GCMS analysis ofcurry leaf (*Murrayakoenigii Linn.)*

Abstract

Curry leaves, or Murrayakoenigii, are a valuable plant with Indian origins that are frequently used in the Ayurvedic medical system. They are a part of the Rutaceae family. This plant contains large amounts of carbazole alkaloids, which have potent pharmacological and biological effects, in its roots, bark, and leaves.MurrayaKoenigii has a long history of strengthening hair roots. This study assessed the potential of dried leaf parts of Lawsoniainermis, Hibiscus rosasinensis, and Murrayakoenigii to be an effective topical formulation for action that promotes hair development. The leaves were then converted into herbal hair oil. Tests were conducted on the assessment patterns, which included physical appearance, pH testing, viscosity, determining the refractive index, and saponification value.The generated Kadipatta hair oil was submitted to qualitative chemical analysis using a variety of techniques in order to identify many plant major components, including sulphur, ascorbic acid, and saponins. The findings demonstrated that the herbal hair oil was stable at room temperature, had a decent pH, and had an acceptable viscosity. It follows that the herbal plant could be a better choice for upcoming formulations. The optimal organoleptic conditions for making curry leaf paste were discovered to be oil-roasted fresh curry leaves combined with a 1:1 ratio of spices and 10% salt. The curry leaf edible paste's sensory score revealed alterations in appearance, colour, flavour, taste, and general quality over the course of the storage periods of one, three, five, and seven days.

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

Introduction

MurrayaKoenigii, the formal name for curry leaves, is a member of the Rutaceae family. Curry leaves are sometimes referred to as delicious neem leaves, karipatta, karieppilai, and kadipattta. Since ancient times, people have employed plants with therapeutic qualities as a kind of traditional medicine. A plant has the ability to be used to make creative, helpful goods for human use in the pharmaceutical, cosmetic, and medical fields. A natural therapy for a number of illnesses and disorders has been the extract from the leaves and stem of several medicinal plants (Mishra, 2018).Murrayakoenigii is one of them; it possesses a lot of bioactive components, which has made it a proven medicinally significant plant, yet scientists have given it little to no attention. (2006) Saikia et al.

Curry leaves are found all across India, with the exception of the higher Himalayan regions. It is widely distributed up to 1650 meters in height in woods and waste areas in their

natural, wild, and farmed forms (Joseph and Peter, 1985). Every household's homestead gardens in southern India are home to it (Gahlawat et al., 2015). Due to their great medical value, affordability, accessibility, and compatibility, natural products are used to treat nearly all illnesses and skin conditions (Solanki, 2011). AlthoughMurrayakoenigii is commonly grown in South-East Asia, certain regions of the United States, and Australia, it is originally from the east and south of India, Pakistan, Sri Lanka, China, and Hainan. It may reach heights of 1500 to 1655 meters above sea level in India.

Climate and soil: Red sandy loam soils that drain well are the best for increasing leaf production (Jain et al., 2012). The ideal range of temperatures is 26–37°C. Murrayakoenigii is a tiny spreading tree or shrub that is semi-deciduous, unarmed, and scented. It has a thin, robust woody stem that ranges in colour from dark green to brownish. The tree may reach heights of 4–8.7 m (13–31 ft) and a trunk diameter of up to 81 cm.

This plant contains large amounts of carbazole alkaloids, which have potent pharmacological and biological effects, in its roots, bark, and leaves. MurrayaKoenigii has a long history of strengthening hair roots. This study assessed the phytochemicals in herbal hair oil prepared from dried leaf parts of Lawsoniainermis, Hibiscus rosasinensis, and Murrayakoenigii.

Material and Methods

1.1 Gathering of plant material

At 8 a.m., at 11.3237° N, 76.9362° E, the leaves of Murrayakoenigii were harvested from Forest College and Research Institute, TNAU. Additionally, gathered from the campus were the leaves of Lawsoniainermis and the blooms and foliage of Hibiscus rosasinensis.

List 1: Collection of leaf samples

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

1.2 Operating Process and Oil Extraction

Step 1: Take 60g of dried curry leaves.
Step 2: Heat 300g 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: Stir continuously over a low flame.
Step 5: Stir until the content turns green, being careful not to burn.
Step 6: Let it sit overnight.
Step 7: Squeeze out any excess contents.

Observations

a) Physical Appearance

Manual evaluation was done on the general characteristics, such as colour and odour (Prakash and Natarajan, 1974).

b) pH Test

The pH 4 and pH 7 buffer solutions were used to calibrate the pH meter. For a few minutes, the electrode was submerged in hair oil until the pH level stabilised (Prakash and Natarajan, 1974).

c) Viscosity

Viscosity was measured using a Brook field viscometer (RVDV-II+PRO) with spindle number 6. The viscosity of the 50 mL of hair oil that was added to the beaker was measured at 100 rpm (Prakash and Natarajan, 1974).

d) DeterminationofRefractiveIndex

Before obtaining measurements, the temperature of the fractometer was adjusted and the oil sample was applied to the cleaned prism. After the measurements were complete, the prism was cleaned with hot water. The readings were corrected using the following equation.

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

Where, R= Adjusted reading, R′= Reading at T ◦C, T′= temp at which readings taken, T= specified temp 40◦C, K= 0.00385for oil (Prakash and Natarajan, 1974).

e) SaponificationValue

One millilitre of oil was precisely weighed, and ten millilitres of a 2:1 ethanol to ether mixture were poured to a 250-millilitre conical flask. To this flask, 25 mL of 0.5 N alcoholic KOH was added. After being stored for half an hour, the flask was cooled. After cooling, the

solution was titrated against 0.5 N HCl using phenolphthalein indicator. The same procedures were followed for the blank titration, but no oil (sample) was used.It was calculated how much KOH was used in milligrammes (Ganesan et al., 2013).

f) Ascorbic Acid Test

combined 1 millilitre of 2 percent w/v solution with 5 millilitres of water, 1 drop of recently made 5 percent w/v sodium nitroprusside solution, and 2 millilitres of diluted sodium hydroxide solution.Records identified, drop in 0.6 cc of hydrochloric acid, mix (Ganesan et al., 2013).

g) SulphurTest

A drop of hydrogen peroxide was put on the test paper. The paper becomes brown when exposed to fumes (Ganesan et al., 2013).

h) Quantitative Phytochemical analysis using GC-MS:

With GC-MS, phytochemical analysis may be done quantitatively. Materials that were previously believed to have decomposed beyond recognition can have trace elements identified in them. Similar to mass spectrometry and liquid chromatography, it enables the examination and identification of even minute quantities of a material. Murrayakoenigii leaf methanol extract sample (3 ml) is obtained, and the phytochemicals contained in the leaf extract are quantified using GC-MS (Karasek et al., 2013).

Results and Discussion

Evaluation parameter of kadipatta hair oil

The developed kadipatta hair oil had a smooth application, a translucent look, and a dark green tint. The entire kadipatta hair oil had a pH of 6.77, which was appropriate for hair and suggested that the herbal hair oil was hair-friendly. It was found that the herbal hair oil had a viscosity of 31 cps. The quality of the kadipatta hair oil was assessed using the refractive index. The refractive index of Kadi Patta hair oil was determined to be 1.31. This indicates that a straightforward laboratory measurement of refractive index may likewise be applied as a quality control method. In fact, it was found that herbal hair oil had a saponification value of 24.30% (Table 1).

Table 1. Physical parameters of Curry leaves

Parameters	Readings
Physicalappearance	Darkgreen
Odour	Good
pH	6.77±0.011
Viscosity	31.2
Saponificationvalue	24.30
Refractiveindex	1.31

An analysis of Murrayakoenigii chemically

Phytochemical study of herbal hair oil reveals the presence of ascorbic acid, sulphur, and saponins (Table 2). Ascorbic acid is one of the most often utilised natural antioxidants due to its potent antioxidant effect and nutritional value as vitamin C. The optimum quantity of ascorbic acid is used to stop the oils from oxidatively degrading. Sulphur is often called one of the building components of hair, and with good reason. Keratin, a durable protein with a high sulphur content, makes up our hair (Table 2).

Proteins (like keratin) require sulphur to retain their structure, which contributes to the general health, suppleness, and strength of hair. It has been demonstrated that sulphur lengthens the growth phase of your hair. Lastly, sulphur has been linked to the management, relief, and avoidance of folliculitis, eczema, psoriasis, and dandruff. The most prevalent phytochemicals that function as natural surfactants are called saponins. Natural saponins provide hair body and sheen, giving it a fuller, smoother, and silkier feel. In Curry leaves, Raghavan (1957); Kumar et al. (1999); and Ghosh et al. (2012) provided evidence in support of this study.

Table .2 Chemical analyses of curry leaves

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

Phytochemical quantification of methanol leaf extracts of *Murrayakoenigii*usingGC-MS

Peaks in the Murrayakoengiimethanolic extract's GC-MS chromatogram (Figure 1) indicated the presence of phytochemical substances. Table 3 lists the chemical components found in the methanolic extract of Murrayakoengii leaves. Peak 1-Methyl-pyrrolidine-2-carboxylic acid was detected by GC-MS analysis, and it registered the highest (69.00%) of all the compounds. Raskin et al. (2002) and Kole et al. (2009) examined the phytochemical content of Curry leaves. The current investigation demonstrated the existence of phytochemicals, which

are evident in the leaves. To identify and characterise the bioactive chemicals, more research is required.

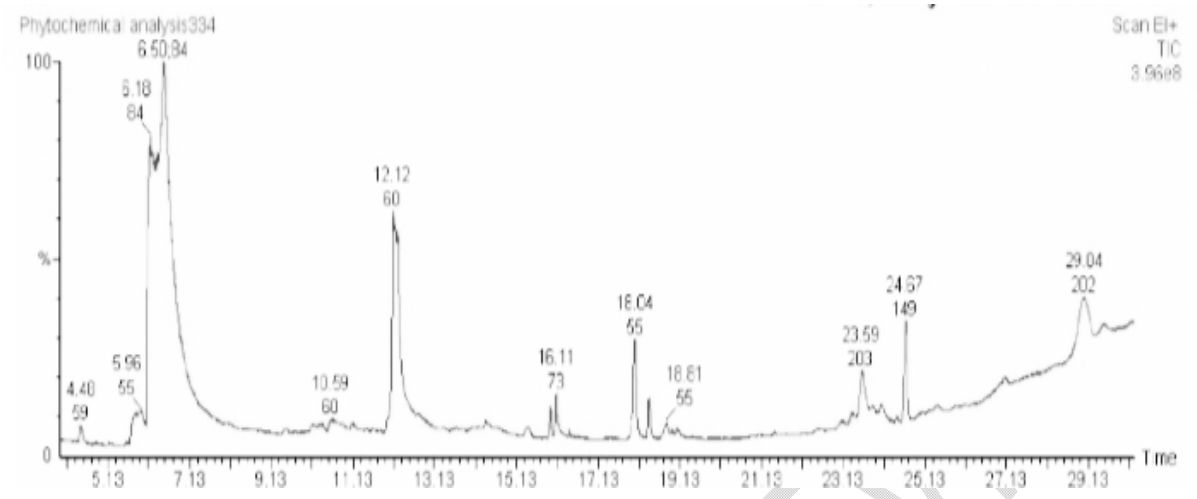

Fig 1. Phytochemical analysis of curry leaf sample using GCMS

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 information on "Standardising the recipe for the preparation of curry leaf hair oil" utilising curry leaves and its general quality was clarified with the help of the current study. Herbal hair oil is among the most well-known hair care products. Herbal hair oil helps treat damaged hair and scalp in addition to hydrating the scalp. It has a number of essential elements that promote healthy sebaceous gland function and promote organic hair growth. According to the findings, fresh Murrayakoenigii leaves contain phytochemicals that may be valuable in future

research aimed at creating hair oils that promote hair development and lessen hair loss. It is anticipated that the metabolites will have a great deal of potential for application in medicine because they are said to have several biological and therapeutic qualities. To pinpoint the precise mechanism of action, further research using pure fractions is necessary.

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