

A Comparative Analysis of Seed Oil Composition in Different Species of Cleome and Future Scope from Arid Zone of Rajasthan

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Abstract:- Seed oils are important secondary metabolites obtained from plants. Rajasthan, a part of the most populated deserts in the world, is famous for diverse flora and fauna. A number of plants are found in this zone belonging to various botanical families. Asteraceae is one of such family.

A number of lesser known seed oils from this family have been analyzed for their phytochemical profiles and scope. The present paper describes the comparative physicochemical characteristics and seed oil composition of *Cleome viscosa* and *Cleome gynandra*, from the family Asteraceae.

The seeds of both plants were collected from wild growing plants and their physicochemical characteristics were analyzed. The seed oils were categorized in drying, semi drying and non-drying oils and their scope was determined on the basis of their fatty acid profiles.

The present paper deals with the physical properties of both seed oils.

Keywords- Asteraceae, phytochemical profiles, seed oils, *Cleome viscosa* and *Cleome gynandra*, Fatty acid composition.

1. INTRODUCTION

Natural products are important substances in drug discovery and chemical biology. Any plant part may contain active components. That plants with antimicrobial activity contain bioactive constituents like tannins, flavonoids, alkaloids and saponins. Alkaloids & flavonoids which have antiviral, antibacterial, antimicrobial & anticancer activity. Other group of secondary metabolites include oils, fats, and Phenolic and polyphenolic substances.

Various species of the genus *Cleome* are found in India everywhere. The most commonly available species are the *Cleome viscosa*, *Cleome chelidonii* and *Cleome gynandra*. The plants of *Cleome viscosa* are commonly known as 'Hurhur' and 'Karaila'. Common name of *Cleome* are Wild Spider Flower, African spider-flower, cat whiskers, Bastard-mustard.

Cleome gynandra is an important medicinal plant described in the Indian traditional system of medicine Ayurveda as well as in The Ayurvedic pharmacopoeia of India and in other ancient medical texts. As an Ayurvedic medicine it is a chief constituent in the *Narayana Churna*. It is used as anthelmintic, in ear diseases, pruritus, gastrointestinal disorders and infections.

The vegetable is used as a leafy vegetable in most of the countries. In India it is used as a pot herb and flavoring in sauces. This plant species has nutritional applications. Leaves extract is used in treatment of scurvy. The meal prepared by boiling of leaves with sour milk is given to pregnant women to reduce labor period and good health of child. The seeds are oiliferous and protein rich with good amount of polyunsaturated oil. The seeds

are bird food and the cake after oil extraction is good for animal feed.¹⁻⁶

The species *Cleome viscosa* have been reported to show ant nociceptive, cytotoxic and antibacterial activity in animal models. Both of the species has remarkable medicinal importance.

The plant of *C. gynandra* is erect, annual herb with height up to 250-600 mm, much branched and becomes woody with time. The stem is sticky with glandular hairs, marked with longitudinal parallel lines while that of *C. viscosa* is erect, less branched herb with yellow flowers.⁵⁻⁹

2. MATERIAL AND METHODS

2.1 Literature Survey and Sample collection

The literature survey of Indian wild plants of medicinal importance was done using local communication, books, internet and survey of waste lands.

During rainy season, the plants were identified and the morphology was studied. The fruits were collected after maturation and the seeds were stored in air tight containers.

Table.1 Identification of Plants.

Property	<i>C. viscosa</i>	<i>C. gynandra</i>
Common name	Hurhur	Spider plant
Shape and size of plant	Erect, glandular pubescent, annual herb	Branched, glandular, annual herb
Flowering and fruiting season	July-October	July-November
Diameter of seeds	1.5 mm	1.7mm
Color of flowers	Yellow	Creamiest to pink
Color of seeds	Brown-black	Brown

2.2 Seed Moisture Testing

The seed moisture content is the amount of water present in the seed. It is expressed as a percentage on wet weight basis. This parameter, influences the seed quality and storage life of the seed. It is related to seed maturity, optimum harvest time, damage, economics of artificial drying, and infestation by insects and pathogens.

The pre-weighed moisture bottles along with seed material are placed in an oven preheated at 103°C. Seeds were dried at this temperature for about 17+-1hr. At the end of seed drying period, weighing bottles/containers be closed with its lid / cover. The weighing containers were transferred to the desiccators having silica gel to cool down for 40 to 45 min. The weights were taken again. Calculation of the seed moisture content was done using following formula-

$$\% \text{age seed moisture content (mc)} = \frac{M_2 - M_3}{M_2 - M_1} \times 100$$

Where

M_1 = Weight of the weighing container with cover in gm.

M_2 = Weight of the weighing container with cover and seeds before drying

M_3 = Weight of the weighing container with cover and seeds after drying

2.3 Oil Extraction

The seeds were grinded in pistil mortar and subjected for oil extraction using n-Hexane as solvent. The Soxhlet apparatus was used for the extraction. The oil was filtered and stored in vials.

2.4 Refractive Index of oils

The Refractive Index of both the oils was determined by Refractometer. The values are given in Table.2.

2.5 Saponification Values of oils

The number of milligrams of potassium or sodium hydroxide required saponifying 1 gram of oil or fat is termed as saponification value. This value provides a brief idea about the chain length and average molecular weight. These values were determined by AOAC official methods.^{11, 12}

2.6 Protein Content

The protein content of seeds was determined by nitrogen estimation method and expressed as NX6.25%.

2.7 Viscosity of oils

The viscosities of oils were determined by Red Wood Viscometer at room temperature. It was recorded on Red Wood Seconds.^{3, 11, 12}



Figure 1 and 2: Plants of *C.viscosa* and *C.gynandra*

3. RESULTS AND DISCUSSION

The results obtained are shown in table 2. From the table it is clear that species 1 contains 9.5% oil while the second one has 8.2% of oil. The moisture content was found as 3.55 and 4.11% respectively. The Refractive Index was recorded as 1.4668 and

1.3566 nD respectively. Both of the species were found to contain a good amount of protein as 34.3 and 30.2% respectively. The saponification values are analyzed as 196 and 185 indicating normal values.

Table 2. Properties of seeds and seed oils

Property	<i>C. viscosa</i>	<i>C. gynandra</i>
Moisture (%)	3.55	4.11
Oil (%)	9.5	8.2
Protein (NX6.25%)	34.3	30.2
RI(30nD)	1.4668	1.3566
Saponification value	196	185
Viscosity(RWs)	180	195

4. CONCLUSION

From the above studies it is concluded that both of the plant species contains good amount of oil and protein. The moderate saponification value indicates abundance of smaller and saturated fatty acid in the oil. As reported by earlier studies. The seed oil of *C. viscosa* is of non-drying category¹³. This type of oil could be applied in soap manufacturing. Since both of the plants have been reported to contain remarkable medicinal values so the commercial production has good scope for industries. The plants of *Cleome* are seen commonly in rainy season as a wild herb in Arid Zone of Rajasthan so if it is cultivated with advanced cultivation methods and seed oil is extracted and derivative with additives, much better outcomes are possible for industries.

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