Ancient Science of Life Vol. No XX (1&2) July, August, September, October 2000 pages 58 - 70

A Review on the Ayurvedic Herb Prosopis cineraria (L) Druce.

M.D. UKANI, N.B LIMBANI and N.K MEHTA
Ban Labs Pvt Ltd., Dr. Vikram Sarabhai Nagar, Gondal Road South, Rajkot – 360 004.

Received: 11.3.2000 **Accepted: 15.6.2000**

ABSTRACT: *Shami (Prosopis Cinerarea (L) Druce) of family Mimosaceae is an indigenous plant which has been mentioned in Ayurveda with several clinical properties [(1).] The plant finds use in one form of the other in various ayurvedic preparations and this has been made in necessary to review the various studies carried out in its chemistry as well as pharmacology.*

INTRODUCTION

Prosopis cineraria (L) Druce. (Family Mimosaceae) is popularly known as shami or khijda in Sanskrit & Gujarati. Te Sanskrit literature on Ayurveda describes man uses of the plant.

Sami tikta katu: Sita kasaya recani laghll:.
Kaphakasabhramasvasakustharasa: Krimijit smrta:…
(dravyaguna)

It is tikta, katu, Sheeta (Sheetaveerya), kashaya, laghu, and purgative; beneficial in deranged kapha, cough, vertigo, dyspnea, piles and worms.

Our ancient rishis gave described various medicinal properties of the herb. An Attempt as, therefore, been made to study beneficial effects of tee b on human system and review the chemistry of shami or khijada and establish relationship between medicinal properties and chemistry of the plant.

Habitat

Shami or khijda is found in dry and arid regions of India[(3).]

BOTONY

Shami is small to moderate-sized tree (see Fig .No.1) evergreen, with light foliage and slender branches having conical spines. Bark rough, exfoliating in thin flakes. Leaves bipinnate, generally with 2 pairs of pinnae; pinnules 7-12 pairs. Flowers borne in slender spikes, small, yellowish. Pods cylindric torulose or flattish with coriaceous exocarp. Seed 10-15, compressed, oblong, with moderately hard brown testa.

Phytochemistry

Kidwai and zaman have reported patulitrin, a glucoside of patuletin isolated form flowers. [(5)]

Bhatt and manzoor have reported sitosterol [(6)] (i) (see chart I)

Cottee and Amir et al., have reported a new alkaloid spicigerine (2) and characterized as W- (3-hydrox – 2 – Methyl -6 piperidyl) alkanoic acid (see chart 1)

Mehta & Sharma et al., have reported new flavone prosogerin C characterized as 6,7,3',4',5'- pentametoxyflavone (3) from seeds [8] (see chart II)

Mehta and Sharma et al., have reported prosogerin A & Prosogerin B (4,5) characterized as 6 methoxy- 7- hydroxyl – 3' 4'- methylenedioxylflavone (1) and 2' 4' dihydroxy -5' methoxy -3,4- methylenedioxy chalkone (II) from flowers [9] (see chart II).

Mehta and Sharma et al., have reported synthesis of prosogerin A (6). [10] (see chart III).

Mehta and Sharma et al., have reported synthesis of prosogerin B (7). [11] (see chart III).

Jain & Sharma et al., Have further reported new flavone prosogerin-D (8) Characterised as 6',3',4'5', - tetramethoxy -7- hydroxyl flavone form seeds. [12] (see chart IV)

Mehta & Sharma further reported constitution of synthesis prosogerin A & B (9,10). Their constitutions as 6-methox-7-hydroxy -3, 4-methalenedioxy (I) and 2',4-diydroxy -5'-methoxy-3,4- methaylenedioxy – chalkone (II) [13]. (see chart IV).

Jain & Sharma have reported a new flavone prosogerin E (II) characterized as 6,7 dihydrixy-3', 4'5'- trimethoxyflavone along with gallic acid, patuletin Iutolin, patulitrin and rutin form seeds [14]. (see chart V).

Jain & Malhotra have reported prosogerins D and E (8,11) (12,14) isolated form seeds together with isomers:

Isoprosoger im –D and E (see chart IV,V)

Brown and paterne have reported synteses of spicigerine [15].

PHARMACOLOGY/USES:

An alkaloidn mixture (1mg/kg) given to dogs caused decrease in blood pressure and immediate mortality.

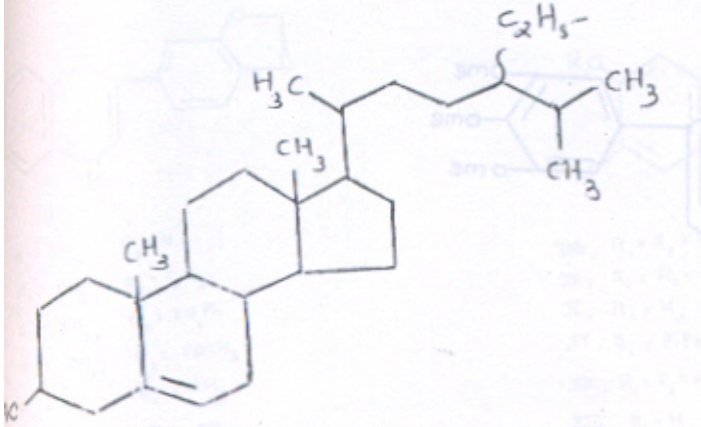
Extensive damage to liver spleen, kidney, lung and heart was observed on histological examination of mice given the alkaloid mixture[16].
Powder mixed with sugar is given to pregnant women as a safeguard against miscarriage[17].

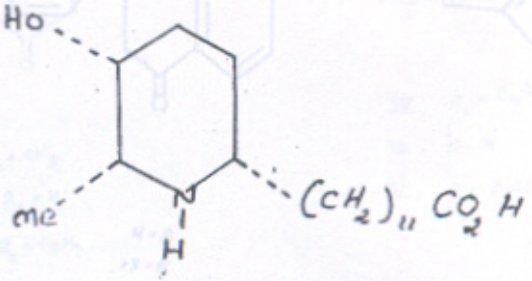
Pod is astringent, demulcent and pectoral.

Bark is efficacious in rheumatism. It is reported during the severe famine of Rajputana in 1898-69, many lives were saved by the use of bark as a source of food.

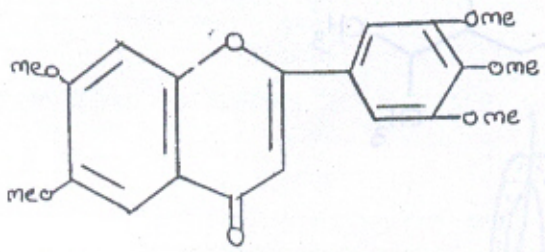
Root is antidysenteric

PROSOPIS CINERARIA (L) DRUCE
Fig .1



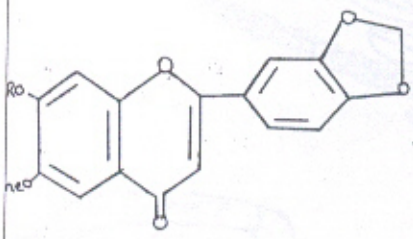


(2) Spicigerine



(3)

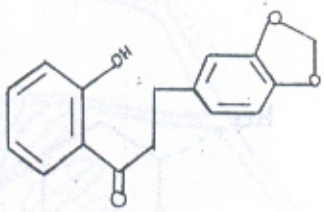
Prosogenin - C



R = H
R = Coma
R = Cl

Prosogenin - A

(4)

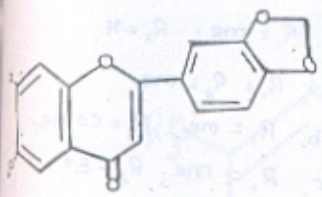


R = H
R = Et.

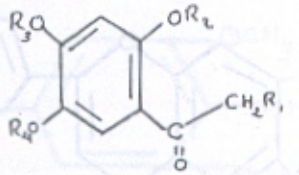
Prosogenin - B

(5)

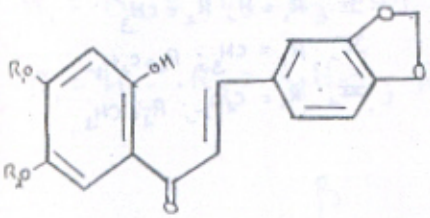
Chemical constituent of Prosopis cineraria (L) druce chart -



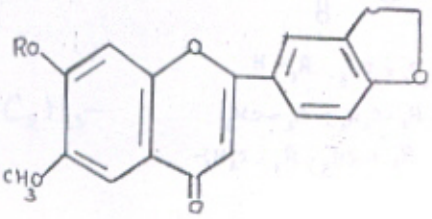
I. $R_1 = CH_3$; $R_2 = H$
II. $R_1 = CH_3$; $R_2 = C_6H_5$
III. $R_1 = CH_3$; $R_2 = CH_2Ph$
IV. $R_1 = CH_3$; $R_2 = COCH_3$
V. $R_1 = H$; $R_2 = CH_3$
VI. $R_1 = CH_2Ph$; $R_2 = CH_3$
VII. $R_1 = COCH_3$; $R_2 = CH_3$



VIII. $R_1 = R_2 = R_4 = H$; $R_3 = CH_3$
IX. $R_1 = R_2 = H$; $R_3 = CH_3$; $R_4 = CH_2Ph$.
X. $R_1 = H$; $R_2 =$ Piperonyl; $R_3 = CH_3$; $R_4 = CH_2Ph$.
XI. $R_1 =$ Piperonyl; $R_2 = H$; $R_3 = CH_3$, $R_4 = CH_2Ph$
XII. $R_1 = R_2 = H$; $R_3 = CH_2Ph$; $R_4 = CH_3$
XIII. $R_1 = H$; $R_2 =$ Piperonyl; $R_3 = CH_2Ph$, $R_4 = CH_3$
XIV. $R_1 =$ Piperonyl; $R_2 = H$; $R_3 = CH_2Ph$; $R_4 = CH_3$



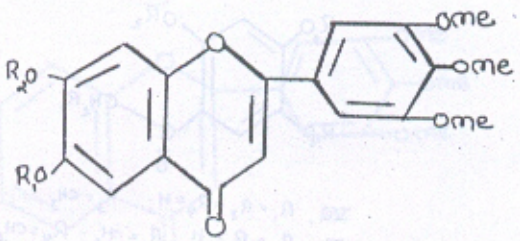
I. $R_1 = H$; $R_2 = CH_3$
II. $R_1 = CH_3$; $R_2 = H$
III. $R_1 = CH_3$; $R_2 = C_7H_7$



IV. $R_1 = C_7H_7$; $R_2 = CH_3$
V. $R = H$
III. $R = C_7H_7$

(7) **Prosogenin - B.**

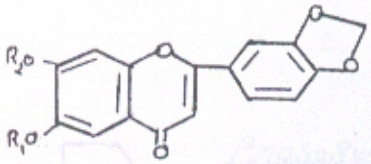
Chemical constituent of Prosopis cineraria (L) Druce cluster - III.



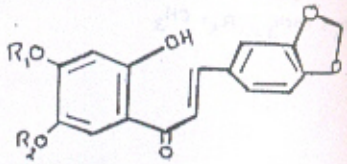
1, R_1 = me; R_2 = H.
1a, R_1 = R_2 = me
1b, R_1 = me; R_2 = come
1c, R_1 = me; R_2 = Et.
1d, R_1 = Et, R_2 = me.

(8)

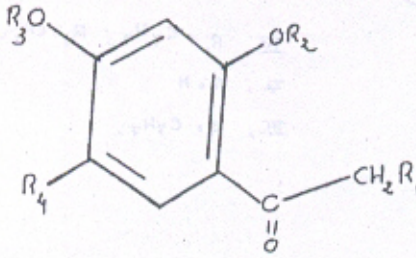
Prosogenin - D.



I, R_1 = CH_3; R_2 = H
III, R_1 = C_2H_5; R_2 = CH_3
IV, R_1 = CH_3; R_2 = C_2H_5



II, R_1 = H; R_2 = CH_3
V, R_1 = CH_3; R_2 = C_2H_5
XI, R_1 = C_2H_5; R_2 = CH_3.

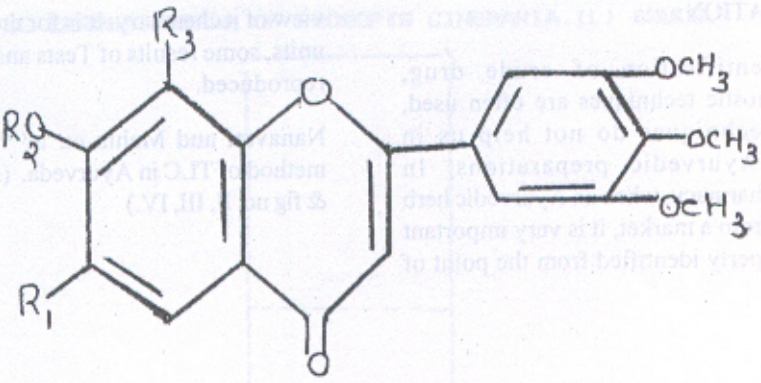


VII; R_1 = R_2 = H; R_3 = CH_3; R_4 = OH
VIII; R_1 = R_2 = H; R_3 = CH_3; R_4 = OC_2H_5
IX; R_1 = H; R_2 = Piperonyl; R_3 = CH_3, R_4 = OC_2H
X; R_1 = Piperonyl; R_2 = H; R_3 = CH_3; R_4 = OC_2H
XI; R_1 = R_2 = H; R_3 = C_2H_5
XII; R_1 = R_2 = H; R_3 = C_2H_5; R_4 = OH
XIII; R_1 = R_2 = H; R_3 = C_2H_5, R_4 = OCH_3
XIV; R_1 = H; R_2 = Piperonyl; R_3 = C_2H_5; R_4 =
XV; R_1 = Piperonyl; R_2 = H; R_3 = C_2H_5; R_4 = OH

(9, 10)

Prosogenin- A & B.

Chemical constituent of Prosopis cineraria (L) Druce. Chent. IV



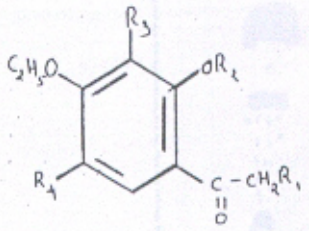
1. $R_1 = OH$; $R_2 = R_3 = H$

1a. $R_1 = OC_2H_5-$; $R_2 = C_2H_5-$; $R_3 = H$

1b. $R_1 = OAc$; $R_2 = Ac$; $R_3 = H$

2. $R_1 = R_2 = H$; $R_3 = OH$

2a. $R_1 = H$; $R_2 = C_2H_5$; $R_3 = OC_2H_5-$



3. $R_1 = R_2 = R_3 = H$; $R_4 = OC_2H_5$

4. $R_1 = R_2 = H$; R_3 = Tri-o-methylgalloyl; $R_4 = OC_2H_5$

5. R_1 = Tri-o-methylgalloyl; $R_2 = R_3 = H$; $R_4 = OC_2H_5$

6. $R_1 = R_2 = R_4 = H$; $R_3 = OC_2H_5$

7. $R_1 = R_4 = H$; R_2 = Tri-o-methylgalloyl; $R_3 = OC_2H_5$

8. R_1 = Tri-o-methylgalloyl; $R_2 = R_4 = H$; $R_3 = OC_2H_5$

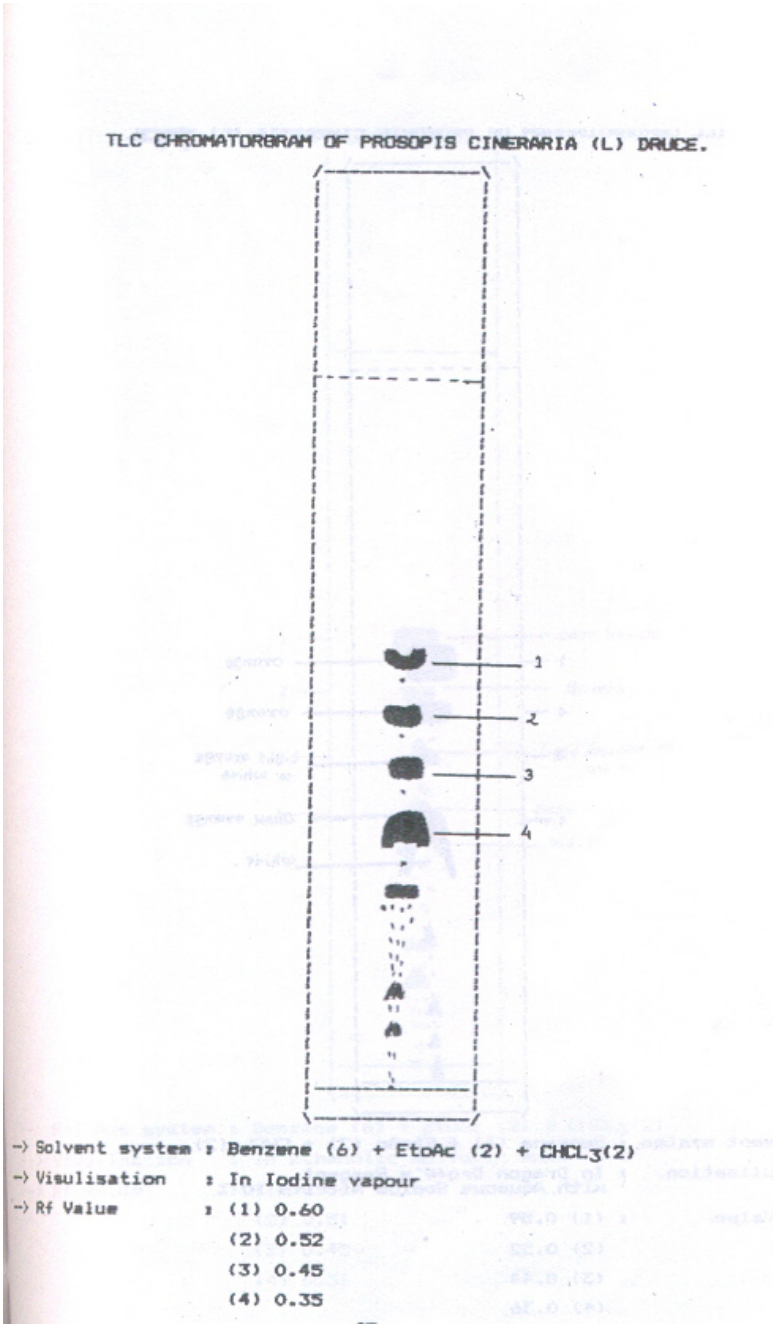
(11) Prosogenin - E.

chemical constituent of Prosopis cineraria (L) Druce chart - VI.

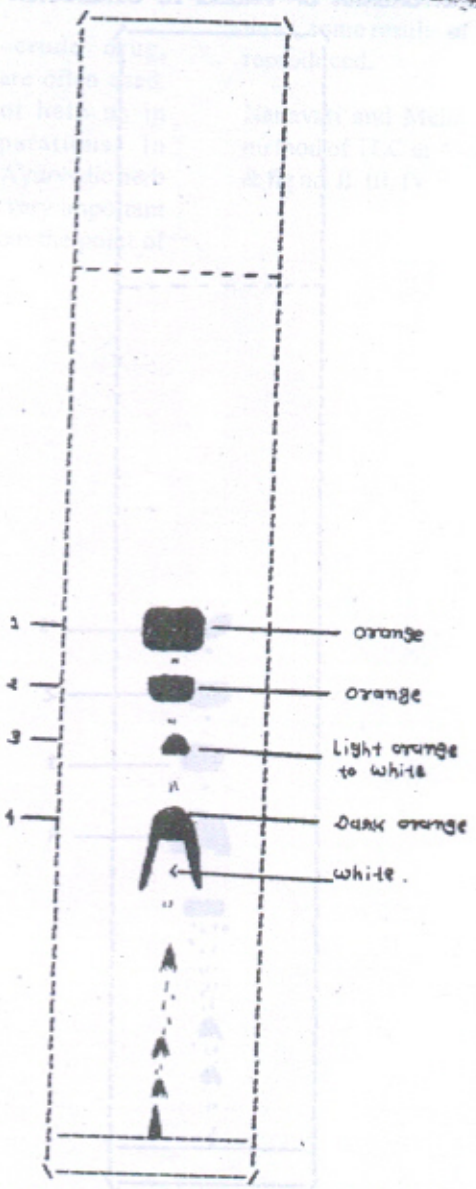
IDENTIFICATION:

In the identification of crude drug, pharmacognostic techniques are often used, but such techniques d not help us in assessing Ayurvedic preparations. In Ayurvedic pharmacy, when an ayurvedic herb is obtained from a market, it is very important that it is properly identified from the point of view of it chemistry. It is for the benefit of such units, some results of Tests analysis have been reproduced.

Nanavati and Meta et. Al [18]. Described the method of TLC in Ayurveda. (see chart No VI & fig no. II, III, IV).



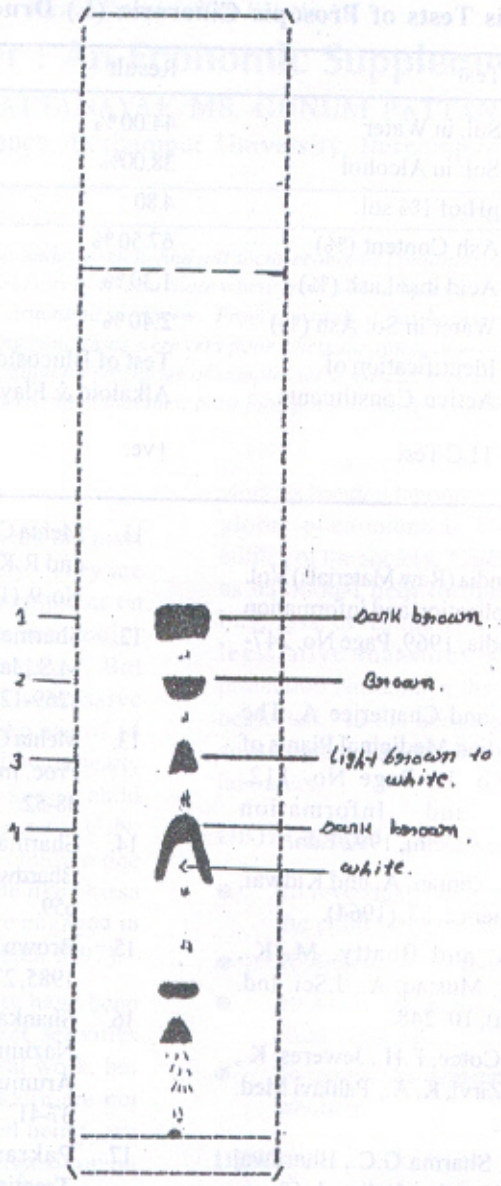
TLC CHROMATOGRAM OF PROSOPIS CINERARIA (L) DRUCE.



-> Solvent system : Benzene (6) + EtoAc (2) + $CHCl_3$(2)

-> Visulisation : In Dragon Droff's Reagent with Aqueous Sodium Nitrite 10 %

-> Rf Value : (1) 0.59
(2) 0.52
(3) 0.44
(4) 0.36



-> Solvent system : Benzene (6) + EtoAc (2) + $CHCl_3$(2)

-> Visulisation : In Ethanolic Sulfuric Acid 10 %

-> Rf Value : (1) 0.60

(2) 0.51

(3) 0.45

(4) 0.36

Analysis Tests of prosopis cineraria (L) Druce (Whole Plant)

Sr.No	Test	Result
01	Sol. In Water	44.00%
02	Sol in Alcohol	38.00%
03	pH of 1% Sol	4.80
04	Ash Content (%)	67.50%
05	Acid insol. Ash (%)	1.30%
06	Eater in So. Ash (%)	2.40%
07	Identification of active constitutes	Test of Blucoside Alkaloid & flavonoid
08	TLC Test	+ve

REFERENCES:

1. The wealth of India (Raw Materials) Vol. 8, (Ph-Re), Publication and information Directorate, India, 1969, page No 247-248.

2. -4 Pakrashi S, and chatterjee A. the treatise on Indian Medicinal Plants of India Vol No II, Page No 112 publication and information directorate, New Delhi, 1992 Edn.

5. Sharma R.C. Zaman, A. and Kidwai, A.R. IndJ. Chem 2, 83 (1964).

6. Manoor, A. and Bhatty, M.K., Chattha, S.M. Mustaq A., JSci. And Res (Pakistan), 10,248.

7. Amir F. and Cotee, F.H. Jeweres. K. Nagler, M.J. Zirvi, K.A., pahlavi Med. J., (1974), 5,1.

8. Mehta C.K., Sharma G.C., Bhardwaj D.K. and R.K. Jain., Indian J Chem, 16B 1133

9. Mehta C.K., Sharma G.C., Bhardwaj D.K. and Bisht, M.S Phytochemistry, 1979, 18,355.

10. Mehta C.K., Sharma G.C., Bhardwaj D.K. and R.K Jain., Indian J. Chem, 17B (1979), 290.

11. Mehta C.K., Sharma G.C., Bhardwaj D.K. and R.K Jain Current Science, Vol 48, No 9, (1979), 381- 382)

12. Sharma G.C., Bhardwaj D.K. and Bisht, M.S Jain R.K. Phytochemistry,1980,19,1269-1270.

13. Mehta C.K. Sharma G.C., Bhardwaj D.K. Proc. Indian Natn Sci. Acd., 1980, 46A, 48-52

14 Sharma G.C., Jain R.K. Gupta A.K., and Bhardwaj D.K J. Net prod. 1981 44,56-659.

15. Brown E., and paterne M.J., Chem Res. 1985,278-279.

16. Shankaranaryan, D., Gopalakrishnan, C., Nazimudeen, S.K. Kameshwaran, L and Arumugam, S., Mediscope 1979, 22 (2), 37-41.

17. Pakrashi S. and Chatterjee A. The Treatise on Indian Medicinal Plants of India Vol No 11, Page No. 112 Publication and information directorate, new Delhi, 1992 Edn.

18. Ukani M.D., Nanavati D.D and Mehta N. K., Indian Drugs 35 (3), 1996, page no 157-162.