacturing practices (GMP) guidelines,. Physicochemical and phytochemical analyses were performed at the Tamilnadu Dr. MGR Medical University, located at no. 69, Anna salai, Guindy, Chennai32.

Results and Discussion: Physicochemical analysis shows the Loss on drying (0.08%), Total ash value (7.08%), Acid insoluble ash (1.55%), Water soluble ash (2.26%), Water soluble extraction (31.43%), Alcohol soluble extraction (19.27%) The Phytochemical analysis shows the presence of important phytoconstituents such as Alkaloids, Carbohydrates, Saponin, Phenols, Tannins, Flavonoids, Diterpenes, Quinones, Gum & Mucilage

Conclusion: According to the results, it can be stated that the MNC has a comprehensive understanding of the presence of Physicochemical properties, Phytochemical components and has the ability to evaluate the quality profile of Madhumega nivaran Chooranam as the basis for the creation of a Pharmaceutical product, which has been standardised.

Keywords: Siddha, Herbal medicine, Physicochemical and Preliminary Phytochemical analysis, Madhumega Nivarana Chooranam.

Introduction

One of the world’s oldest medical systems is Siddha. It includes formulations that are animal-based, mineral-based, herbal-based, and poly-herbal. Siddha medications are drawing increased attention because of their possible medicinal benefits and minimal adverse effects. In order to ensure the quality, safety, and effectiveness of herbal medicine and integrate it into the current healthcare system, standardisation is crucial [1]. Siddha medicine consists of 32 internal and 32 external medicines [2].

In Siddha system of medicine, Neerizhivu (Diabetes mellitus) can be managed by the drug Madhumega Nivaran Chooranam (MNC) mentioned in “The Pharmacopoeia of Siddha Research Medicines. Madhumega Nivaran Chooranam is a combination of drugs, i.e., Avarai ver pattai (Cassia auriculata), Seendhil sarkarai (Tinospora cordifolia), Navarkottai (Syzygium cumini), Neelikai juice powder (Phyllanthus emblica), Chirukurinjan (Gynema sylvestris), Adutheendapalai (Aristolochia bracteolata) [3].

The evolution of these traditional medical systems based on safety, efficacy, and quality will contribute not just to the preservation of traditional heritage but also to rationalising the usage of herbal products in the health arena. There is no data available regarding the standardization of Madhumega Nivaran Chooranam. It was planned to standardize Siddha formulation Madhumega Nivaran Chooranam to develop evidence-based Siddha medicine. The objective of the study was to identify Physicochemical, Phytochemical analysis present in Madhumega Nivaran Chooranam.

2. Materials and Methods

2.1 Selection of drugs

Numerous formulas with distinct indications are recorded in the Siddha text. The Pharmacopoeia of siddha research
medicines Page No: 106 One of them is Madhumega nivarani chooranam this herbal preparation has been shown to be useful in the treatment of polyuria, polydipsia, Diabetes mellitus.

2.2 Ingredients: Ingredients of Madhumega Nivarana Chooranam (Ref: The Pharmacopoea of siddha research medicines Page No: 106) [3]

### TABLE NO 1 Ingredients of Madhumega Nivarani Chooranam

<table>
<thead>
<tr>
<th>INGREDIENTS</th>
<th>RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seendhil Sarkarai [5]</td>
<td>6 Tolas (72 grams)</td>
</tr>
<tr>
<td>Navarkottai [6]</td>
<td>6 Tolas (72 grams)</td>
</tr>
<tr>
<td>Nellikai juice powder [7]</td>
<td>6 Tolas (72 grams)</td>
</tr>
<tr>
<td>Chirukurinjan [8]</td>
<td>6 Tolas (72 grams)</td>
</tr>
<tr>
<td>Aduthendapalaipalai extract or Aduthendapalai leaves chooranam [9]</td>
<td>6 Tolas (72 grams)</td>
</tr>
</tbody>
</table>

2.3 Authentication of the Drug:
The Indigenous herbal raw drugs were procured from a reputed raw drug store, identified by the Botanist of Government Siddha Medical College, Chennai, (Voucher number GSMC/MB-608 – 613). The Madhumega Nivarana Chooranam ingredients were authenticated by the experts of Gunapadam, Government Siddha Medical College, Arumbakkam, Chennai - 106.

2.4 Purification of Raw Drugs
The Purification of drugs was done by procedures mentioned in Siddha literature. The Madhumega Nivarana Chooranam drugs are purified as mentioned in “Sikitcha Rathna Deepam Ennum Vaithiya Nool (10)”

2.5 Preparation
Avarai ver pattaial when well pounded in a stone martar placed in a mud pot, then added required amount of water and boiled, reduced to 1/4th part or less, cooled and then the decoction filtered after well crushing the bark sediments with the hands. This decoction is again boiled in to kulambu Pakuvam exposed to the sun, dries, powdered, weighed and preserved. The other five ingredients (Seendhil sarkarai, Navarkottai, Nellikai juice powder, Chirukurinjan, Aduthendapalai) were taken purified and dried. Then the purified ingredients are powdered and mixed together. Then the powder was stored in an airtight container.

2.6 Physicochemical Analysis of Madhumega Nivarani Chooranam
The Preliminary physicochemical screening test was carried out for MADHUMEGA NIVARANI CHOORANAM as per the standard procedures mentioned hereunder.

2.6.1 Loss on Drying
An accurately weighed 1g of MADHUMEGA NIVARANI CHOORANAM formulation was added in crucible at a temperature 600°C in a muffle furnace till carbon free ash was obtained. It was calculated with reference to the air dried drug.

2.6.2 Determination of Total Ash
Weighed accurately 2g of MADHUMEGA NIVARANI CHOORANAM formulation was added in crucible at a temperature 600°C in a muffle furnace till carbon free ash was obtained. It was calculated with reference to the air dried drug.

2.6.3 Determination of Acid Insoluble Ash
Ash above obtained, was boiled for 5min with 25ml of 1M Hydrochloric acid and filtered using an ashless filter paper. Insolublematter retained on filter paper was washed with hot water and filtered paper was burned to a constant weight in a muffle furnace. The percentage of acid insoluble as was calculated with reference to the air-dried drug.

2.6.4 Determination of Water Insoluble Ash
Total ash 1g was boiled for 5min with 25ml water and insoluble matter collected on an ash less filter paper was washed with hot water and ignited for 15 min at a temperature not exceeding 450°C in a muffle furnace. The amount of soluble as his determined by drying the filtrate.

2.6.5 Determination of Water Soluble Extractive
5gm of air-dried drug, coarsely powdered MADHUMEGA NIVARANI CHOORANAM was macerated with 100ml of distilled water in a closed flask for twenty-four hours, shaking frequently. The Solution was filtered and 25 ml of filtrate was evaporated in a tarred flat bottom shallow dish, further dried at 100°C. The percentage of water-soluble extractive was calculated with reference to the air-dried drugs.

2.6.7 Determination of Alcohol Soluble Extractive
1 gm of air-dried drug coarsely powdered MADHUMEGA NIVARANI CHOORANAM was macerated with 20ml alcohol in closed flask for 24hrs. With frequent shaking, it was filtered rapidly taking precaution against loss of alcohol 10ml of filtrate was then evaporated in at arred flat bottom shallow dish, dried at 100°C and weighted. The percentage of alcohol soluble extractive was calculated with reference to air-dried drug.

### TAB NO 2 Parameters of Madhumega Nivarani Chooranam

<table>
<thead>
<tr>
<th>S.No</th>
<th>Parameters</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loss on drying</td>
<td>0.09%</td>
</tr>
<tr>
<td>2</td>
<td>Total ash value</td>
<td>7.08%</td>
</tr>
<tr>
<td>3</td>
<td>Acid insoluble ash</td>
<td>1.55%</td>
</tr>
<tr>
<td>4</td>
<td>Water soluble ash</td>
<td>2.26%</td>
</tr>
<tr>
<td>5</td>
<td>Water soluble extraction</td>
<td>31.43%</td>
</tr>
<tr>
<td>6</td>
<td>Alcohol soluble extraction</td>
<td>19.27%</td>
</tr>
</tbody>
</table>

Certified that the above stated are the physicochemical properties of the given sample.

2.7 Preliminary Phytochemical Screening Of Madhumega Nivarani Chooranam
The Preliminary phytochemical screening test was carried out for each extracts of MADHUMEGA NIVARANI CHOORANAM as per the standard procedure mentioned hereunder.

2.7.1 Detection of Alkaloids
Extracts were dissolved individually in dilute Hydrochloric
that will indicate presence of gum and mucilage
The Preliminary phytochemical studies of aqueous extract of MADHUMEGA NIVARANI CHOORANAM were done using standard procedures. The results were presented in tables.

\[\text{TAB NO 3 Phytochemical Screening Of MNC}\]

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Phytochemicals</th>
<th>Test Name</th>
<th>H:O Extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alkaloids</td>
<td>Mayer’s Test</td>
<td>-ve</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drangendorff’s Test</td>
<td>-ve</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wagner Test</td>
<td>-ve</td>
</tr>
<tr>
<td>2</td>
<td>Carbohydrates</td>
<td>Molisch’s Test</td>
<td>+ve</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Benedict Test</td>
<td>+ve</td>
</tr>
<tr>
<td>3</td>
<td>Saponin</td>
<td>Foam Test</td>
<td>+ve</td>
</tr>
<tr>
<td>4</td>
<td>Phenols</td>
<td>Ferric Chloride Test</td>
<td>+ve</td>
</tr>
<tr>
<td>5</td>
<td>Tannins</td>
<td>Gelatin Test</td>
<td>+ve</td>
</tr>
<tr>
<td>6</td>
<td>Flavonoids</td>
<td>Alkaline Reagent Test</td>
<td>-ve</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lead acetate Test</td>
<td>+ve</td>
</tr>
<tr>
<td>7</td>
<td>Diterpenes</td>
<td>Copper Acetate Test</td>
<td>-ve</td>
</tr>
<tr>
<td>8</td>
<td>Quinones</td>
<td>Test for Quinones</td>
<td>-ve</td>
</tr>
<tr>
<td>9</td>
<td>Gum &amp; Mucilage</td>
<td>Test for Gum &amp; Mucilage</td>
<td>+ve</td>
</tr>
</tbody>
</table>

\[\text{+ve/-ve present or absent if component tested}\]

Certified that the above stated are the phytochemical properties for given sample

3. Result and Discussion
Physicochemical analysis shows the Loss on drying (0.08%), Total ash value (7.08%), Acid insoluble ash (1.55%), Water-soluble ash (2.26%), Water-soluble extraction (31.43%), Alcohol soluble extraction (19.27%). The Phytochemical analysis shows the presence of important phytoconstituents
such as Alkaloids, Carbohydrates, Saponin, Phenols, Tannins, Flavonoids, Diterpenes, Quinones, Gum & Mucilage. The recently completed physicochemical, phytochemical analysis of MNC revealed substantial proof regarding the presence of specific compounds. The aforementioned substances are thought to be elements of action having the capacity to aid in pathogenic mechanisms linked with Diabetes mellitus, therefore delivering a potential means of managing the illness. The Madhumega Nivarana chooranam drug possesses the anti-diabetic property and prevent the diabetes and their complications.

The goal of this study was to recognize its existence of bioactive components in a formulation, hence determining its efficacy and therapeutic importance. Researchers can acquire insights into probable mechanisms of action and helpful characteristics of the formulation by identifying and measuring these phytoconstituents. This standardization process guaranteed the formulation's uniformity, safety, and efficacy, improving its utility as a medicinal intervention.

4. Conclusion
The study drug was analyzed for physicochemical properties, and preliminary phytochemical analysis and the sample's quality was estimated. Standardization becomes more important as the physicochemical, phytochemical bioactive component profiles of siddha formulations become apparent. The results of the physicochemical and phytochemical analysis of Madhumega Nivarana Chooranam, which may be responsible for the medicine's safety and significant therapeutic efficacy.

5. Acknowledgement
The corresponding author would like to thank the staff, PG classmaters, and my seniors in Government Siddha Medical College, Arumbakkam, Chennai, and the research centre who helped in this study.

6. Funding
No funding was received for this study.

7. Inform Consent
It is not applicable.

8. Ethical Approval
All the guidelines provided by the ethical committee of the Government Siddha Medical College, Arumbakkam, Chennai were followed.

9. Conflict of Interest
The authors don't have any conflict of interest.

10. Author Contribution
Conception and the study were organized by the corresponding author, and guided by the co-authors.

11. References