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PHYTOCHEMICAL ANALYSIS OF SELECTED WOUND HEALING MEDICINAL PLANTS

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ABSTRACT: In the present study, pharmacognostical, qualitative and quantitative phytochemical analysis of *Azardirachta indica, Cassia auriculata, Moringa oleifera* and *Curcuma longa* was done. The results showed the presence of various vital secondary metabolites. Primary metabolites was found to be more in *Cassia auriculata* whereas the secondary metabolites content was higher in *Azardirachta indica*. In the selected plants, the alkaloid content was found to be high followed by flavonids, proline. This proves that, the selected plants posses good medicinal property and can be recommended for treatment of diseases.

INTRODUCTION: Traditional systems of medicine (Ayurveda, Siddha and Unani) are well established in India and are widely acknowledged to be effective and safe without any side effects [1]. India is rich in ethnic diversity and traditional knowledge that has resulted in a considerable body of ethnobotanical research. There are over 537 different aboriginal groups in India with widespread knowledge of plants. Traditional system of medicines has been in use over thousands of years in India. Significant contributions have been made by its practitioners particularly the primary health care providers at the community level. Folk healers (Nattu Vaidhiyars) in remote places use local flora for treating and preventing ailments and are generally considered as healthcare resource in rural places inaccessible to modern health care services.

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More than 70% of wound healing pharma products are of plant based, 20% are mineral based and the remaining contain animal products as their base material. The plant based materials are used as first aid, antiseptic, coagulants, wound wash, for infected wounds. However, only few investigations have been made to assess the wound healing properties plants used by tribal people. Hence, a systematic and scientific validation of these traditional medicinal plant is needed.

MATERIALS AND METHODS: The plants selected for the study were *Azardirachta indica, Cassia auriculata, Moringa oleifera* and *Curcuma longa* collected from our college premises, sivakasi under vegetative condition. Selection was done based on the literature survey as these plants possess good wound healing property. The collected healthy plant materials were washed thoroughly, shade dried, powdered and screened for physicochemical and biochemical analysis.

Pharmacognostical and phytochemical analysis was done following the method of Kokate [2]. Total chlorophyll, carotenoids [3], proteins [4], free amino

acids, total soluble sugar [5], proline, total phenol, tannin [6], falvonoids [7] and total alkaloids.

RESULTS AND DISCUSSION: The aim of the study is to highlight the physicochemical and biochemical constituents of the chosen herbal drugs.

Pharmacognostical studies: The results of pharmacognostical studies showed the following results. Determination of ash value is one of the important parameter to evaluate crude drugs. Difference in ash value indicates the change in the drug quality. *Cassia auriculata* recorded the highest total ash (16± 1.25%) and water soluble ash content (11.3± 0.86%). This is due to the deposition of silica materials in the drug. *Azardirachta indica* showed the highest acid insoluble ash content (12.6± 0.95%) which is also due to the contamination of silicious material. *Curcuma longa* exhibited maximum sulphated ash (23±1.78%) among the tested plants (**Table 1**). High sulphur content enhances the curative property.

TABLE 1: ESTIMATION OF ASH CONTENT

S. No	Selected Plants	Percentage of ash content (w/w)			
		Total ash	Acid insoluble ash	Water soluble ash	Sulphated ash
1.	*Azadirachta indica*	12.6±0.97	12.6±0.95	7.6±0.56	20.6±1.60
2.	*Cassia auriculata*	16±1.25	11.3±0.86	11.3±0.86	22.3±1.77
3.	*Moringa oleifera*	15.3±1.20	10.3±0.78	10.3±0.77	17.3±1.34
4.	*Curcuma longa*	10.6±0.80	6.6±0.48	6.6±0.49	23±1.78

Extractive value of drug counts more in determining the extraction of active ingredients for preparing drug formulation. It varies with the solvent used for extraction. Higher the extractive value higher the phytochemical extraction. *Moringa oleifera* leaves showed highest values in all the extracts except benzene followed by *C. auriculata, A. indica* and *C. longa* (**Table 2**).

TABLE 2: EXTRACTIVE VALUES OF SELECTED PLANTS

S. No	Samples	Extractive value in percentage (w/v)					
		Petroleum ether	Benzene	Chloroform	Acetone	Ethanol	Water
1.	*Azadirachta indica*	16.15±1.25	13.6±1.04	18.95±1.47	13.5±1.04	8.97±0.66	7.87±0.59
2.	*Cassia auriculata*	16.49±1.27	14.96±1.15	19.46±1.52	15±1.16	9.11±0.69	9.74±0.76
3.	*Moringa oleifera*	21.99±1.70	15.8±1.21	19.68±1.51	15.97±1.22	9.87±0.75	9.89±0.73
4.	*Curcuma longa*	14.9±1.15	18.1±1.9	19.13±1.50	15.7±1.21	9.44±0.73	9.55±0.72

Qualitative phytochemical screening: A qualitative screening of the phytochemicals revealed that ethanol and water extract showed the presence of alkaloids, carbohydrates and protein in all the four chosen samples. Saponins were found in water extract. Petroleum ether and Benzene extract did not record the presence of alkaloids, carbohydrates, phenols and tannins. Tannins and phenols in the ethanol and water extracts. (**Table 3**).

TABLE 3: QUALITATIVE PHYTOCHEMICAL SCREENING

Phytochemical tests done	*Azardirachta indica*						*Cassia auriculata*						*Moringa oliefera*						*Curcuma longa*					
	Petroleum ether	Benzene	Chloroform	Acetone	Ethanol	Water	Petroleum ether	Benzene	Chloroform	Acetone	Ethanol	Water	Petroleum ether	Benzene	Chloroform	Acetone	Ethanol	Water	Petroleum ether	Benzene	Chloroform	Acetone	Ethanol	Water
Alkaloids																								
Mayer's reagent	-	-	-	-	+	+	-	-	-	-	+	+	-	-	-	-	+	+	-	-	-	-	+	+
Wagner's reagent	-	-	-	-	+	+	-	-	-	-	+	+	-	-	-	-	+	+	-	-	-	-	+	+

Carbohydrates and glycosides																								
Molisch's reagent	-	-	-	-	-	+	-	-	-	-	+	+	-	-	-	-	-	+	-	-	-	-	+	+
Fehling Solution	-	-	-	+	+	+	+	+	+	-	-	+	-	-	-	-	-	+	-	-	-	+	+	+
Barfoed's reagenyt	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	+	+
Benedicts reagent	-	-	-	-	+	+	-	-	-	+	+	+	-	-	-	-	+	+	-	-	-	+	+	+
Proteins and amino acids																								
Millon's reagent	-	+	-	+	-	+	+	+	+	+	+	+	-	-	-	+	-	+	-	-	-	-	-	+
Biuret test	-	-	-	+	-	+	-	-	-	-	-	+	-	-	-	+	+	+	-	-	-	+	-	+
Nin-hydrin reagent	-	-	-	-	-	+	-	-	-	-	+	+	-	-	-	+	-	-	-	-	-	-	-	+
Tannin andphenic compouns																								
Ferric chloride solution	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	+
Fixed oils and fats																								
Spot test	-	+	-	-	+	-	-	+	+	-	-	+	-	+	+	-	-	-	-	+	+	-	-	-
Saponification	+	+	-	+	-	-	+	+	-	-	-	-	+	+	-	-	-	+	+	-	-	-	-	+
Saponins																								
Foam test	#	#	#	#	#	+	#	#	#	#	#	+	#	#	#	#	#	+	#	#	#	#	#	+
Gums and mucilage																								
Molisch's test	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	+

(+) – Positive (-) – Negative (#) – Not perfomed

Estimation of Chlorophyll: Total chlorophyll content was well above 6.23mg/g LFW in *Azadirachta indica* (**Fig. 1**). There was a marked increase in chlorophyll a, chlorophyll b in *Azadirachta indica*, where as carotenoid was found be higher in1.49mg/g LFW *Moringa oleifera* than other three tested samples.

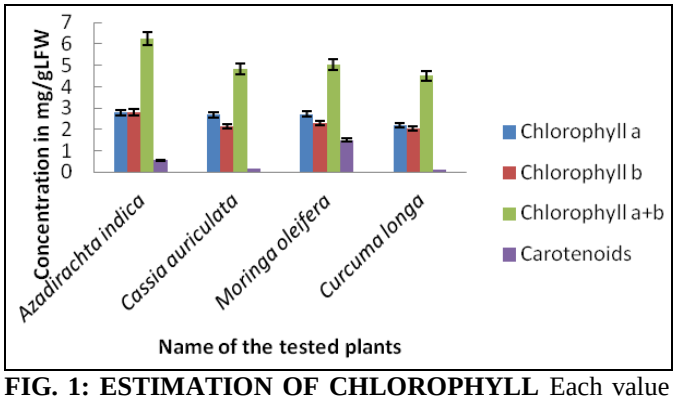

FIG. 1: ESTIMATION OF CHLOROPHYLL Each value represents mean ± SEM (n=3)

Estimation of primary metabolites: Among the experimental samples, the leaves of *Azadirachta indica* exhibited highest values (0.098mg/g) of protein while soluble sugar (0.30mg/g) and amino acids (0.070mg/g) was found to be lower (**Fig. 2**). The level of soluble sugar showed a prominent increase in *Cassia auriculata* (0.704mg/g) amino acid in *Moringa oleifera* (0.103mg/g).*Curcuma longa* showed lowest concentration (0.088mg/g) in protein and amino acid(0.07mg/g) among four samples.

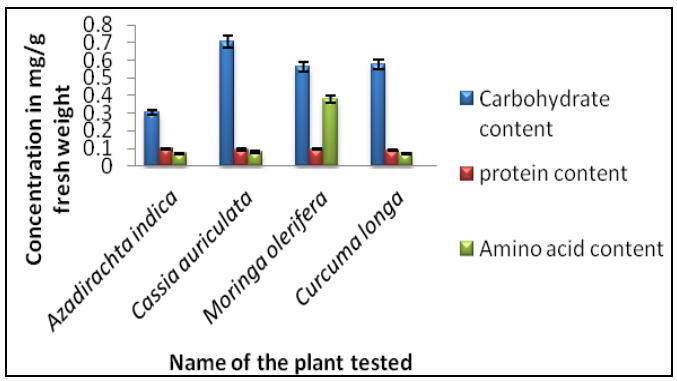

FIG. 2: ESTIMATION OF PRIMARY METABOLITES Each value represents mean ± SEM (n=3)

Estimation of secondary metabolites: Changes in biochemical constituents such as proline, phenols, tannin, flavonoids and alkaloids were analysed (**Fig. 3**). The results showed that free proline and tannin increased exponentially in *Cassia auricalata* to 16.66 mg/g LFW and 2.11mg/g respectively.

Azadirachta indica showed the highest amount of flavonoid content of 28.8 mg/g LFW.

Total alkaloid content was found to higher 60% in *Azadirachta indica* and lesser an 30% in *Curcuma longa.* Phenol content higher in *Cassia auriculata* and low in *Curcuma longa.*

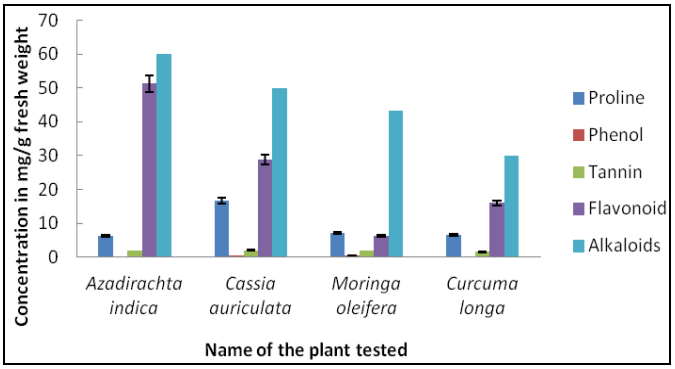

FIG. 3: ESTIMATION OF SECONDARY METABOLITES
Each value represents mean ± SEM (n=3)

The results showed that ethanol was the best solvent for extracting the effective phytoconsituents from the selected medicinal plants. Plants are more potent healers because they promote the curability and repair mechanisms in the natural way [8]. Tannin promote the wound healing through several cellular mechanism, chelation of free radicals and reactive species of oxygen, promoting contraction of the wound and increasing the formation of capillary vessels and fibroblasts. In the present study flavonoid and tannin was found to be present in all the tested plants [9].

CONCLUSION: It is concluded that, all the physical parameters of the plants studied were recorded to ensure the quality of the drug. The potent activity of the plants is due to the phytochemicals which may be acting synergistically to enhance the healing effect. The study revealed that polyherbal treatment might show good wound healing properties which may be attributed to the individual or combined action of phytoconstituents like alkaloids, saponins and flavonoids, present in it. These findings suggest a new pathway in elucidating potent polyherbal formulation.

REFERENCES:

1. Dash GK and Murthy PN:, The wound healing effects of a new poly herbal formulation. Der Parmacia Lettre, Vol. 3 (1), 2011; 342-349.
2. Kokate CK: Practical Pharmacognosy, Vallabh Prakashan. New Delhi, 1991; 108-127.
3. Gaurav M. Doshi, Mukesh D. Shahare, Gayatri V, Aggarwal, Preeja G. Pillai, and Sandhya K. Desai:. Evoluation of in vitro antioxidant methods of *Cassia auriculata*, Der pharmacia letter, 3 (3), 2011; 297-305.
4. Lowry OH, Rosenbrough NJ, Farr AI and Randal RJ: Protein measurement with folin- phenol reagent. J. Biol. Chem., 1951; 193**:** 265-275.
5. Kainsa S, Kumar P, and Poonamrani: Pharmacological potentials of *Cassia auriculata* and *Cassia fistula* plants: A Review, Pakistan Journal of Biological Sciences, 9:15, 2012; 408-417.
6. Sadasivam S, and Manickam S: Biochemical methods, New Age International, 2008; 193-201.
7. Radha R, Prasad MVV, Lakshmi devi A, Bhanu Murthy R, Ravi kumar M, Sitaram B, and Ranganayakulu D: *In-vitro* antioxidant activity of C*assia auriculata* leaves, International journal of pharmaceutical and chemical sciences, 2 (2), 2013; 597-602.
8. Kumer B, Vijayakumar M, Govindarajan R and Pushpangadan P: "Ethnopharmacological approaches to wound healing- Wound healing activity of Wattakaka volubilis leaf Exploring medicinal plants of India", J. Ethnopharmacol, 2007; Vol. 114 (2), 103-113
9. Murugan T, Wins JA, and Murugan M: Antimicrobial Activity and phytochemical Constituents of leaf extracts of *Cassia auriculata*. Indian J Pharm Sci. 75: 2013; 122-5.

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