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STANDARDIZATION OF JAYTYADI TAIL BY USING PHYSICO-CHEMICAL PARAMETERS AND HPTLC FINGERPRINT

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ABSTRACT

Jaytyadi Taila is a ayurvedic medicated oil preparation which is used for topical for the treatment of all the kinds of wounds of the body. It is poly herbal formulation using 15 herbal ingredients. This formulation and preparation was found in authentic book like ayurvedic formulatory of India. In this research paper an attempt to develop quality control protocols and evaluate the standardization parameters like refractive index, iodine value, saponification value, peroxide value, acid value, rancidity, HPTLC fingerprint profile. Establishing quality protocol and standard parameters like physicochemical parameters analysis was carried out as per the guidelines of Ayurvedic Pharmacopeia of India and developing HPTLC fingerprint can be considered as preliminary data which is significant for quality control of jaytayadi taila.

KEYWORDS: Jaytyadi Taila, Medicated oil, Ayurveda, wounds, physico chemical, HPTLC.

INTRODUCTION

Ayurveda is an ancient science of India which is helps the human body to keep healthy and strong while providing cures from indigenous plants, animal and mineral origin products for various ailments.[1] Ayurveda is a complete and holistic traditional healthcare system of India which can be treat as both preventive and therapeutic aspects.[2,3] In Ayurveda, different medicated oil also play important role for providing health benefit and to treat specific indications. medicated oil can be use for external or certain types of medicated oils that are processed with milk are administered orally also. Detailed medicated oil processing is described in Ayurvedic textbooks recognized by Drugs and Cosmetic Act.[4]

Medicated oil is one of the important dosage forms which are mentioned in Ayurvedic pharmaceutics. For medicated Taila preparation, specific oil is boiled with prescribed liquid media (Svarasa or Kwatha, etc.) and a fine paste (Kalka) of the drugs specified in the formulation composition. Unless specified otherwise, taila means Tila taila.[5]

Jaytyadi Taila is an Ayurvedic medicated oil used for multipurpose for skin diseases and potential for, since ancient times to cure different type of tropical wounds.[6]

Jaytyadi Taila contains about 15 herbs, Jasminum officinale Linn, Azadirachta indica, Trichosanthes dioica, Pongamia pinnata, Glycyirrhiza glabra, Saussurea lappa, Curcuma longa, Berberis aristara, Pichrorhiza kurroo, Rubia cordifolia, Prrunus cerasoides, Symplocos racemosa, Terminalia chebula, Nymphaea stellata, Hemidesmus indicus, water, goat milk, Sesamum indicum(Til tail) and all the ingredients are blended in the form of decoction as per the Ayurvedic Formulary of India (AFI).[7] as per the literature most of the ingredients of jaytyadi taila are reported to contains pharmacologically active constituents like rutin, quercitin, glycyrrhizin, β-sitosterol, curcumin, berberin, gallic Acid, lupeol, karanjin, etc.[9,10,11,12] Most of these phytoconstituents are helpful to promoting different skin diseases as well as potent for wound healing.[13,14]

Moreover, disease of the Tropical part of the body remains no more frequent with the regular use of jaytyadi Taila. An Ayurvedic formulation must confirm test for identity, potency, purity, safety, and efficacy as per Pharmacopeial standards and WHO guidelines.[15] Quality assurance of traditional formulations relies upon good manufacturing practices with adequate batch-to-batch analysis and a standardized method of preparation.[16]

In the present study, an effort has been made to develop quality control protocols as well as evaluate the standardization parameters like refractive index, iodine value, saponification value, peroxide value, acid value, rancidity, HPTLC fingerprint profile. Establishing quality protocol and standard parameters like physicochemical and HPTLC fingerprint profiling are highly significant for quality control. Routine use of such scientific techniques will lead to quality control and assurance of the Ayurvedic preparations to a certain extent. It would help in building confidence in the use of these Ayurvedic formulations.[17] We evaluated the jaytyadi Taila for physicochemical parameters, HPTLC fingerprint profiling for batch to batch consistency which can be use for better efficacy.

MATERIALS AND METHODS

Physico-chemical parameters

1. Determination of weight/mL at 40 C
2. Determination of Saponification Value
3. Determination of Acid Value
4. Determination of Peroxide Value

Chromatography Parameters

1. High Performance Thin layer chromatography (HPTLC)

Physico-chemical Parameter

1. Determination of weight/mL at 40° C

- Weight/mL of a liquid is determined by dividing the weight in air expressed in g of the quantity of the liquid which fills a pycnometer (refer to Annexure-3 for details) at 20˚C/25˚C by the capacity of the pycnometer at 20˚C/25˚C respectively expressed in mL. The capacity of the pycnometer at these temperatures is ascertain from the weight in g of quantity of water of the pycnometer.

2. Determination of Saponification Value

Saponification Value is required to measure average molecular weight (or chain length) of all fatty acid present as most of the mass of a fat/tri-ester is in the 3 fatty acids, it allows for the comparison of the average fatty acid chain length.

The Saponification value is the number or mg of KOH required to neutralize the fatty acids, resulting the complete hydrolysis of l g of the oil or fat when determined by the following method.

- Dissolve 35 to 40g of KOH in 20mL of water and add sufficient alcohol to make 1000mL.
- Allow it to stand overnight and pour off the clear liquid.
- Weigh accurately about 2g of the substance in a tarred 250mL flask, add 25mL of the alcoholic solution of KOH(refer to Annexure 2-f), attach a reflux condenser and boil on a water bath for one hour frequently rotating the contents of the flask.
- Cool and add 1mL solution of 1% phenolphthalein(refer to Annexure 2-e) and titrate the excess of alkali with 0.5N HCl (refer to Annexure 2-c)

- Note the number of mL required.
- Repeat the experiment with the same quantities of the same reagents in the same manner, omitting the substance, note the number of mL required.
- End point —colourless oil globules to pink oil globules
- Calculate the Saponification value from the following formula:

Saponification Value = $\frac{(b-a) \times 0.02805 \times 1000}{W}$

Where, b - Blank.

a - Sample.

W - Weight in g of the substance taken.

Calculations

According to formula,

Saponification Value = $\frac{(b-a) \times 0.02805 \times 1000}{W}$

Saponification value = (30.1-16.9) x 0.0280 x1000/ 2

3. Determination of Acid Value

The acid value is the number of mg of KOH required to neutralize the free acid in 1 gm of substance, when determined by the following method.

- Weigh accurately about I g of the substance (l to 5g in case of resin) into a flask and add 50mL of a mixture of equal volumes of alcohol and solvent ether which has been neutralized after the addition of 1 mL of solution of phenolphthalein.
- Heat gently on a water bath, if necessary, until the substances have completely melted and titrate with 0. IN KOH (refer to Annexure 2-d), shaking constantly until a pink colour which persist for 15sec is obtained.
- Note the number of mL required.
- Calculate the acid value from the following formula:

Acid Value = $\frac{0.00561 \times 1000}{W}$

Where, a - Number of mL of 0.1N KOH required. W - Weight in g of the substance taken.

Calculations

According to formula,

Acid Value = a x 0.00561 x 1000

W

Acid value = 1.2 x 0.00561 x 1000 / 5

4. Determination of Peroxide Value

- It is the number which expresses in milli-equivalents of active oxygen, the amount of peroxide contained in 100g of substance.
- Weigh 5.0 ± 0.05g into 250mL glass stopper conical flask, add 30mL mix of 3 volumes of Glacial Acetic Acid (18mL) and 2 volumes of Chloroform (12mL), swirl until dissolved and then add 0.5mL of saturated KI solution.
- Allow to stand for exactly one minute, with occasional shaking.
- add 30mL of water and titrate gradually, with continuous and vigorous shaking, with 0.01N Sodium Thiosulphate (Refer to Annexure 2-a) until the yellow colour almost disappears.
- Add 0.5mL of Starch solution (Refer to Annexure 2-b) and continue titration immediately with 0.01N Sodium Thiosulphate until the blue colour disappears.
- Note the number of mL required ('a' mL).
- Carry out a blank determination under the same conditions without the substance being examined ('b' mL). The volume of 0.01N Sodium Thiosulphate in the blank determination must not exceed 0.1mL.
- **Calculate the peroxide value from the following formula**

Peroxide Value = (a-b) x 10

W

Where, b - Blank.

a - Sample.

W - Weight in g of the substance taken.

Calculations

According to formula,

Peroxide Value = (a-b) x 10

W

Peroxide value = (1.7-0.1) x 10/5

CHEMICAL FINGERPRINT PARAMETER

5. High Performance Thin layer chromatography (HPTLC)

Extract - 0.5g of jatyadi taila in 10mL of Methanol by keeping the mixture for 12h at 37˚C. Filter and carry out the thin layer chromatography

Activation of TLC plate - 110˚C/20min.

Plate used - TLC plate with silica gel 60 F_{254} of uniform thickness of 0.2mm.

Plate size – 10 × 10 cm

Application volume – 10 microliter

Start position – 0.8 mm

Saturation time – 30 minutes

Run length – 80 mm

Mobile phase – Toluene : Ethyl acetate : Glacial acetic acid (8.5:1.5:0.3). After development, allow the plate to dry in air and examine under AT 254nm, AT366nm and after development AT Visible light.

Derivatizing reagents – Anisaldehyde Sulphuric Acid

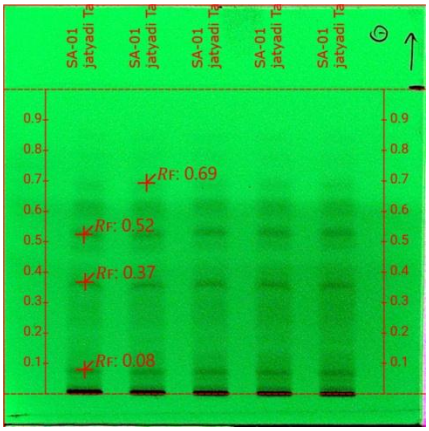
Wavelength – 210 nm, 580 nm

RESULTS AND DISCUSSION

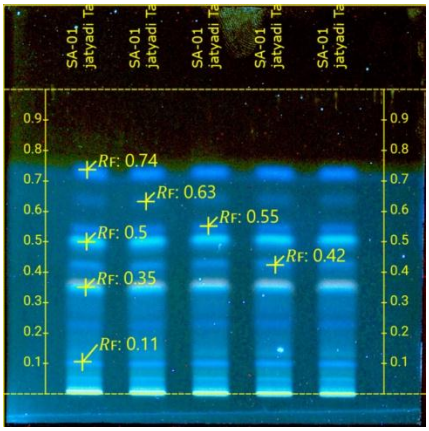
Physico chemical parameters

Test	Limit	Observation
Weight/ml at 40˚C	Not more than 1.000gm/ml	0.946gm/mL
Saponification value	Between 178 to 194	185
Acid value	NMT 4	1.3
Peroxide value	NMT 7.50 miliequivalent/1000 gm	3.2

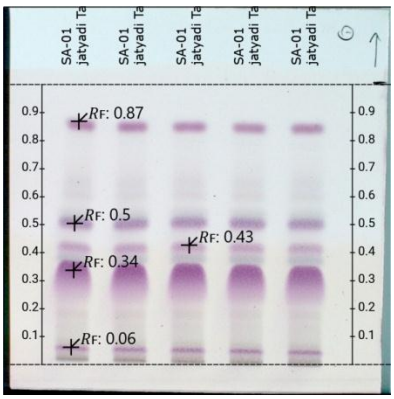
HPTLC Chemical fingerprint



(Image AT 254nm, After Development, four Band was observed at Rf: 0.08,0.37,0.52,0.69 Respectivly.)



(Image AT 366nm, After Development, seven Strong flurocence band was observed at RF : 0.11,0.35,0.42,0.50,0.55,0.63,0.74)



(Image AT white light, After Derivatization with ASR, Five Purpul pink color was observed at white light at Rf : 0.60,034,0.43,0.50,0.87 respectivly.)

CONCLUSION

All the parameters and result of this study provides quality standards for *Jaytyadi Tailam* representing its source from herbal. This can be utilized for the overall quality check over its preparation and formulation. It is realize that for the monitoring of the quality of jaytyadi taila physical parameters is important but for the stability and batch to batch consistency HPTLC fingerprint is suitable and useful technique.

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