RESEARCH ARTICLE

PHYSICAL CHARACTERISTICS AND CHEMICAL CONSTITUENTS IN CRUDE PLANTS METHANOLIC EXTRACT OF SELECTED MEDICINAL PLANTS BASED ON LITERATURE AND TRADITIONAL KNOWLEDGE

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Abstract: Eucalyptus globules yielded highest in case of leaves extract, while in case of fruit extract Annona squamosa yield highest and in case of seed extract Butea frondosa yield was highest. Phytochemical evaluation showed that Ailenthus excels (leaves) extract was positive for alkaloids, flavonoids, tannins, phenolic compounds and triterpenoids, while in Calotropis procera (leaves) methanolic extract alkaloids, flavonoids and tannins were identified and in case of Chenopodium album (seeds) alkaloids, saponins, glycosides, fixed oils and tannins were present.

Keywords: Phytochemical, Medicinal plants, Alkaloids, Flavonoids, Tannins, Phenolic compounds, Triterpenoids

INTRODUCTION

Indigenous medicine in the root of nearly all traditional and modern system of medicines in the world. Early accounts of medicinal use of plant can be found in ancient Vedic text, the Rigveda (4500 BC – 1600 BC) and detailed account of instructions and information to be used for prevention and treatment of diseases is found in Ayurveda (2500 – 6000 BC). "Shusrutha Samhita" and "Charak Samhita" followed Ayurveda. Later it made a considerable progress in knowledge of medicinal plants during Buddist period. Its influence infiltrated even to Egypt, Greece and Rome. The hidden treasures, which are still lying in the indigenous system of Indian Medicine used for curing many diseases in the past, still hold good for their remedial quality.

Plants are the miracle laboratories of nature to provide various kinds of drugs and medicines for maintenance of optimum health and vitality. So far, more than 100,000 biologically active secondary plant compounds have been isolated from higher plants, with most of these diverse structures falling into four main chemical classes, the phenolics (phenols, flavonoids, quinines, tannins and lignins), terpenoids (monoterpenes, sesquiterpene lactones, diterpenes, saponins and others), sulphur compounds (glucosinlates, disulphide and acetylenic thiophenes) and nitrogen compounds (alkaloids, amines, non-protein amino acids and cynogenic glycosides) (Chung AC 1995). India is known for its biodiversity as of today about 1.26 lakhs plants species have been catalogued (Chopra &Chopra 1955)**.**

Indigenous medicines continue to have strong roots amongst local community and to some extent priviledge in urban locality. Zoopharmacognosy (the study of animal research of certain herbs to treat diseases) has revealed that instinct consistently provides certain animals with therapeutic information allowing them to use this natural system of medicine themselves. This system of medicines is of specific value in developing countries where precious allopathic veterinary medicines are often beyond the reach of livestock producers and still more than 80 percent of livestock population is deprived of modern and systemic approach of high tech allopathic treatment (Mc. Corkle CM 1982). Compare costs and benefits of choosing indigenous medicine in India where the commercial exploitation of herbal medicine has started at a long level, again showing their positive affect in the therapeutic regimen. At the same time, increased use of herbal medicine draws attention of scientific community towards over exploitation of plant resources.

Superiority of these drugs in term of "safe Drug" with parallel efficacy having without or least side effect over high tech allopathic drugs can force more attention and personal to research, development and extension of this system as scarcity of systemic literature.

However, several modern researchers elaborated the use of natural medicinal plant drugs, being safer than synthetic chemicals because there is no side effect, less cost, no incidence of resistance and easily available at the door of farmers (Misri et.al. 2002, Malairajanet.al. 2006 & Kosalge and Fursule 2009).

Moreover, Synergistic effect of their active ingredients and presence of minerals and salts are also beneficial in the treatment of *Haemonchus contortus* infestation in animals.

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MATERIALS AND METHODS

Selection of experimental plants:
Plants were selected on the basis of literature and indigenous traditional knowledge. The selected palnts were Aegle marmelos, Ailenthus excelsa, Annona squamosa, Bauhinia varigata, Butea frondosa, Calotropis gigantean, Calotropis procera, Chenopodium album, Chrysanthemum indicum, Cuscutta reflexa, Datura stramonium, Euphorbia hirta, Eucalyptus globules and Ficus religiosa. All the information regarding taxonomy and action are collect from the book "Encylopedia of Indian Medicinal Plants" written by Dr. C.P. Khare.

Collection and processing of raw plant material:
The selected plant material were collected from the Botanical garden of school of Life Sciences, Khandari, Agra (U.P) during March – April 2013 and some of them were purchased from the local market. Plant materials were authenticated by taxonomic characteristics and consultation with experts. The selected plant materials were washed with clean water and allow shade dried for about 2-3 weeks. The dried materials were crushed in an electric grinder to coarse powder.

Preparation of crude plant extracts:
Crude plant extract was prepared by Soxhlet extraction method. About 100 gm of powder material was uniformly packed in to a thimble and run in Soxhlet extractor. It was exhaustible extracted with methanol for the period of about 48 hours or 22 cycles or till the solvent in the siphon tube of an extractor become color less. After the extracts were filtered with the help of filter paper and solvent evaporate in rotator and vacuum evaporator (Heidolph) to get the syrupy consistency. The residue was dried over anhydrous sodium sulphate to remove trace of alcohol. Then extract kept in refrigerator at 4^0C for qualitative phytochemical analysis. The percent yield of different extracts was calculated.

Determination of extraction yield (%yield):
The yield (% w/w) from all the dried extracts was calculated as :
Yield (%) = (W1 x 100)/ W2
Where W1 is the weight of the extract obtained after drying of solvent and W2 is the weight of the plant powder.

Phytochemical analysis of different crude extract
Extracts in different solvents were tested for the presence of active principle such as steroids, Carbohydrates, fixed oils, tannins and phenolic, flavonoids, saponins, alkaloids, glycosides, triterpenoids and proteins. Satandard procedures (Debela A 2002).
were used for phytochemical analysis.

RESULT AND DISCUSSION

Yield of crude methanolic extract
In present study total of seventeen crude methanolic extract were prepared from using different plant parts. *Eucalyptus globules* (Leaves) Yield highest (28.42%), while *Bauhinia varigata* (leaves) yield was lowest (18.67%). In case of fruit extract highest yield (33.40%) was in *Annona squamosa* followed by *Aegle marmelosa* (32.23%) and in case of seed extract *Butea frondosa* yielded highest (30.67%) while *Chenopodium album* yielded lowest (18.45%). Difference of percent yield of extraction product amomg different extraction might be due to the solubility of various ingredients and method and type of extraction used (Paech & Tracy 1955)**.** The details of all extract about perecent yield and physical characteristics are given in Table 1.

Phytochemical analysis
Phytochemical analysis of different extracts were conducted by different tests to know the presence of active constituents like alkaloids, flavonoids, saponins, steroids, carbohydrate, glycosides, tannins, phenolic compounds, protein and triterpenoids.
Phytochemical analysis of methanolic extracts of *Ailenthus excels* (leaves) showed presence of alkaloids, flavonoids, tannins and phenolic compounds and triterpenoids while in case of methanolic extract of *Annona squamosa* (leaves) flavonoids, tannins and triterpenoids were present, methanolic extract of *Annona squamosa* (seeds) showed alkaloids, carbohydrates, tannins and fixed oils.
Methanolic extract of *Aegle marmelos* (leaves) showed the presence of alkaloids, flavonoids and triterpenoids during analysis while methanolic extract of *Butea frondosa* (seeds) alkaloids, tannins, and fixed oils were present, *Bauhinia varigata* (leaves) showed presence of alkaloids, flavonoids and tannins.
In case of methanolic extract of *Calotropis procera* and *Calotropis gigantean* (leaves) alkaloids, flavonoids and tannins were present in both the extracts while in methanolic extract *Cuscutta reflexa* (whole plant) only alkaloids and triterpenoids were present. In the extract of *Chrysanthemum indicum* (leaves) three compounds alkaloids, flavonoids and triterpenoids were present, while in seed of *Chenopodium album* alkaloids, saponins, glycosides, fixed oils and tannins were present, methanolic extract of *Datura stramonium* (leaves) showed the presence of alkaloids, flavonoids and tannins.
Methanolic extract of *Euphorbia hirta* (leaves) contains alkaloids, flavonoids, and tannins where as in methanolic extract of *Eucalyptus globules* (leaves) alkaloids, flavonoids, tannins and triterpenoids were present. *Ficus religiosa* (bark) contains alkaloids, carbohydrates and tannins. Results are portrayed in Table 2.

Table 1. Physical characteristics and percent yield of crude methanolic extract of various plants

S.No.	Extracts with common name	Botanical Name	Nature	Color	Odour	% yield
1.	Ardu leaves	*Ailenthus excelsa*	Non sticky	Drak green	Aromatic	24.42
2.	Sharifa leaves	*Annona squamosa*	Oily	Solid green	Aromatic	21.50
3.	Sharifa fruit	*Annona squamosa*	Sticky	Yellowish brown	Peculiar	33.40
4.	Bel leaves	*Aegel marmelos*	Sticky	Brownish	Peculiar	32.23
5.	Palas seeds	*Butea frondosa*	Sticky	Yellowish brown	Aromatic	30.67
6.	Kachnar leaves	*Bauhinia varigata*	Non sticky	Balckish green	Aromatic	18.67
7.	Aak leaves	*Calotropis procera*	Non sticky	Dark green	Aromatic	21.50
8.	Aak leaves	*Calotropis gogantea*	Non sticky	Balckish green	Aromatic	19.10
9.	Amar bel whole plant	*Cuscutta reflexa*	Siicky	Brownish	Peculiar	22.38
10.	Guldaudi leaves	*Chrysanthemum indicum*	Sticky	Balckish green	Aromatic	24.32
11.	Bathua seeds	*Chenopodium album*	Sticky	Brownish	Aromatic	18.45
12.	Dhatura	*Datura stramonium*	Non sticky	Blackish green	Aromatic	22.87
13.	Dudhi leaves	*Euphorbia hirta*	Non sticky	Brownish	Peculiar	24.72
14.	Peepal leaves	*Ficus religiosa*	Non sticky	black	Aromatic	27.23
15.	Eucalyptus leaves	*Eucalyptus globulus*	Non sticky	Yellowish brown	Peculiar	28.42

Table 2. Chemical constituents in different crude plants methanolic extract

S.No.	Plant extract	Plant constituents									
		Alkaloids	**Flavonoids**	**Saponins**	**Carbohydrates**	**Steroids**	**Glycosides**	**Fixed Oils**	**Tannins & Phenolic**	**Protein & A.Acid**	**Triterpenoids**
1.	*Ailenthus excels* (leaves)	+	+	-	-	-	-	-	+	-	+
2.	*Annona squamosa* (leaves)	+-	+	-	-	-	-	-	+	-	+
3.	*Annona squamosa* (seeds)	+	-	-	+	-	-	+	+	-	-
4.	*Aegel marmelos* (leaves)	+	+	-	-	-	-	-	+	-	-
5.	*Butea frondosa* (seeds)	-	+	-	-	-	-	+	+	-	-
6.	*Bauhinia varigata* (leaves)	+	+	-	-	-	-	-	+	-	-
7.	*Calotropis procera* (leaves)	+	+	-	-	-	-	-	+	-	+
8.	*Calotropis gogantea* (leaves)	+	+	-	-	-	-	-	+	-	+
9.	*Cuscutta reflexa* (whole plant)	+	-	-	+	-	-	-	-	-	+
10.	*Chrysanthemum indicum* (leaves)	+	+	-	-	-	-	-	-	-	+
11.	*Chenopodium album* (seeds)	+	-	+	-	-	+	+	+	-	-
12.	*Datura stramonium* (leaves)	+	+	-	-	-	-	-	+	-	-
13.	*Euphorbia hirta* (leaves)	+	+	-	-	-	-	-	+	-	-
14.	*Ficus religiosa* (bark)	+	-	-	+	-	-	-	+	-	+
15.	*Eucalyptus globules* (leaves)	+	+	-	-	-	-	-	+	-	+

It was observed from the above observations that the presence of the alkaloids, flavonoids and tannins were necessary for anthelmentic activity. It was intresting to know that the absence of amines in the methanolic extract of all the plants which indicates towards the safety of feeding, because amines are usually toxic substance and this observation was further supported by (Thanabhorn et.al. 2006, Rajesh and Latha2004 & Gupta and Mishra 2006).

REFERENCES

Chung, A.C. (1995). Antimicrobial Agents. Chemother., **39**: 2235-2238

Chopra, R.N. and Chopra, I.C. (1955). A review of work on Indian medicinal plants. I.C.M.R. special reports series, pp 102

Mc. Corkle, C.M. (1982). Management of animal health and disease in an indigenous anderson community SRC RSP Technical report No. 4 Department of Rural Sociology, University of Missouri, Columbia, Missouri, USA pp 106.

Misri, J., Vihan, V.S., Kumar, A. and Sharma, D.K. (2002). Evaluation of anthelmintic properties of *M. azedarach* (Bakain) on experimental *H. contortus* infection in goats. Indian J. Vet. Med., **22 (2),** 4-6

Malairajan, P., Gopalakrishnan., Geetha., Narasimhan, S., Jessi., Kala and Ven. K. (2006). Analgesic activity of some Indian medicinal plants. J. Ethnopharmacol., **106(3):** 425-428.

Kosalge, S.B. and Fursule, R.A. (2009). Investigation of ethnomedicinal claims of some plants used by Tribals of Satpuda Hills in India. J. Ethnopharmacol., **121(3):** 456-461.

Debela, A. (2002). Mannual of Phytochemical screening of medicinal plants. Ethiopian Health and Nutrition Research Institute, Addis Ababa, Ethiopia, 35-47

Paech, K. and Tracy, M.V. (1955). Modern methods of plant analysis. III.

Thanabhorn, S., Jenjoy, K., Thamaree, S., Ingkaninan, K. and Panthong, A. (2006). Acute and subacute toxicity study of the ethanol extract from *Lonicera japonica.* J. Ethnopharmacol., **107**: 370-373

Rajesh, M.G. and Latha, M.S. (2004). Preliminary evaluation of the antihepatotoxic activity of Kamilari, a ployherbal formulation. J. Ethnopharmacol., **91**: 99-104.

Gupta, A.K. and Mishra, N. (2006). Hepatoprotective activity of aqueous ethanolic extract of *Chamomile capitula* in paracetamol intoxicated albino rats. Am. J. Pharmacol. Toxicol., **1**: 17-20.