

## Phytochemical analysis of curry leaf (*Murrayakoenigii*) for Hair Oil

### Abstract

*Murrayakoenigii* (Curry leaves), member of the Rutaceae family commonly employed in the Ayurvedic system of medicines which is an important herb of Indian provenance. The leaves, roots, and bark of this plant are high in carbazole alkaloids, which have powerful biological and pharmacological effects. *Murrayakoenigii* has long been known for its hair root strengthening effects. In this study, dried leaf portions of *Murrayakoenigii*, *Hibiscus rosasinensis* and *Lawsoniainermis* were made into herbal hair oil and evaluated for their potential as an effective topical formulation for hair growth-promoting action. The evaluation patterns like Physical appearance, pH Test, Viscosity, Determination of Refractive Index, Saponification Value were tested. Using various procedures, the produced Kadipatta hair oil was subjected to qualitative chemical analysis for the identification of numerous plant main ingredients such as sulfur, ascorbic acid, and saponins. The results showed that herbal hair oil exhibited good pH, acceptable viscosity, and was stable at room temperature. As a result, it is clear that the herbal plant may be a preferable option for future formulations. Oil roasted fresh curry leaves and spice mix of 1:1 ratio with 10% salt were found to be the best organoleptically for preparing curry leaf paste. The sensory score of the curry leaf edible paste indicated that the changes in appearance, color, flavor, taste and overall quality during the 1-, 3-, 5- and 7-day storage period.

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### Keywords

*Murrayakoenigii* (Curry Leaves), Hair oil, Chemical Standardization, GCMS analysis

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### Introduction

Curry leaves, botanical name *Murrayakoenigii*, belongs to the Rutaceae family.

Curry leaves also known as karieppilai, karipatta, sweet neem leaves and kadipattta etc. Plants with medicinal properties are being used as a traditional medicine from immemorial time. A plant has medicinal, pharmaceutical and cosmetic potential, using it many innovative

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products can be prepared useful for mankind. The extract from the leaves and stem of various medicinal plants have been employed as a natural remedy in curing various ailments and diseases (Mishra, 2018). Among them *Murrayakoeniigii* have a lot of bioactive principles due to which plant has been proven as the medicinally important plant but least or no attention received by the scientist (Saikia *et al.*, 2006).

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Curry leaves are widely distributed throughout India except at higher altitude of Himalayas. It is found abundantly in forests and waste lands in natural, wild and cultivated forms up to 1650m altitude (Joseph and Peter, 1985). In southern India it is found in homestead gardens of every house hold (Gahlawat *et al.*, 2015). Natural products could be found in the treatment of almost all diseases and skin problems owing to their high medicinal value, cost effectiveness, availability and compatibility (Solanki, 2011). *Murrayakoeniigii* originates from east and south part of India, Pakistan, Sri Lanka, China and Hainan but widely cultivated in South-East Asia and some parts of the United States and Australia. It grows throughout India up to the height of 1500 to 1655m from sea level and in the Andaman Islands. Soil and climate - Red sandy loam soils with good drainage are ideal for better leaf yield (Jain *et al.*, 2012). The optimum temperature requirement is 26°to37°C. *Murrayakoeniigii* is semi deciduous, unarmed aromatic small spreading shrub or tree with strong woody stem but slender with the stem which is dark green to brownish in color the tree is 4-8.7m(13-31 feet) tall, with a trunk up to 81cm diameter .

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Comment [LXY10]: (26to37)°C

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The leaves, roots, and bark of this plant are high in carbazole alkaloids, which have powerful biological and pharmacological effects. *MurrayaKoenigi*It has long been known for its hair root strengthening effects. In this study, dried leaf portions of *Murrayakoeniigii*, *Hibiscus rosasinensis* and *Lawsoniainermis* was made into herbal hair oil and the phytochemicals were evaluated.

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## Material and Methods

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### 1.1.Collection of plant parts

The leaves of *Murrayakoeniigii* were collected from Forest College and Research Institute, TNAU. The leaves of *Lawsoniainermis*, the leaves and flowers of *Hibiscus rosasinensis* were also collected from the Campus.

## 1.2. Ingredients

Ingredients	Plant part	Quantity(%)
<i>Murrayakoenigii</i>	Leaves	40
Methi	Seeds	3
Coconut Oil	Oil	40
Henna	Leaves	7
Hibiscus	Leaves	7
	Flowers	3

## 1.3. Working Procedure

- **Step 1** : Take 60g of dried curry leaves
- **Step 2** : Heat 300 g of Coconut Oil
- **Step 3** : Add 60g of curry leaves, 3 tbsp of methi, 10g of henna , 15 hibiscus leaves and 5 hibiscus flowers
- **Step 4** : Keep stirring it in low flame
- **Step 5** : Stir the content until the content turns Green – Don't burn
- **Step 6** : Leave it over night
- **Step 7** : Filter out the extra contents, by squeezing it

**Comment [LXY15]:** International units of measurement must be mentioned, not tbsp. (g, km).

## Observations

### a) Physical Appearance

The general characters like color and odor were evaluated manually ( Prakash and Natarajan, 1974).

### b) pH Test

The pH meter was calibrated with buffer solutions of pH 4 and pH 7. The electrode was bathed in hair oil for a few minutes until the pH returned to normal ( Prakash and Natarajan, 1974).

### c) Viscosity

A Brook field viscometer (RVDV-II+PRO) was used to measure viscosity with spindle number 6. 50 mL of hair oil was poured into the beaker, and the viscosity was tested at 100 rpm ( Prakash and Natarajan, 1974).

### d) Determination of Refractive Index

There refractometer's temperature was adjusted, and the oil sample was smeared over the cleaned prism before taking readings. The prism was washed with hot water when the measurements were finished. The following equation was used to rectify the readings.

$$R = R' + K (T - T')$$

Where, R= Adjusted reading, R'= Reading at T°C, T'= temp at which readings taken, T= specified temp 40°C, K= 0.00385 for oil ( Prakash and Natarajan, 1974) .

**e) Saponification Value**

In a 250 mL conical flask, 1mL of oil was accurately weighed, and 10 mL of ethanol: ether combination (2:1) was added. 25 mL of 0.5 N alcoholic KOH was added to this flask. The flask was kept for 30 minutes and then cooled. Using phenolphthalein indicator, the cooled solution was titrated against 0.5 N HCl. The blank titration was carried out in the same way but without using any oil (sample). The amount of KOH used in mg was computed ( Ganesan *et al.*, 2013).

**f) Ascorbic Acid Test**

Added 1 drop of freshly prepared 5 percent w/v sodium nitroprusside solution and 2ml of dilute sodium hydroxide solution to 1ml of 2 percent w/v solution and 5ml of water. Drop in 0.6ml of hydrochloric acid, mix, and records found ( Ganesan *et al.*, 2013) .

**g) Sulfur Test**

On the test paper, a drop of hydrogen peroxide was placed. When exposed to fumes, the paper becomes brown ( Ganesan *et al.*, 2013) .

**h) Quantitative Phytochemical analysis using GC-MS:**

Quantitative phytochemical analysis can be done by using GC-MS. It can identify trace elements in materials that were previously thought to have disintegrated beyond identification. Like liquid chromatography-mass spectrometry, it allows analysis and detection of even tiny amounts of a substance.

A sample of 3 ml of methanol extract of *Murrayakoenigi* leaves are taken and subjected to GC-MS for quantifying the phytochemicals present in the leaf extract

(Karasek *et al.*, 2013).

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## Results and Discussion

### Evaluation parameter of kadipatta hair oil

Developed kadipatta hair oil was dark green in color with a transparent appearance, and when applied, it was smooth. The pH of the whole kadipatta hair oil was 6.77, which was suitable for hair, implying that the herbal hair oil was compatible with hair. The viscosity of herbal hair oil was determined to be 31 cps. The refractive index was used to determine the quality of kadipatta hair oil. Kadipatta hair oil was found to have a refractive index of 1.31. This demonstrates that a simple refractive index measurement in the laboratory may also be utilized as a quality control approach. The saponification value of herbal hair oil was discovered to be 24.30% in practice (Table 1). This study was proven by Raghavan, (1957); Kumar *et al.* (1999); Ghosh *et al.* (2012) in curry leaves.

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**Table 1. Physical parameters of Curry leaves**

Parameters	Readings
Physical appearance	Darkgreen
Odour	Good
pH	6.77±0.011
Viscosity	31.2
Saponification value	24.30
Refractive index	1.31

### Phytochemical Evaluation of *Murrayakoenigii*

Herbal hair oil contains ascorbic acid, sulfur and saponins, according to phytochemical analysis (Table 2). Because of its powerful antioxidant action and nutritional importance as vitamin C, ascorbic acid is one of the most commonly used natural

antioxidants. The ideal amount of ascorbic acid is used to prevent oxidative degradation of the oils. For a good reason, sulfur is commonly referred to as one of the building blocks of hair. Our hair is made of keratin, a long-lasting protein with high sulfur concentration (Table 2).

Sulfur is needed for proteins (like keratin) to maintain their structure, which helps maintain hair's overall health, strength, and suppleness. Sulfur has been shown to increase the length of your hair's growing phase. Finally, sulfur has been associated with the treatment, alleviation, and prevention of psoriasis, dandruff, eczema, and folliculitis. Saponins are the most common phytochemicals that act as natural surfactants. Natural saponins provide body and gloss to the hair, making it feel fuller, silkier, and smoother. This study was proven by Raghavan, (1957); Kumar *et al.* (1999); Ghosh *et al.* (2012) in Curry leaves.

**Table 2 Chemical analyzes of curry leaves**

Tests	Observations	Results
Ascorbic acid test	Color change from yellow to blue	+
Sulfur test	Appearance of brown color	+
Saponin test	Appearance of foam	+

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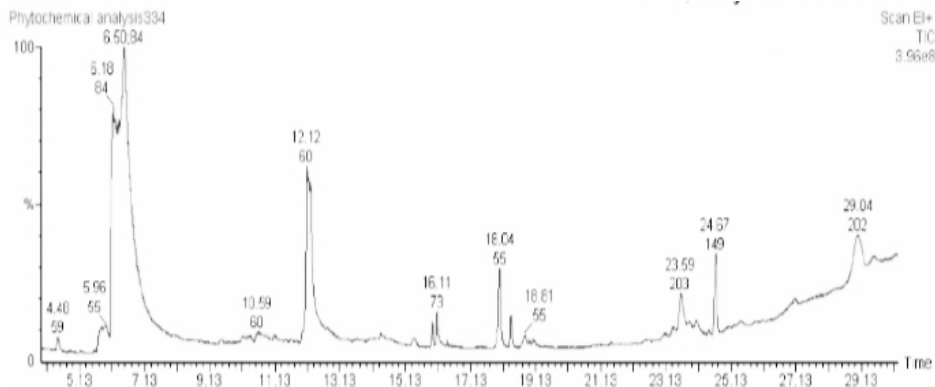
### Phytochemical quantification of methanol leaf extracts of *Murrayakoengi* using GC-MS

GC-MS chromatogram of the methanolic extract of *Murrayakoengi* (Figure-1) showed peaks indicating the presence of phytochemical compounds. The chemical compounds identified in the methanolic extract of the leaves of *Murrayakoengi* are presented in Table 3. GC-MS analysis revealed the presence of Peak 1-Methyl-pyrrolidine-2-carboxylic acid registered the highest (69.00%) compared to others. Kole *et al.* (2009) and Raskin *et al.* (2002) analyzed the effect of phytochemicals in Curry leaves. In present study showed presence of phytoconstituents and it indicates in the leaves of *M.* Future studies are needed to isolate and characterize the bioactive compounds.

Comment [LXY21]: (Figure 1)

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**Fig 1. Phytochemical analysis of curry leaf using GCMS**

**Table 3. Phytochemical quantification of curry leaf using GCMS analysis**

S.No	R. Time	Name of the compound	Peak Area (%)
1.	4.48	Propane,1,1,3-triethoxy	0.56
2.	5.96	1,2- Ethanediol, monoacetate	2.79
3.	6.50	1-Methyl-pyrrolidine-2-carboxylicacid	69.00
4.	12.12	Ethyla -d- glucopyranoside	13.36
5.	15.41	Pentadecanoicacid,14- methyl, methylester	0.39
6.	16.11	n- Hexadecenoicacid	0.81
7.	16.43	Hexadecenoic acid, ethylester	0.11
8.	18.04	Oleicacid , methylester	2.54
9.	18.39	Phytol	0.72
10.	18.81	9,12- Octadecadienoicacid( Z,Z)	0.60
11.	23.59	c- Himachalene	2.88
12.	24.67	1,2-Benzenedicarboxylicacid, diisooctylester	2.55
13.	29.04	Isolongifolene,4,5-dehydron	3.68

### Summary and Conclusion

The current study aided in elucidating information on “Standardizing the recipe for the preparation of curry leaf hair oil” using curry leaves and its overall quality. One of the most well-known hair treatments is herbal hair oil. Herbal hair oil not only hydrates the scalp, but also helps to heal dry scalp and hair. It contains various vital nutrients that support regular sebaceous

gland activity and encourage natural hair growth. The results show that the fresh leaves of *Murrayakoenigii* consist of phytochemicals and these elements can be useful for further studies in developing hair oil which helps in reducing hair fall and enhancing growth of the hair. The metabolites are reported to have many biological and therapeutic properties so it is expected to have high potential for medical uses. However, further investigation with purified fractions is required to predict the exact mechanism of action.

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