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Assessment of Quality of Curry Leaves (*Murraya koenigii*)

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ABSTRACT: *Murraya koenigii is a valuable medicinal plant which has been used in traditional system of medicine since long time. The extraction of active ingredients such as alkaloids, flavonoids, triterpenes, steroids etc. from the plant facilitates pharmacological studies. The present investigation is to evaluate the proper taxomic status and preliminary phyto-chemical characters as well as physicochemical standards and thin layer chromatographic analysis of the leaves of Murraya koenigii.*

KEY WORDS: *Curry leaves, Murraya koenigii, Phytochemical, Physicochemical parameters*

I. INTRODUCTION

Knowledge of plants and healing has been closely linked from the time of man's earliest social and culture grouping. Besides medicine, mankind is almost completely dependent on plants for requirements such as food, shelter and clothing. Therefore, one of the biggest myths attending the use of herbs today is the idea that because something is "natural", it is completely safe. This is dangerous notion because some of the drugs that are available from plants are very toxic in natural state. So, the use of herbal medicine however, can be made relevant and popular after evaluating them for their quality, safety and efficacy (WHO, 1991). The therapeutic activity of herbs is because of various constituents present in them. The therapeutic effects of herbal products is inconsistent and varies because the chemical constituents vary; they depend on various factors and one of them is the source. In some plants toxic constituents are also present therefore it is essential to evaluate their quality, safety and efficacy. Correct Identification and quality assurance of the starting material is, therefore an essential prerequisite to ensure reproducible quality of herbal medicine, which contributes to its safety and efficacy (Joshi et al., 2004). The present work is aimed at the pharmacognostical and phytochemical analysis of Curry leave.

II. MATERIALS AND METHODS

Plant Collection:

Fresh leaves of *Murraya koenigii* were collected in the month of August 2011, from Himalaya's/ Herbal Research and Development Institute (HRDI),Selaqui-Dehradun (UK). The authenticity of the plant was confirmed by comparing their morphological characters with the description in books (Anjaria et al., 2010). Besides, the identity of the plant was also confirmed by Dr. GBS Reddy, Department of R&D chemistry. for further confirmation, the microscopic characteristics of this plant was studied and compared with available literature. The fresh plant material collected was thoroughly cleaned by washing under running tap water and air-dried in shade for seven days. It was then homogenized to fine powder and stored in air-tight bottles for further studies.

Preparation of Plant Extracts*:*

Extraction:

Ten grams of dried leave powder of *Murraya koenigii* was successively extracted by Soxhlet extraction method using three solvents with increasing polarity viz. petroleum ether, acetone and methanol. The solvent was evaporated under reduced pressure and the extract thus obtained was stored in air-tight bottles at 4ºC for further experiments. Three determinations were carried out for each parameter.

Determination of loss on drying

The loss on drying was determined by weighing 2 g of crude powder of Murraya koenigii in an evaporating dish and then dried in an oven at 105ºC till constant weight was obtained. The weight after drying was noted and loss on drying was calculated. The percentage was calculated on the basis of sample taken initially.

Determination of total ash

The total ash value of crude powder of *Murraya koenigii* (MCR) was determined by incinerating 1 g of accurately weighed crude powder in a tarred silica crucible. It was incinerated in a muffle furnace at a temperature not exceeding 450ºC until free from carbon, then cooled and weighed.

Determination of acid insoluble ash

The total ash obtained was boiled for 5 min with 25 ml dilute HCl. The insoluble matter was collected on the filter paper placed in a Gooch crucible, washed with water and heated till the constant weight was obtained. The percentage of acid insoluble ash was calculated with reference to the sample taken initially.

Determination of solubility

The qualitative solubility test of the different extracts of *Murraya koenigii* (MPE, MAC, and MME) was determined for different solvents with different polarities.

Determination of melting point

The melting point of the crude powder and different extracts of *Murraya koenigii* (MCR, MPE, MAC, and MME) were taken help from Samarth Analytical Laboratory, Nasik (MH) India, by open capillary method (Apparao etal., 1971; Sukhwal et al., 1995).

Determination of pH

The crude powder of *Murraya koenigii* and its different extracts (MCR, MPE, MAC, and MME) were dissolved in distilled water and were kept in water bath for 20 min. It was then filtered and then pH of the filtrate was noted down with the help of pH meter.

Determination of heavy metals

Contamination of medicinal plant materials with heavy metals can be attributed to many cases including environmental pollution and traces of pesticides. Therefore, detection of heavy metals is important for herbal drugs. The analysis for heavy metals like arsenic, chromium, cobalt, lead, mercury and nickel for crude powder and different extracts of Murraya koenigii (MCR, MPE, MAC, and MME) were taken help from Samarth Analytical Laboratory, Nasik (MH) India.

III. RESULTS AND DISCUSSION

The results of melting point and pH of the crude powder and different extracts of Curry Leaves (*Murraya Koenigii*) are shown in Table 1. The melting point of crude powder (MCR), acetone extract (MAC) and methanol extract (MME) was < 300°C and that of petroleum ether extract (MPE) was 206-210°C. All the samples were acidic in nature. The methanol extract (MME) was the most acidic in nature. Determination of heavy metals in crude powder and different extracts of Curry Leaves (*Murraya koenigii*) MCR: Crude powder, MPE: Petroleum ether extract, MAC: Acetone extract, MME: Methanol extract, NDT: Not detected The presence of heavy metals in the medicinal plants exceeding certain limit tends to cause a health hazard. Thus, the crude leave powder of Curry leaves and its extracts (MPE, MAC and MME) were analysed for the presence of heavy metals. The results showed that lead, chromium and nickel were not present in any of the sample drugs; mercury and cobalt was present in all the four sample drugs with varying values. The presence of arsenic was present only in two sample drugs (MPE and MAC). The crude drug contained 0.071 ppm mercury and 2.07 ppm cobalt; MPE had 0.09 ppm mercury, 2.36 ppm cobalt and 0.045 ppm arsenic; MAC had 0.046 ppm mercury, 2.12 ppm cobalt and 0.027 ppm arsenic and MME had 0.094 ppm mercury and 2.02 ppm cobalt. Although, there was minor presence of some heavy metals but the extracts did not exceed the limit given according to the WHO guidelines (1991). Therefore, the sample drugs investigated were free from heavy metal contamination. MCR 0.071 NDT 2.07 NDT MPE 0.09 NDT 2.36 0.045 NDT MAC 0.046 NDT 2.12 0.027 NDT, MME 0.094 NDT 2.02 NDT, Plant extract Heavy Metals (ppm) Mercury(Hg), Chromium(Cr), Cobalt(Co), Arsenic(As),Nickel(Ni), Lead(Pb)

IV. CONCLUSION

From the present study, it can be concluded that crude powder (MCR) of Curry Leaves (*Murraya koenigii*) leave was dark green in color with characteristic odour and tasteless. The extractive yield of MPE, MAC and MME was 5.60 %, 8.07 % and 13.05 % respectively. The crude powder and different extracts of Curry Leaves (*Murraya koenigii*) leave (MCR, MPE, MAC and MME) were free from heavy metal and microbial contamination. All the four sample drugs were acidic in nature. MPE, MAC and MME were maximally soluble in polar solvents. All the sample drugs (MCR, MPE, MAC and MME) possessed maximum amount of Conclusions Peak Max Rf Area (%) Peak Max Rf Area cardiac glycosides and steroids while they were totally devoid of flavonoids. Except MPE, all the other sample drugs contained tannins and saponins. Alkaloids were present in all sample drugs with varying degree. The HPTLC fingerprinting showed maximum 13 peaks for MAC, followed by 12 peaks for MME and 7 peaks for MPE. Hence, the determination of pharmacognostical and phytochemical profile of Curry Leaves (*Murraya koenigii*) leave authenticates the

further usage of this plant material for evaluating safety and efficacy. This qualitative and quantitative approach to understand the plant *Murraya koenigii*, does help in better identification, taxonomical position and medicinal importance of this unused multi valuable traditional herb in depth. The adulterants in drug obtained from *Murraya koenigii* can be identified by this investigation and ensure the proper use of this plant in pharmaceutical field.

V. ACKNOWLEDGEMENT

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Table 1 Quality control parameters of *Murraya koenigii*

Sr. No.	Particulars	Values
1	pH	6.3 -6.4
2	Ash values	
i	Total ash	4.06 ± 0.05
ii	Water soluble ash	1.0 ± 0.05
ii	Acid insoluble ash	1.24 ± 0.11
3	Extractive values	
i	Petroleum ether (60-80oC)	5.60 ± 0.15
ii	Chloroform	8.07 ± 0.05
iii	Ethanol (90%)	13.05 ± 0.15
iv	Aqueous	16.05 ± 0.15
4	Loss on drying	10.06 ± 0.15
5	Crude fiber content	70.25 ± 0.15

Table 2 Determination of curry leaves solubility of different extracts

Solvent	Solubility		
	MPE	MAC	MME
Hexane	++	+	+
Heptane	++	+	+
Benzene	+++	++	++
Diethyl ether	++	+++	++
Petroleum ether	++	+	+
1-4 diozxan	++	+++	++
Tetrahydrofuran	-	++	+++
Ethyl acetate	++	++	++
Chloroform	+++	++	++
Acetone	++	++	++
Dimethylformadmide	+	+++	+++
Dimethylsulphoxide	++	+++	+++
Dimethylsulphoxide	++	+++	+++
1-Butanol	++	++	++
1-Propanol	++	+++	+++
Acetic acid	++	++	++
Ethanol	++	+++	+++
Methanol	+	+++	+++
2-Methoxy ethanol	++	+++	+++
Triacetin	+	+	+
Toluene	-	++	+++
Distilled water	-	+	+
Tap Water	-	++	++
2-Methyl Propanol	++	++	+
Dicloromethane	+++	++	++
Amyl alcohol	++	++	+
Benzyl alcohol	++	+++	++
Benzaldehyde	+++	+++	++
Orthophosphoric acid	+	++	+++
Formic acid	++	+++	+++

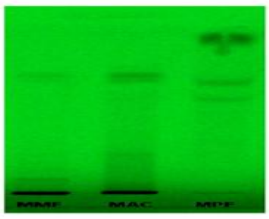
(-): No presence, (+): Less presence, (++): Moderate Presence,(+++): High presence, MCR: Crude powder, MPE: Petroleum ether extract, MAC: Acetone extract, MME: Methanol Extract,

Table 3 Phytochemical Tests

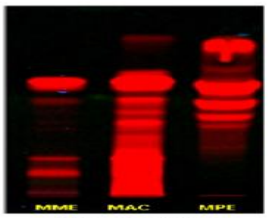
Phytochemical tests	**CURRY LEAVES EXTRACTS**			
	MCR	**MPE**	**MAC**	**MME**
Alkalodids				
Dragondroffs test	+	+	-	-
Mayers test	++	-	-	+
Wangners test	+++	+	+++	+++
Flaconoids				
Shinoda test	-	-	-	-
Saponins				
Frothing test	+	-	+++	++
Tannins				
Fecl3 test	+++	-	+++	+++
Steroids				
Liebermann-Burchard reaction	+++	+++	+++	+++
Cardiac Glycosides				
Keller-Kilianni test	+++	+++	+++	+++

(-): No presence, (+): Less presence, (++): Moderate Presence,(+++): High presence, MCR: Crude powder, MPE: Petroleum ether extract, MAC: Acetone extract, MME: Methanol Extract,
Common in MPE and MME. the Constituents can be further isolated and purified to find its potency for biological activities.

THIN LAYER CHROMATOGRAPHY



TLC AT 254nm



TLC AT 366nm

FIGURE 3.4 Thin layer chromatography (TLC)

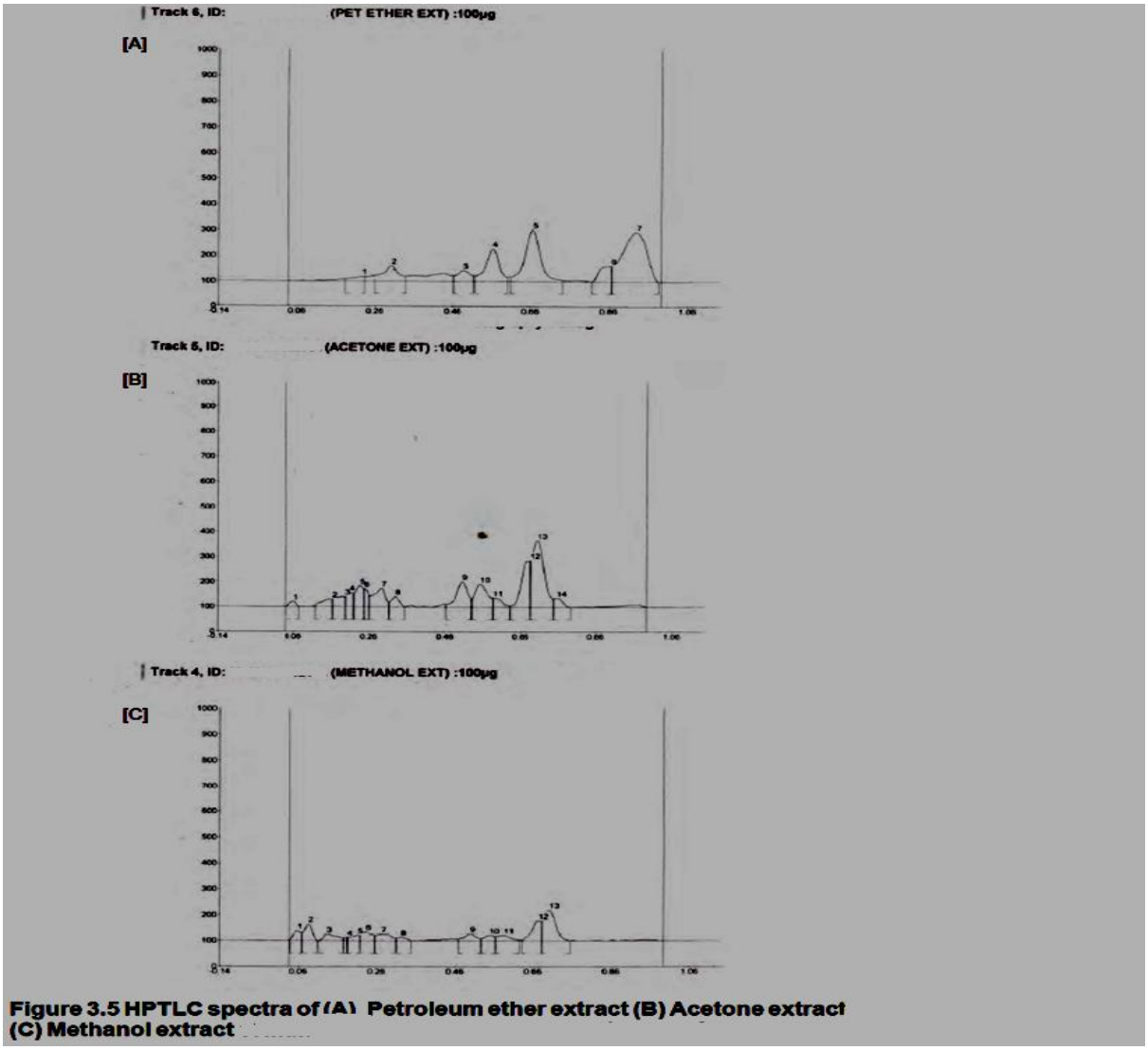


Figure 3.5 HPTLC spectra of (A) Petroleum ether extract (B) Acetone extract (C) Methanol extract