

Mathan Tailam, an Oily Herbomineral Formulation

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ABSTRACT

Mathan Tailam, or 'Paccai ennai' is a medicated herbo-mineral oil used in Siddha system of medicine a remedy for healing suppurative wound and in healing diabetic ulcers. Medicated oil prepared by boiling of base oil with juice of prescribed herbal drug and mineral drug till it is dehydrated or near dehydration. This process results in the transfer of some therapeutically active principles of the ingredients into the base oil. Increasing popularity of this medicated oil for the treatment of diabetic foot ulcer necessitated the improved methods of standardization. Hence the present work was carried out to develop Standardized Operating Procedure (SOP) for the preparation of Mathan Tailam and standardization in addition to this the physico-chemical parameters and phytochemical constituents were studied.

Keywords: Mathan Tailam, Oil, Siddha Formulation, Diabetic Foot Ulcer, Physic Chemical Parameters

Introduction

Siddha system is one style of medicine that routes to our ancient traditional health care system. Siddha medicine cures various chronic and acute diseases through not only the medicines but also life style regimens and is very potential in therapeutic and pharmacy. The daily regimen is mentioned as Naalozhukkam in Siddha literature [1].

Siddha system of medicine is nestled with 32 types of Internal medications and 32 types of External medications that can be widely used for various ailments. The reverence of Siddha system could be validated by the copious existing external medications. VEDIUPPU nitrate), Manosilai (Arsenic disulphide), Navacharam (Ammonium Chloride), and Veeram (Mercuric per chloride) triturated with cow ghee [2]. Eloquence of Mathan thailam is because of its preparation where the effect of copper sulphate is nullified.

Mathan tailam a promising cure for diabetic wound which is a slow-healing wound, on the foot, that develops as a complication

of diabetes. A combination of high blood sugar damaging nerves (neuropathy) and blood vessels (vascular disease), leading to poor sensation and circulation. Complications being making one unaware of minor injuries like cuts or blisters, which then struggle to heal and can become severe infections, potentially leading to amputation if not properly treated.

Mathan tailam had been prepared in laboratory scale as per the Govt. Siddha formulary and chemically analysed. The physico chemical parameters and the thin layer chromatography of the oil had been studied. The present findings prove that polyherbal Mathan tailam formulation is significantly potential.

Materials and Method

Standardized operating procedure (SOP) for preparation. (Datura metel L.) belongs to the family Solanaceae, Tamil name-Umathai was collected from Chennai, Tamil Nadu. The plant was authenticated by Prof. P. Jayaraman, Director, Institute of Herbal Botany, Plant Anatomy and Research Centre, Chennai, based on the organoleptic, and macroscopic examination of fresh sample. The specimen (voucher No: PARC/2015/3055) was deposited in his Institute for future reference. Virgin chekku oil of Cocos nucifera Linn. was procured from local market and its quality

was checked. Copper sulfate was procured from laboratory and purified by dissolving in water followed by subsequent recrystallization. It was then tested for the presence of copper qualitatively by adding excess of ammonia to a small amount of solution prepared out of it. This first produced a bluish precipitate followed by a deep blue colored solution indicating the presence of copper while presence of sulphate was confirmed by treating the solution with barium chloride which resulted in formation of white precipitate [3]

Raw materials complying pharmacopoeia quality were further used for Mathan Tailam preparation. Fresh leaves of the plant were cleaned with running water and drained enough to remove excess water. Fresh juice was obtained from the macerated leaves of *D. metel*. References from Siddha Formulary of India and Gunapadam were followed for Mathan Tailam preparation –Table 1 [4,5].

Table 1: Ingredients Of Mathan Tailam

Serial Number	Tamil Name	Botanical Name	Part Used	Quantity
1	Ummattai elai	<i>Datura metel</i> L	Leaf juice	3500 ml
2	Tengai ennai	<i>Cocos nucifera</i> L.	Oil	1400 ml
3	Turucu	Copper sulphate	Salt	350g

Protocol for Preparation of Mathan Tailam

Copper sulphate (350 g) crystals were dissolved in *Datura metel* leaf juice already extracted in a clay vessel (3.500 L). Coconut oil (1.400 L) was added to this, mixed and heated using hard fire wood - smoking point of coconut oil is approximately 171 °C, care must be taken to avoid overheating beyond this temperature. Mixture in the open vessel was stirred intermittently till the desired colour being green should be free of cracking sound, disappearance of froth and rolling of the herbal drug between the fingers. The tailam should be prepared at a stretch within a day. Finally, the mixture was filtered when hot, through muslin cloth, stored in a glass bottle and stoppered until use [6,7].

Thin Layer Chromatography

Thin-layer chromatography (TLC) a separation technique used to isolate and identify components of a non-volatile mixture mainly works on polarity, using a stationary phase (a thin layer of adsorbent material like silica gel on a plate) and a mobile phase (a solvent). As the solvent moves up the plate via capillary action, it carries the sample components with it, with more polar compounds traveling shorter distances and less polar compounds traveling further. TLC was carried out using silica gel and using hexane and ethyl acetate as solvent.

IR Spectrum

The infrared technique is one of the oldest techniques which depicts the frequencies of bond vibration in a molecule. The main uses of this technique are to identify and determine components in various organic or inorganic compounds. The IR spectrum was obtained using FT/ IR Jasco without using K Br pellets.

Results

The physico-chemical parameters were carried by using standard procedure [8,9]. Tabulated in Table 2 and the thin layer chromatogram with the oil and aqueous extract of *Datura* [Figure 2].

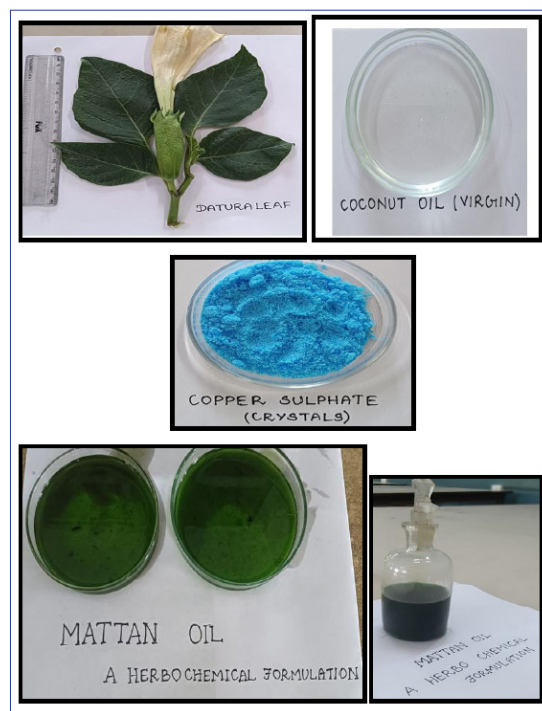


Figure 1: Ingredients of Mathan Tailam

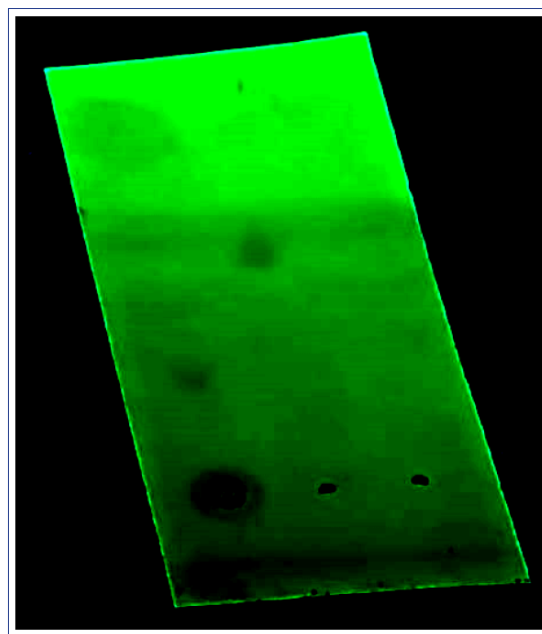


Figure 2: Thin Layer Chromatogram of Mathan Tailam and Datura Leaf Extract

Table 2: Physico Chemical Analysis of Mathan Tailam

Serial Number	Property	Result	Standard value
1	Acid value	2.99	1.62
2	Appearance	Clear	clear

Serial Number	Property	Result	Standard value
3	Colour	Green	Greenish blue
4	Copper content	yes	yes
5	Odour	Pleasant	Slightly pungent
6	Peroxide value	0.92	0.92
7	pH	6.5	6.5
8	Refractive index	1.35	1.39
9	Saponification value	252.00	255.10
10	Specific gravity	0.92	0.92

The IR spectrum reveals the presence of functional groups -OH, C-H, -C = C, C=O further analysis of the active principle can be done using mass spectroscopy and NMR technique [Figure 3].

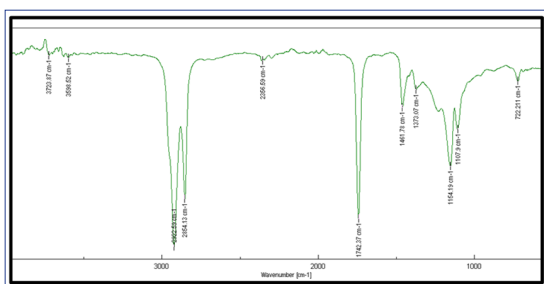


Figure 3: IR Spectrum

Discussion

Mathan Tailam is a herbo mineral Siddha formulation prescribed widely for several conditions such as eczema, weeping eczema, itches, wounds, chronic ulcers, bed sores, anal fistula, ear infections, carbuncle ulcer of diabetes, per anal abscess, non-healing of external ulcers, folliculitis, alopecia and burn wound [10]. Real standard of a drug should be of its therapeutic value, a biological parameter, which varies from individual to individual and species to species. The biological standards can be supplemented and complemented by enhancing the physico- chemical parameters already employed by making use of latest techniques. Information on quality control standards for Mathan Tailam described in CCRAS publication covers only physico-chemical parameters which address mostly the characters of base oil and not about the herbal and mineral portion of the drug [11].

However, the copper sulphate may have iron, lead and other contaminants. Hence, in order to remove such contaminants, recrystallization is always preferred. Reference states that addition of copper sulfate in medicated oil for external application increases its shelf life [12]. The presence of copper from copper sulfate, lauric and capric acids from coconut oil and other phyto chemicals from leaves of *D. metel* ensures wound healing and counteract the bacterial and fungal infection thereby decides the quality of the drug [13-15].

Conclusion

All the parameters and result of this study provide quality standards for Mathan Tailam representing its source from both herbal and mineral origin. This can be utilized for the overall quality.

Future Prospects

The future prospect of mattan tailam being formation of cream a herbo mineral formulation with shelf life and better effective covering a larger surface area with minimal quantity.

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