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Review on Multipotential Medicinal Plant *Murraya koenigii* [Linn. Spreng]

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Abstract

Murraya Koenigii commonly known as curry patta tree which have been shown antidepressant activity. Stress plays a big role in developing the neuropsychiatric diseses including depression.

This present study which aimed to examine the effects of murraya koenigii extract in animal models of depression.

The effect of increased doses of murraya koenigii extract was evaluated on Forced Swim Test [FST] and Tail Suspension Test [TST] as comparision to control groups in experimental animal mice [swiss albino mice].

In FST, MK 400 reduced the time duration of immobility from 145.2±29 to91±17. 2* which was significant, and on TST, MK produced dose dependant decrese in immobility, it was significant only with MK400.

Murraya koenigii extrat reduced the despair behavior and which suggesting as antidepressant like activity.

Keyword- Murraya Koenigii, Depression.

1. INTRODUCTION

Plants have been used as medicines for thousands of years all over the world. According to WHO (World Health Organization), 80% of the population, mostly in developing countries still rely on plant-based medicines for their primary health care. In India, the different systems of medicinal usage like Ayurveda, Siddha, Unani, Amchi and local health traditions, focuses on the use of plant products for the treatment of human and animal diseases.[1] *Murraya koenigii*, which commonly known as *curry* leaf or *kari patta* in India, belong to Family Rutaceae which also represent more than 1600 species and 150 genera. Murraya Koenigii is a highly valuable plant for its characteristic ordour aroma and medicinal values.[1,2] It is an important export commodity from India as it fetches good foreign revenue. Numerous chemical constituents as Grinimbine, Murrayazoline**,** Mahanine, Mahanimbine[8] which present in curry plant and have been extracted.Medicinal plants contain a number of biologically active compounds which are very helpful in the treatment of various diseases and in improving human lives[7]. It is also a good source of anti-infective agents, they are very cost-effective and having less side effects.[13] It have various life sustaining constituents in plants which has ever encouraged the scientists to carry out investigations on herbal plants for finding new therapeutic agents for biomedicine.[2]

Plant Description

Tree is a semi-deciduous, unarmed aromatic small spreading shrub or tree as strong woody stem, stem which is dark green to brownish in colour. The tree is 4.2–8.6 m (14–31 feet) tall, with a trunk up to 81.2 cm diameter. The diameter of the main stem is approximate 16-17 cm. **Stem and Bark** areBrown to dark green, the main stem is 16 cm up to 6 meters in height and 15 to 40 cm in diameter.[6] The stem has dots on the bark like small node.**Curry leaves** are Aromatic in nature, Leaves of curry leaves are shiny and smooth undersides are paler. Leaves are pinnate, exstipulate, reticulate and have ovate lanceolate with an oblique base, with 11-22 leaflets and the size is each leaflet is 0.80–1.56 inch in length and 0.38–0.78 inch broad.The flowers of curry leaves is-Small, white fragrant and funnel-shaped.The Curry tree **flowers** have a sweet fragrance, black berries in small size with shiny appearance. **The fruits are** in the subglobose and smaller in size in the spinach green colour seed in one or two number which are enclosing each other in the thin pericarp[1]. The fruits are 1 .2 to 1.3 cm in the diameter with length 1.3 to 1.5 cm, purple black after ripening and they are edible.[5]

Fig 1:1 Curry Tree

Fig 1:2 Bark And Stem

Various Names

English	Kannada	Hindi	Tamil	Malayalam	Marathi	Sanskrit
Curryleaves	Karibevu	Karipatta, Mithanim	Kariveppilai	Kariveppu	Kadhilimb	Girinimba

Fig 1: 3 Curry Leaves

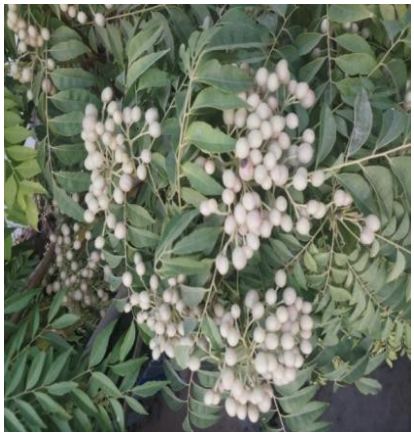

Fig 1: 4 Curry Seeds

Taxonomical Classification

Kingdom: Plantae Subkingdom: Tracheobionta Division: Magnoliophyta Class: Magnoliopsida Subclass: Rosidae Order: Sapindales Family: Rutaceae Genus: Murraya Species: koenigii[5]

Traditional Uses

Fresh leaves, dried leaf powder, and essential oil are widely used for flavouring soups, curries, fish and meat dishes, eggs dishes. The essential oilof curry leaves is also utilized by soap and cosmetic aromatherapy industry.[4] Curry leaves which are boiled with coconut oil till they are reduced to blanked residue which is then used as an excellent hair tonic for retaining natural hair tone and stimulating hair growth.[3]

2. Method And Preparation

Chemicals

All the chemical used like KOH, Phenolphthalein indicator, HCl, carbon tetrachloride, potassium Iodide, sodium thiosulphate, starch, Folin-Ciocalteus reagent, gallicacid, tannic acid, rutin, were of analytical grade and purchased commercially from S D Fine,Mumbai.

Plant Material

The dried leaves of *Murraya Koenigii* were plucked from the curry tree from house at Lucknow, UP, India. The leavesare authenticated by a taxonomist from CSIR-NBRI Lab, Lucknow. A voucher specimen no (NBRI/CIF/593/2018) and Specification [NBRI-SOP-202] has been submitted.

Soxhlet Extraction Procedure

The shade dried leaves screened for any impurities and dried in shade. Dried leaves were grind to coarse powder using an electric grinder, sheaved (80 meshes) and stored in air tight jars until use. The dried powdered leaves were extracted by Soxhlet apparatus[8] using petroleum ether, Chloroform, Acetone, Methanol, and Ethanol successively. Each extract was then concentrated using rotary vacuum evaporator at 40- 50^0 C under vacuum and dried residue was collected and stored in refrigerator for further experimentation In preparation of extract by soxhlet[9],need some solvents with their increasing polarity .the solvents which are used is given as petroleum ether, Chloroform, Acetone, Methanol, and thenEthanol.

Procedure

Requirements: solvents (petroleum ether, chloroform, acetone, ethanol, metanol); dried powdered leaves of 'Murraya Koenigii.Firstly weighs 20 gm. Thedreied leaf powder of 'Murraya Koenigii'. About 20gm drug is filled in apparatus and extracted with solvents by increasing their polarity.This extraction process takes 6 hrs pereach solvents extraction. The solvents is evaporated under reduced pressure and, The final extract thus obtained and stored in air tight bottles.These five determinations is carried out for each parameter. Result is given in table 1,2.

Phytochemical Evaluation Of Curry Leaf

Petroleum ether, chloroform, acetone, ethanol, metanol extracts of Murraya koenigii leaves will be screened for following phytocontituents class. The method for the preliminary phytochemical screening was carried away as per Pharmacognocy C. K. kokate[9]. The result of phytochemical evaluation is given in table 3.

Thin Layer Chromatography

TLC plates were prepared by using silica gel G, and were left for air drying. These Plates were activated by hot air drying in hot air oven at 100^0 C for 1 hr. Extracts

from different solvents was spotted on TLC plates. The plates were dried and developed in suitable solvents for rapid screening. The plates were run in the following solvent system and dried at room temperature. Detection of TLC plate was done by Iodine chamber and UV chamber. Rf value of different spots available is calculated by using formula[9]:

Rf value = Distance travelled by the solute / Distance travelled by the solvent

The solent which used in TLC used as their polarity successively the ratio of polar is 5:5[methanol : hexane], 7: 3[methanol : hexane], 9: 1[methanol : hexane] and the ratio for non- polar is5:5[hexane : methanol], 7: 3[hexane : methanol], 9: 1[hexane : methanol]and The result of Thin Layer Chromatography is given in table4.

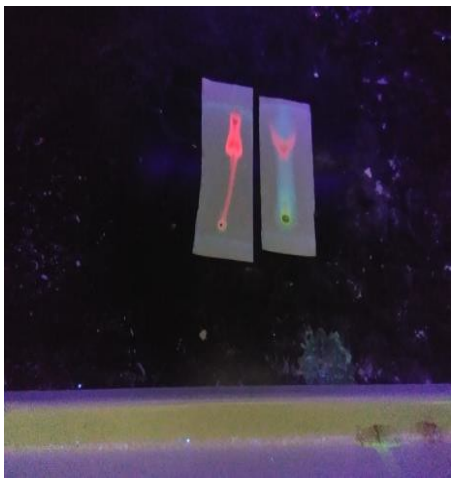

Fig 2:1 Solvent Runs In Tlc Plate

Physiochemical Studies

The physiochemical studies parameters in, petroleum ethere extract [saonification value] and methanol extract were determined using methods reported in AOAC 1990.[10]result on table 5.

Antioxident Activity

The estimation of Total Phenolic Content, the estimation of total flavonoid content[19] and the estimation of tannin content, which is expressed in terms of mg gallic acid equivalent/g, mg rutin equivalent/g, and also mg tannic acid equivalent/g, these all based on the calibration standards curves that is gallic acid, rutin and tannic acid.[17]

Experimental Animal

Mice (Swiss Albino Mice) is used for the study of either sex weighed between 25 to 30 gm. which was taken for the study. Swiss Albino mice were housed in central animal house of the institution under the standard laboratory condition and kept under proper diet and water. Total 60 mice of male sex used for the study, the test of depression were on different five groups (n=6/ group) of swiss albino mice.[14]The vehicle / drug, standard and three test groups were orally administered distilled water (10 ml/kg).Fluoxetine (25 mg/kg), and increase doses of 200, 300 and also 400 mg of *Murraya koenigii* extract respectively, one hour before to the experiments started. For Group 1:Control: Vehicle of Murraya koenigii, (Distilled water) (10ml/kg, p.o.) – [DW], Group 2: Standard drug: Fluoxetine (20 mg/kg, p.o) for anti-depressant activity, Group 3: Murraya koenigii (200 mg/kg, p.o.) - [MK 200], Group 4: Murraya koenigii (300 mg/kg, p.o.) - [MK 300], Group5: Murraya koenigii (400 mg/kg, p.o.) - [MK 400].[16]

Experimental Models for Depression Forced Swim Test

Each animal was placed inside a vertical plexiglass cylinder approx hight40 cm in height and 18 cm in diameter, the cylinder containing water up to a height level of 15 cm maintained at 24 – 25°C. During the test, each animal was placed in the water for 6 min. then after the duration of immobility was recorded during the last four minutes of the forced swim test.[16]

The Tail Suspension Test

On the bases of this test, each experimental animal was suspended from the edge of a 58 - 60cm high table top with the help of an adhesive tape placed approximately 1 cm from the tip of the tail. Then after the duration of immobility [motionless] was recorded for a period of 5 minutes.[15.16]

Drug Treatment

Fluoxetine, 20 mg/kg reduced the duration of immobility in forced swim test from 145.2 ± 29 in the case of vehicle to 82±23, which is a statistically significant reduction. MK400 also reduced the duration of immobility to 91±17. 2 as compared to vehicle control that were again statistically significant reductions.Fluoxetine, 20 mg/kg reduced the duration of immobility in the tail suspension test from 192.5±9.5 in the case of vehicle to 76.5±24, which is a statistically significant. MK also produced a dose-dependent decrease in the duration of immobility; however, it was statistically significant only in the case of MK400 (123±17.4).[16]The result is given in table 7.

3. RESULT

Phytochemical screening of murraya koenigii shows presence of constituents like alkaloids, glycosides, tannins, proteins, amino acids and flavonoids. After that physicochemical screening studies shows that oil contents which contain iodine value, acid value, saponification ,ash value and moisture content were 116.51mgKOH/g, 9.537n/w, 183mg/100gm, 5.5%, 1.50% respectively.Total phenolics(mg gallic acid equivalent/g) 10.79±3.2, Total flavonoid(mg rutin equivalent/g) 56.115±4.6, Total tannin(mg tannic acid equivalent/g) 19.4±0.40 in methanolic extract.

Table-1 Extractive values

S.N.	Parameters	Petroleum Ether	Chloroform	Acetone	Ethanol	Methanol
1.	Vol. of solvent used (ml.)	200	200	200	200	200
2.	Wt. of dried powder (gm.)	20	20	20	20	20
3.	Wt. of solventextract (gm.)	17.64	14.08	8.72	18.68	18.96
4.	Extractive value (%)	88.2	70.4	43.6	93.4	94.8

Table - 2 Extract Characteristic

Types ofsolvent	Consistency	Color
Petroleum ether	Oily	Dark brown
Acetone	sticky	Dark green
Chloroform	Pasty	Light green
Methanol	Pasty	Yellowish
Ethanol	Pasty	Light brown

Table -3 Phyto-chemical Screening Result

A. ALKALOIDS-

Plant constituents test/reagent used	Petroleum ether	Chloroform	Acetone	Ethanol	Methanol
Meyer's reagent	+	+	+	+	+
Dragendroff's reagent	_	_	+	+	+
Wagner's reagent	+	_	+	+	+
Hager's reagent	_	_	+	+	+

B. TEST FOR CARBOHYDRETES-

Test	Pt. ether	chloroform	acetone	ethanol	Methanol
Molisch's Test	+	+	_	_	+
Barfoed's Test	_	+	_	_	+

C. TEST FOR AMINO ACIDS-

Test	Pt. ether	chloroform	acetone	ethanol	Methanol
Millon's	+	_	_	+	+
Ninhydrine	_	+	+	+	_

D. TEST FOR FLAVONOIDS-

Test	Pt. ether	chloroform	acetone	ethanol	Methanol
Alkaline reagent test	+	+	_	+	+
Zinc hydrochloride test	_	_	_	_	_

E. TEST FOR ANTHRAQUINONE GLYCOSIDES-

Test	Pt. ether	chloroform	acetone	ethanol	Methanol
Test for hydroxy	+	_	_	+	+
Bronteager's test	_	_		+	+

F. TEST FOR CARDIAC GLYCOSIDES-

Test	Pt. ether	chloroform	acetone	ethanol	Methanol
Baljets test	+	_	+	+	+
Raymond's test	_	_	_	+	-
Legal's	_	_	_	+	+

G. TEST FOR SAPONIN GLYCOSIDES-

Test	Pt. ether	chloroform	acetone	ethanol	Methanol
Forth formation test	+	+	_	+	+
Haemolysis test	_	_	_	_	_

H. TEST FOR TANNINS (PHENOL COMPOUNDS)-

Test	Pt. ether	chloroform	acetone	ethanol	Methanol
Ferric chloride test	_	_	+	_	_

I. TEST FOR FATS & FIXED OILS-

Test	Pt. ether	chloroform	acetone	ethanol	Methanol
Test for fats and oils	+	_	+	_	_

+ mean present, -mean absent

Table - 4TLC Studies (Calculation of Rf Value)

EXTRACT	NON POLAR							POLAR					
	MPA			MPB		MPC		MPA		MPB		MPC	
	S. n.	Sp .N.	RF V.	Sp. N.	RF V.	Sp. N.	RF V.	Sp. N.	RF V.	Sp. N.	RF V.	Sp. N.	RF V.
Petroleum Ether	I	1	0.72	1	0.60	1	0.38	1	0.70	1	0.35	1	0.32
Chloroform	II	2	0.88 0.21	2	0.82 0.34	3	0.86 0.55 0.11	2	0.94 0.22	2	0.97 0.69	1	0.90
Acetone	III	3	0.92 0.38 o.19	2	0.96 0.28	2	0.98 0.34	1	0.76	2	0.62 0.33	1	0.89
Ethanol	IV	2	0.80 0.52	3	0.85 0.50 0.21	2	0.63 0.59	2	0.58 0.26	1	0.61	2	0.59 0.53
Methanol	V.	2	0.5 0.26	1	0.82	2	0.63 0.27	1	0.82	3	0.81 0.63 0.40	2	0.62 0.39

Table-5Physico - chemical Parameter

S. No	Physico chemicalParameter	Value [UNIT]
1	Iodine value	116.51mgKOH/g
2	Acid value	9.537n/w
3	Saponification value	183mg/100gm
4	Ash value	5.5%
5	Moisture content	1.50%
6	State of oil	liquid
7	Colour of oil	yellow

Table -6 chlorophyll content

Wavelength	Absorbance
645	0.142
663	0.250
652	0.124

Chlorophyll content A	Chlorophyll content B	Total chlorophyll content
0.279	0.208	0.487

Table -7 Experimental dataresult

TREATMENT	FST(SEC)*	TST(SEC)*
DW	145.2±29	192.5±9.5
FLUXETINE 20 MG/KG	82±23*	76.5±24**
MK 200	158±16.6	177.6±10.7
MK300	122.5±30.7	146±0
MK400	91±17. 2*	123±17.4*

DW distilled water, FST: forced swim test, TST: tail suspensiontest.

*Duration of immobility in seconds,*P<0.05 AND **P<0.01.MK: murraya koenigii,

4. Discussion And Conclusion

At the modern time, Neuropshychiatric disease is common in man. Neuropshychiatric disease is a type of depression which is more prevalent. The forced swim test and Tail suspension test both are the antidepressants models.oral administration of Murraya Koenigii extract [group 200, 300, 400] significantly reduced the immobility as p< 0.05 and P<0.01.hydroalcohlic extract of Murraya koenigii have potentially antidepressant action and both models as FST and TST prove the antidepressantactivity.

At the end, conclusion is that Murraya koenigiileaves extract shows antidepressant effent on comparision to fluoxetine in experimental models.

References

1- Gahlawat D.K.; Jakhar S.; Dahiya S.; "Murraya Koenigii [L.]Spreng: An Ethnobotonical review." Journal of Pharmacognosy and Phytochemistry; 3[3], 2014.

2- Dhongade H.; Sawarkar H.; Muley B.; Deshmukh V.; Pande A.; "Therapeutic Potentials of Murraya koenigii Spreng [Rutaceae]; Indo American Journal of Pharmaceutical Research; vol -3, issue-9, 2013.

3- Handral H.K, Jha P.K, Shruthi S.D., Pharmacognostic and phytochemical studies on the leaves of Murraya koenigii (L) Spreng, Pharmacophore., 2010, 1(3), 231-238.

4- Jain V.; Momin M.; Laddha K.; "Murraya Koenigii an updated review." International journal of Ayurvedic and Herbal Medicine, 2[4], aug. 2013.

5- Nishan M.; Subramanyam P.; "Murraya Koenigii [Curry Leaves]-A Review on its Multipotental; International Journal of PharmTech Research; vol -7,no.- 4, 2014-2015.

6- Ajay S, Rahul S, Sumit G, Paras M, Mishra A, Gaurav A., Comprehensive review: Murraya koenigii Linn, Asian Journal of

Pharmacy and Life Sciences., 2011, 1(4), 417-425.
7- Bhandari, P. R. (2012). Curry leaf (Murraya Koenigii) or cure leaf: Review of its curative properties. Journal of Medical Nutrion& Nutraceuticals, 1:92-97.
8- Rana VS, Juyal JP, Rashmi, Blazquez MA. Chemical constituents of the volatile oil of Murraya koenigii leaves. Int J Aromather, 2004; 14(1): 23-25.
9- Kokate C. K. "*Practical Pharmacognosy*"; Vallabh Prakashan;108-109. 2008.
10- AOAC (1990). Official Methods of Analysis (15th Ed.). Washington, VA: Association of Official Analytical Chemists..
11- Samritifaujdaretal, "Total Phenolic Content Estimation of murraya koenigii by Colorimetry; "International Journal of research and Development in Pharmacy and life sciences",vol-2, 2012.
12- Balamurugan S; et al, Pharmacognostical evaluation of Murraya Koenigii (l.) Spreng; "International Letters of Natural Sciences".
13- Saini et al, A review on Curry leaves[Murraya koenigii]: Versatile Multipotential medicinal plant; American Journal of phytomedicine and chemical therapeutics,ISSN-2321-2748.
14- Sharma S.; Handu S; et al " Anti-anxiety and antidepressant like effects of Murraya koenigii in E xperimental models of anxiety and depression."Anc. Sci. Life 2017, apr-june;36(4)215- 219.
15- Prasad K.D; Harshaa S.N; et al; "Evaluation of Antidepressant activity of Murraya Koenigii Leaf Extract in Mice" Journal of pharmaceutical and Biological Research,2013,Vol-1(1)
16- SharmA.S; Handu.S; et al, "Anti-anxiety and Anti-depressant Like Effects of *Murraya koenigii* in Experimental Models of Anxiety and Depression"AncSci Life. 2017 Apr-Jun; 36(4): 215–219.
17- Charoonratana T. et al. Screening of antioxidant activity and total phenolic content in *Raphanussativus* pod; Int J PharmPharmSci, Vol 6, Issue 8, 224-226;2014.
18- Dixit A. et al.Estimation of antioxidant and antibacterial activity of crude extracts of Thevetiaperuviana (pers.) k. schum; Int J PharmPharmSci, Vol 7, Issue 2, 55-59;2015.
19- Ordon, Ez, AAL., Gomez, JD., Vattuone, MA., Isla, MI., Antioxidant activities of Sechiumedule (Jacq.) Swart extracts, Food Chem. 97, 452-458; 2006.