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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 *Madhumegam* (Type-II Diabetes mellitus)

Materials and Method: The Siddha Polyherbal formulation Madhumega Nivarani Chooranam was prepared in accordance with good manufacturing practises (GMP) guidelines,], Physicochemical and phytochemicalanalyses 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 nivarani 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.*

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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 Nivarana Chooranam* (MNC) mentioned in "The Pharmacopeia of Siddha Research Medicines. Madhumega Nivarana Chooranam is a combination of drugs, i.e.,*Avarai ver pattai (Cassia auriculata),Seendhil sarkarai (Tinospora cordifolia), Navarkottai (Syzygium cumini), Nellikai juice powder (Phyllanthus emblica),Chirukurinjan (Gymnema sylvestris), Adutheendapalai (Aristolochia bracteolate*) [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 Nivarana Chooranam*. It was planned to standardize Siddha formulation *Madhumega Nivarana Chooranam* to develop evidence-based Siddha medicine. The objective of the study was to identify Physicochemical, Phytochemical analysis present in *Madhumega Nivarana 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 Pharmacopoeia of siddha research medicines Page.No:106) [3]

TABLE NO 1 Ingredients of Madhumega Nivarani Chooranam

INGREDIENTS	RATIO
Avarai ver pattai [4]	24 Tolas (288grams)
Seendhil Sarkarai [5]	6 Tolas (72 grams)
Navarkottai [6]	6 Tolas (72 grams)
Nellikai juice powder [7]	6 Tolas (72 grams)
Chirukurinjan [8]	6 Tolas (72 grams)
Adutheendapalaipalai extract or *Adutheenda palai* leaves chooranam [9]	6 Tolas (72 grams)

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 pattai*was well pounded in a stone martar placed in a mud pot, then added required amount of water and boiled, reduced to the1/4th 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, Adutheendapalai)* 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 taken in atarred glass bottle. The crude drug was heated at 1050C for 6 hours in an oven till a constant weight. The Percentage moisture content of the sample was calculated with reference to the shade dried material.

2.6.2 Determination of Total Ash

Weighed accurately 2g of ***MADHUMEGA NIVARANI CHOORANAM*** formulation was added in crucible at a temperature 6000C 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 ashlessfilterpaper.Insolublematterretainedonfilterpaperwas washedwithhotwaterandfilterpaperwasburntto 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 4500C 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 powered ***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 filtrated was evaporated in a tarred flat bottom shallow dish, further dried at 1000C and weighted. 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 for24 hrs. 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 1000C and weighted. The percentage of alcohol soluble extractive was calculated with reference to air-dried drug.

The observed values of the physic-chemical properties are given below:-

TAB NO 2 Parameters of Madhumega Nivarani Chooranam

S.No	Parameters	Percentage
1	Loss ondrying	0.08%
2	Totalashvalue	7.08%
3	Acidinsolubleash	1.55%
4	Watersoluble ash	2.26%
5	Watersolubleextraction	31.43%
6	Alcoholsolubleextraction	19.27%

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 here under.

2.7.1. Detection of Alkaloids

Extracts were dissolved individually in dilute Hydrochloric

acid and filtered.

a. **Mayer's Test**: Filtrates were treated with Mayer's reagent (Potassium Mercuric Iodide). Formation of a yellow colour precipitate indicates the presence of alkaloids
b. **Dragendroff's Test**: Filtrates were treated with Dragendroff's reagent (Potassium Bismuth Iodide). Formation of a red precipitate indicates the presence of alkaloids.
c. **Wagner's Test**: Filtrates were treated with Wagner's reagent (Iodine in Potassium Iodide). Formation of brown/reddish precipitate indicates the presence of alkaloids

2.7.2. Detection of carbohydrates

Extracts were dissolved individually in 5 ml distilled water and filtered. The filtrates were used to test for the presence of carbohydrates.

1. **Molisch's Test**: To 2 ml of plant sample extract, two drops of alcoholic solution of α- naphthol are added. The mixture is shaken well and few drops of concentrated sulphuric acid is added slowly along the sides of test tube. A violet ring indicates the presence of carbohydrates.
2. **Benedict's test**: Filtrates were treated with Benedict's reagent and heated gently. Orange red precipitate indicates the presence of reducing sugars.

2.7.3. Detection of saponins

Foam Test: 0.5 gm of extract was shaken with 2 ml of water. If foam produced persists for ten minutes it indicates the presence of saponins.

2.7.4. Detection of phenols Ferric Chloride Test

Extracts were treated with 3-4 drops of ferric chloride solution. Formation of bluish black color indicates the presence of phenols.

2.7.5. Detection of tannins Gelatin Test

The extract is dissolved in 5 ml of distilled water and 2 ml of 1% solution of Gelatin containing 10% NaCl is added to it. White precipitate indicates the presence of phenolic compounds.

2.7.6. Detection of Flavonoids

a) Alkaline Reagent Test: Extracts were treated with few drops of sodium hydroxide solution. Formation of intense yellow color, which becomes colorless on addition of dilute acid, indicates the presence of flavonoids.

b) Lead acetate Test: Extracts were treated with few drops of lead acetate solution. Formation of yellow color precipitate indicates the presence of flavonoids.

2.7.7. Detection of diterpenes Copper Acetate Test:

Extracts were dissolved in water and treated with 3-4 drops of copper acetate solution. Formation of emerald green color indicates the presence of diterpenes.

2.7.8. Test for Quinones:

Extract was treated with sodium hydroxide blue or red precipitate indicates the presence of Quinones.

2.7.9. Gum and Mucilage:

To 1ml of extract add 2.5ml of absolute alcohol and stirring constantly. Then the precipitate was dried in air and examine for its swelling properties. Swelling was observed 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. The present study reveals that the bioactive compounds were present in all the extracts of ***MADHUMEGA NIVARANI CHOORANAM.***

TAB NO 3 Phytochemical Screening Of MNC

S.No.	Phytochemicals	Test Name	H_2O Extract
1	Alkaloids	Mayer'sTest Dragendroff'sTest Wagner Test	-ve -ve -ve
2	Carbohydrates	Molisch's Test Benedict Test	+ve +ve
3	Saponin	Foam Test	+ve
4	Phenols	Ferric Chloride Test	+ve
5	Tannins	Gelatin Test	+ve
6	Flavonoids	Alkaline Reagent Test Lead acetate	-ve +ve
7	Diterpenes	Copper Acetate Test	-ve
8	Quinones	Test for Quinones	-ve
9	Gum & Mucilage	Test for Gum & Mucilage	+ve

+ve/-ve present or absent if component tested

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

FIG NO 1 Phytochemical screening of MNC

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 possess the anti-diabetic property and prevent the diabetes and their complications.

The goal of this study was to recognise 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.

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6. Funding

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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.

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