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Research Article

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COMPARATIVE INVESTIGATION OF ANTI-INFLAMMATORY NIRGUNDI OIL AND CASTOR OIL BY PHYSICOCHEMICAL, PHYTOCHEMICAL AND CHROMATOGRAPHIC TECHNIQUES

Shraddha Dhanokar*, Mayuri Kale, Anil Kumar Aher and Sonali Gawali

NDMVPS College of Pharmacy, Nasik, Maharashtra, India.

ABSTRACT

Nirgundi oil and Castor oil are used in the treatment of inflammation and Rheumatoid Arthritis. Nirgundi oil is obtained from the leaves of the *Vitex Negundo* Linn., Lamiaceae and Castor oil is extracted from the seeds of *Ricinus Communis* L., Euphorbiaceae. The formulations containing both oils produce synergistic effect. Nirgundi oil contains Luteolin and Castor oil has Ricinoleic acid which are responsible for the anti-inflammatory action. The study aims to perform physicochemical and phytochemical investigation of the oils available in local market as its standardization parameters for detection of the adulterations in the oil. The results obtained can be utilized as a quality determination tool for marketed oils.

Keywords: Nirgundi oil, Castor oil, Luteolin, Ricinoleic acid and inflammation.

INTRODUCTION

Nirgundi oil is Volatile aromatic oil extracted from *Vitex Negundo* leaves which is commonly known as Three leaf or Five leaf chaste tree. Castor oil is vegetable oil obtained by pressing seeds of *Ricinus Communis* that is locally known as Erande. In Ayurveda, both oils are considered as treatment for 'Ammavata'[6]. Nirgundi oil is contraindicated in patients who are undergoing medications as Schizophreia, contraceptives and during pregnancy[19]. Castor oil is contraindicated in Patients suffering from Abdominal, intestinal infections and Kidney disorders and also during Pregnancy[21]. The Pharmacological action of different medicinal plant depends on the phytoconstituents it contains. Inflammation is the primary and complex response of the tissue in order to any uncertain physiological and pathological changes. Inflammation occurs due to activation and migration of Leucocytes from the veins to the injured site and releases Cytokines along with Reactive Oxidative and Nitrogen species. In Nirgundi oil, Luteolin acts in reducing inflammation it acts by reducing oxidative stress of the tissue. Luteolin causes decrease in the synthesis of Interleukin- NF Kappa B which helps in reduction of the Cyclooxygenase (COX)[14]. Ricinoleic acid in Castor oil acts over inflammation by nucleotide binding domain and Leucin rich protein (NALP3) inflasome cells activation in the injured area and reduces histamine secretion [18].

MATERIAL AND METHODS

Sample Collection

Nirgundi oil and castor oil where procured from the local market for analytical study.

Sample Preparation

Nirgundi oil and Castor oil were solubilized in Ethanol in 1:2 ratio.

Physicochemical and Phytochemical Sample Preparation

On the ethanolic samples physicochemical parameters and phytochemical tests are carried out.

Chromatographic Sample Preparation

Oil samples were completely solubilized in Ethanol. Mobile phase used was Toulene: Ethyl Acetate: Formic Acid (6:4:0.3) and

Toulene: Ethyl Acetate (8.2:0.4) for Nirgundi oil and Castor oil respectively.

RESULTS

A]Physicochemical standardization

The oils were standardized for physical parameters as Color, Odour, Solubility, Viscosity, Relative density and Refractive index. The Chemical parameters studied are Iodine, Saponification, Unsaponification and Acid Values. The observations are mentioned in Table 1.

B] Phytochemical Standardization

The oils were analyzed for presence of Alkaloids, Carbohydrates, Glycosides, Flavanoids, Phenolics, Steroids and type of oil. Results have been described in Table 2.

C]Chromatographic Standardization

Chromatographic analysis of Nirgundi oil and Castor oil was performed. Structure of Luteolin and Ricinoleic acid has been given in Figure 1&2 respectively. Nirgundi oil showed presence of Luteolin at Rf Value 0.44 as a Dark orange spot. Castor oil contains Ricinoleic acid which is observed at Rf Value 0.27 as a Greenish Yellow Spot. Observed TLC of Nirgundi Oil and Castor Oil has been shown in Figure 3 and Figure 4 respectively.

CONCLUSIONS

This research work concludes with the standard values of marketed oils. Qualitative analysis helps to determine the Purity of oils. Further HPTLC studies can be carried out for Quantitative analysis. Adulteration of oils can be determined with above mentioned tests.

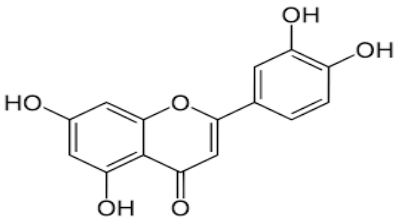

Fig. 1: Luteolin
3', 4', 5, 7-tetrahydroxyflavone

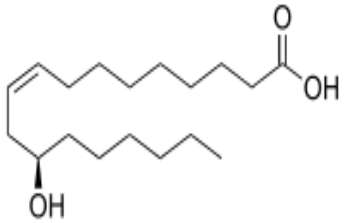

Fig. 2: Ricinoleic acid
12-hydroxy-9-cis-octadeconic acid

DISCUSSIONS

Table 1: Physicochemical Parameters

Sr. No.	Physicochemical Parameters	Result	
		Nirgundi Oil	Castor Oil
1.	Plant Part	Leaves	Seeds
2.	Color	Greenish Brown	Pale yellow
3.	Odour	Aromatic	Faint
4.	Solubility	Soluble in Ethanol, Ethyl acetate.	Soluble in Ethanol, Benzene, Chloroform.
5.	Viscosity	6 Centistoke	8 Centistoke
6.	Relative density	0.92	0.96
7.	Refractive index	1.49	1.47
8.	Iodine Value	124	85
9.	Saponification Value	148	178
10.	Unsaponification matter	8.4%	0.8%
11.	Acid Value	11.9	1.4

Table 2: Phytochemical Tests

Sr. No.	Test	Observation	Result	
			Nirgundi Oil	Castor Oil
1.	Alkaloids- Wagner's Test	Reddish brown Precipitate	Negative	Positive
2.	Carbohydrates- Fehling's test	Brick red precipitate	Positive	Positive
3.	Anthraquinone Glycosides- Borntrager's Test	Ammonical layer appears Pink	Negative	Positive
4.	Saponin Glycosides- Foam test	Persistant Foam	Positive	Positive
5.	Flavanoids- Shinoda test	Reddish purple color	Positive	Positive
6.	Phenolics- Ferric Chloride Test	Blue black Color	Negative	Negative
7.	Tannins- Gelatin test	White Precipitate	Positive	Positive
8.	Steroids- Salkowski test	Chloroform layer appears red and acid layer appears yellow	Negative	Negative
9.	Type of Oil- Filter Paper test	Stain on filter paper- Fixed oil is Present	Negative- Volatile Oil	Positive- Fixed oil

Table 3: Chromatographic standardization

S.No.	Sample	Mobile Phase	Visualization	Rf Value
1.	Nirgundi Oil	Toulene: Ethyl Acetate: Formic Acid (6:4:0.3)	In UV Spectrophotometer at 254 nm.	0.44
2.	Castor Oil	Toulene: Ethyl Acetate (8.2:0.4)		0.27

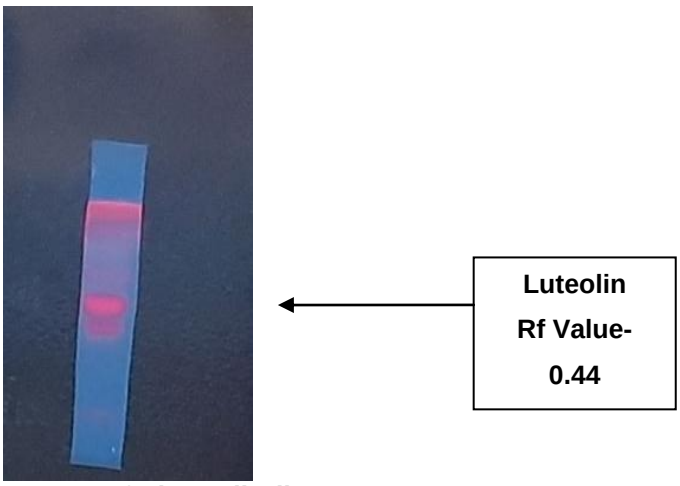

Fig. 3: TLC of Nirgundi Oil

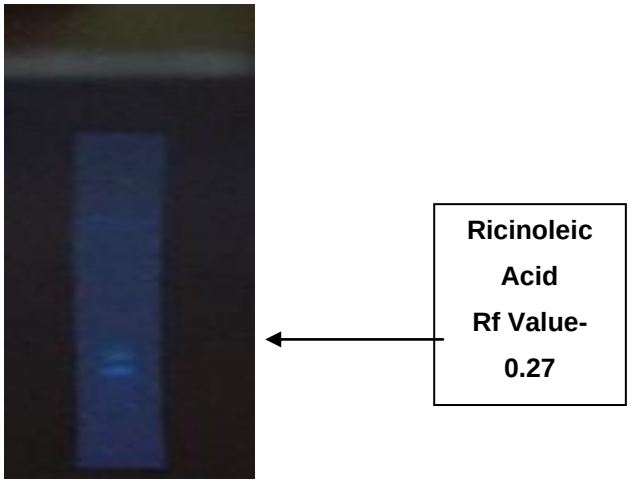

Fig. 4: TLC of Castor Oil

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