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# EXTRACTION, PHYTOCHEMICAL SCREENING AND ANTI-OXIDANT ACTIVITY OF MEDICINAL PLANT (*CURCUMA* CAESIA)

**Manshood Ahmad, Dr. Vivekanand Katare*[1], Mr. Shivam Nema[1], Mr. Prabhat Kumar Jain [2]**

[1]Vivekanand College of Pharmacy, Bhopal (M.P.), [2]Scan Research Laboratories, Bhopal (M.P.)

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**Abstract:**

*Herbal plants are generally defined as one year gramineous herbs with not any strict contexture. Because of unending advantages and their considerable benefits, plants with medicinal potentials are anticipated to be applied widely in human nutrition to improve not only the healthiness of human's body cells but also ensure the psychological health.* Curcuma caesia *Roxb. is a member of the family Zingiberaceae and popularly known as Kali haldi. In India it is found in West Bengal, Madhya Pradesh, Orissa, Chhattisgarh, and Uttar Pradesh states. It flourishes well in moist deciduous forest areas. Rhizomes of the plant are used for sprains and bruises and also employed in the preparation of cosmetics. This investigation is mainly focused on the extraction, phytochemical screening and in vitro anti-oxidant activity of Curcuma caesia. The yields were found to be (9.21% w/w of crude drug) of Hydroalcoholic extract Curcuma caesia roots. The results of phytochemical revels that the all polar and Methanolic and aqueous soluble compound was found to be present in Curcuma caesia extract. Antioxidant activity of the samples was calculated through DPPH assay. % inhibition was calculated as an indicative of antioxidant potency. The higher the % inhibition the better the activity. Ascorbic acid was taken as standard and the values were comparable with concentration ranging from 10 µg/ml to 100µg/ml.*

**Key Words:** *Curcuma caesia, Extraction, Phytochemical, Anti-oxidant activity.*

**Corresponding author:**

**Dr. Vivekanand Katare,**

*Vivekanand College of Pharmacy, Bhopal (M.P.)*

QR code

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## INTRODUCTION:

Plants with medicinal potentials and their secondary metabolites have been identified and applicated in dishes from the earliest annals of human habitancy; herbal medicine in ancient systems as well as advanced medicine has created one of the most important science bases for security in various lands of the mankind. For many of years, herbal plants have been used for distinct goals. Herbal plants are generally defined as one year gramineous herbs with not any strict contexture. Because of unending advantages and their considerable benefits, plants with medicinal potentials are anticipated to be applied widely in human nutrition to improve not only the healthiness of human's body cells but also ensure the psychological health [1].

Curcuma caesia Roxb. is a perennial, erect rhizomatous herb with large leaves. Fresh rhizomes are aromatic with intense camphoraceous odour, cultivated for its rhizomes, which are used in traditional medicine. The plant is reported to contain camphor, ar-turmerone, (Z)-ocimene, ar-curcumene, 1, 8-cineole, elemene, borneol, bornyl acetate and curcumene as the major constituents. The plant has been reported to have antifungal activity, anti-asthmatic, smooth muscle relaxant, antimicrobial activity, antioxidant activity, analgesic, locomotor depressant, anticonvulsant and muscle relaxant effects, anti-inflammatory properties. It is now considered as a valuable source of unique natural products for development of medicines against various diseases [2].

The role of free radical reactions in disease pathology is well established and is known to be involved in many acute and chronic disorders in human beings, such as diabetes, atherosclerosis, aging, immunosuppression and neurodegeneration. An imbalance between ROS and the inherent antioxidant capacity of the body, directed the use of dietary and /or medicinal supplements particularly during the disease attack. Studies on herbal plants, vegetables, and fruits have indicated the presence of antioxidants such as phenolics, flavonoids, tannins, and proanthocyanidins. The antioxidant contents of medicinal plants may contribute to the protection they offer from disease. The ingestion of natural antioxidants has been inversely associated with morbidity and mortality from degenerative disorders. Liver diseases remain a serious health problem. It is well known that free radicals cause cell damage through mechanisms of covalent binding and lipid peroxidation with subsequent tissue injury. Antioxidant agents of natural origin have attracted special interest because of their free radical scavenging abilities. The use of medicinal plants with high level of antioxidant constituents has been proposed as an effective therapeutic approach for hepatic damages [3,4].

## Experimental:

### Materials:

### Collection of plant materials:

The roots of *Curcuma caesia* were collected from Akshat Nursery, Bhopal in the period of March 2022, considering the seasonal conditions for obtaining maximum phytoconstituents.

### Extraction (By Maceration Method) [5]:

Collected plant drugs namely *Curcuma caesia* roots were cleaned properly and washed with distilled water to remove any kind of dust particles. Cleaned and dried plant drugs were converted into moderately coarse powder in hand grinder. Powdered plant drugs were weighed (50 gm) and packed in (1 liter) air tight glass Bottle. The plant drugs were subjected to extraction by Methanol+water (20:80) as solvent for about 24 hrs. The liquid extracts were collected in a tarred conical flask. The solvent removed from the extract by evaporation method using hot plate.

### Phytochemical Screening:

In order to detect the various constituents present in the Hydroalcoholic extract of roots of *Curcuma caesia*, were subjected to the phytochemical tests as per standard methods.

### Estimation of total flavonoids content:

The aluminum chloride colorimetric method was modified from the procedure reported by Woisky and Salatin. Quercetin was used to make the calibration curve. Ten milligrams of quercetin was dissolved in 80% ethanol and then diluted to 10 to 50 µg/mL. The diluted standard solutions (0.5 mL) were separately mixed with 1.5 mL of 95% ethanol, 0.1 mL of 10% aluminum chloride, 0.1 mL of 1M potassium acetate and 2.8 mL of distilled water. After incubation at room temperature for 30 min, the absorbance of the reaction mixture was measured at 415 nm with a Shimadzu spectrophotometer. The amount of 10% aluminum chloride was substituted by the same amount of distilled water in blank. Similarly, 0.5 mL of Hydroalcoholic extracts and Flavonoid standard solutions (100 ppm) were reacted with aluminum chloride for determination of Flavonoid content as described [6].

### Antioxidant Activity:

DPPH free radical scavenging assay DPPH scavenging activity was measured by modified method. DPPH scavenging activity was measured by

the spectrophotometer. Stock solution (6 mg in 100ml methanol) was prepared such that 1.5 ml of it in 1.5 ml of methanol gave an initial absorbance. Decrease in the absorbance in presence of sample extract at different concentration (10- 100 µg/ml) was noted after 15 minutes. 1.5 ml of DPPH solution was taken and volume made till 3 ml with methanol, absorbance was taken immediately at 517 nm for control reading. 1.5 ml of DPPH and 1.5 ml of the test sample of different concentration were put in a series of volumetric flasks and final volume was adjusted to 3 ml with methanol. Three test samples were taken and each processed similarly.

Finally the mean was taken. Absorbance at zero time was taken for each concentration. Final decrease in absorbance was noted of DPPH with the sample at different concentration after 15 minutes at 517 nm [7].

## RESULTS AND DISCUSSION:

The yields were found to be (9.21% w/w of crude drug) of Hydroalcoholic extract *Curcuma caesia* roots. Results of Phytochemical test showed the presence of Carbohydrates, Flavonoids, Proteins & Amino acids, Diterpenes and Saponins. Phenols and Alkaloid were found to absent in extract *Curcuma caesia*. Antioxidant activity of the samples was calculated through DPPH assay. % inhibition was calculated as an indicative of antioxidant potency. The higher the % inhibition the better the activity. Ascorbic acid was taken as standard and the values were comparable with concentration ranging from 10 µg/ml to 100µg/ml. A dose dependent activity with respect to concentration was observed Table 5.

**Table 1: Extractive values obtained from *Curcuma caesia***

| S.N. | Solvent | % Yield |
|---|---|---|
| 1. | Methanol+water (20:80) | 9.21% |

**Table 2: Preliminary phytochemical screening of *Curcuma caesia***

| S.N. | Phytoconstituents | Test Name | Hydroalcoholic Extract |
|---|---|---|---|
| 1 | Alkaloids | Wagner's Test | **-(ve)** |
| 2 | Carbohydrates | Fehling's Test | **+(ve)** |
| 3 | Flavonoids | Lead acetate | **+(ve)** |
| | | Alkaline reagent test | **+(ve)** |
| 4 | Proteins & Amino acids | Precipitation test | **+(ve)** |
| 5 | Phenols | Ferric chloride test | **-(ve)** |
| 6 | Diterpenes | Copper acetate test | **+(ve)** |
| 7 | Saponins | Foam test | **+(ve)** |

**Table 3: Absorbance of standard and Hydroalcoholic extract of *Curcuma caesia***

| S. No | Concentration of Quercetin (µg/ml) | Mean absorbance |
|---|---|---|
| 1 | 5 | 0.415 |
| 2 | 10 | 0.428 |
| 3 | 15 | 0.514 |
| 4 | 20 | 0.536 |
| 5 | 25 | 0.548 |

n=3, values are given in SEM

**Table 4: Total Flavonoid content of Hydroalcoholic extract *Curcuma caesia***

| S. N. | Extracts 100µg/ml | Flavonoid content Quercetin equivalent mg/100mg |
|---|---|---|
| 1 | Hydroalcoholic extract (100µg/ml) | 0.165 |

n=3, values are given in SEM

**Table 5: % Inhibition of Hydroalcoholic extract of *Curcuma caesia* using DPPH method**

| S. No. | Concentration (µg/ml) | Ascorbic acid % Inhibition | Hydroalcoholic extract (*Curcuma caesia*) |
|---|---|---|---|
| 1 | 10 | 42.74 | 12.56 |
| 2 | 20 | 47.85 | 20.34 |
| 3 | 40 | 67.54 | 24.98 |
| 4 | 60 | 70.79 | 29.63 |
| 5 | 80 | 78.25 | 30.87 |
| 6 | 100 | 88.41 | 42.51 |
| | **IC 50 value** | **19.34 µg/ml** | **133.97µg/ml** |

## CONCLUSION:

The results of the phytochemical test indicated the presence of Diterpenes, proteins and amino acids, flavonoids, and carbohydrates. *Curcuma caesia* extract was discovered to be devoid of Phenols and phenolic compounds. The Phenols and flavonoids are present in higher amount in the extract .This plant was also subjected to in vitro antioxidant activity, which demonstrated the existence of antioxidants needed to combat free radicals. In order to treat many diseases and ailments, this plant portion can be used.

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