PHARMACOGNOSTICAL STUDIES ON LEAF OF
Coldenia procumbens Linn

R. SENTHAMARI, M.UVARANI, B. JAYAKAR

Periyar College of Pharmaceutical Sciences for Girls, Tiruchirapalli - 620 021.

Received: 16.12.2001 Accepted: 18.2.2002

ABSTRACT: The plant Coldenia procumbens Linn. is used commonly in Indian system of medicine for various ailments. The present paper deals with detailed pharmacognosy of the leaf of coldenia procumbens Linn. and includes its Macro/Micro morphological (vein islet, vein termination numbers and stomatal index) anatomical characters, Physico chemical standards such as ash values, extractive values, crude fibre content and fluorescence characters of various extracts and leaf powder after treatment with different chemical reagents under UV light. Preliminary phytochemical tests on various extracts of the leaf have also been carried out.

INTRODUCTION

Coldenia procumbens 1-6 Linn. (Family-Boraginaceae) is abundantly available in most parts of India and has been used by locals for number of medicinal purposes. In villages, the fresh leaves are ground and applied to rheumatic swelling. The whole plant used in external application of causing suppuration of boils. The leaves are also used to cure fever, piles and scorpion sting. But it has still not been explored properly and remains as a silent drug in herbal medicine. Considering various uses of the leaf, the present investigation was undertaken to bring out the detailed pharmacognostical characteristics of the leaves as whole an fits powdered form.

MATERIALS AND METHODS

Plant Materials

The plant material were collected from Tirunelveli in the month of May 1997 and authenticated by Dr. V. Nandhagopalan, Department of Botany, National College, Tiruchirapalli. A Herbarium specimen of

the plant is preserved in the Department of Pharmacognosy of our Institute for future reference. The collected leaves were shade dried, Pulverized to get a coarse powder and used for the present study.

Reagents

All the reagents used were of analytical grade obtained from S.d. Fine chemicals Ltd., Mumbai, Qualigens Fine Chemicals, Mumbai.

Methods

The morphological characters of the plant Coldenia procumbens Linn. were observed. Free hand sections of leaf were taken, fixed in 70% ethanol, stained with safranin and fast green and mounted following the usual plant micro technique7 (Johansen, 1940). The histo chemical colour reactions of the leaf were done according to the methods described by Trease and Evans8, (1972) and K.V. Krishnamoorthy9 (1988) and the microscopic photographs were taken by
fitting Minolta X-300s Camera (Belgium) in
Topic T-Trinocular Research Microscope.
The quantitative microscopical analysis such
as vein islet, vein termination numbers and
stomatal index. 10 of the leaves were
studied.

The ash values, ethanol soluble and water
soluble extractive values of leaves were
determined as per the Indian
Pharmacopoeial methods11 and the crude
fibre content was done by Dutch process 12.
other extractive values were determined
successively starting from pet. Ether (60-
80c), benzene, chloroform, acetone, alcohol
by using soxhlet extraction apparatus. The
dried extractive were obtained after
evaporation of solvent under reduced
pressure. The fluorescence characters of the
various extracts and powdered leaf with
different chemical reagents were observed
under ultra violet at 254nm 13. preliminary
phyto chemical tests of different extracts
were performed by specific reagents.14,15.

RESULTS:
MORPHOLGY 16
Habit and Habitat

It is a prostrate herb usually lying quite flat
on the ground, stems reaching 45cm long ,
shaggy with whit hairs, branches often
numerous, young plants silky white hairs. It is distributed in tropical and
subtropical zones.

LEAVES

Crisped, 1.3-3.8 by 0.6-2cm, obovate to
oblong, rounded at the apex, coarsely
serrate, very hairy on both sides, base
tapering, petioles 3-10 mm long, shaggy.

FLOWERS

Pale yellow, solitary, axillary, nearly sessile;
calyx-divided to the base or nearly, so, very
hairy. Segments 4, ovate, acute, 2-5mm
long, ciliolate; corolla-2.5 mm long, lobes 4,
oblong, rounded at the apex; Androceium—
long stamens 4, scarcely higher than the
corolla-tube; Gynoeceium-ovoid, slightly 4
lobed, sub 4 celled with one ovule in each
cell. Style 2, distinct from the base or
cohering to the middle, but easily separable,
terminal stigmas capitate.

FRUIT:

A dry 4 lobed pyramid about 3mm high and
4 mm across at the widest part, grooved on
two and ribbed on the other two sides, with a
sharp central double beak, hairy, muriculate,
ultimately separating into 1 celled, beaked
pyrenes; Seeds-albuminous.

HISTOLOGICAL STUDIES (Fig-1)

Anatomy of Coldenia procumbens Linn. leaf, The transverse section of leaf through
midrib shows. The cells in both the
epidermises are one layered in thickness,
some of the epidermal cells re modified into
hairs, which are unicellular, thick walled in
nature. The palisade layer are well
distinguished, they are double layered
compact cells and radially arranged but the
spongy mesophyll cells are much more
differentiated, spongy parenchyma are
loosely arranged, intercellular spaces are
found. The midrib portion of the leaf
contains 3 to 4 layers of collenchymatous
cells on lower epidermis. The vascular
bundles located at the centre of midrib
portion, the large bundle was typically
centre in position and small bundle was
observed just above to the central bundle.
The vascular bundle is surrounded by
parenchymatous cells, having radiated
xylem and phloem. Paracytic stomata are
seen in the lower epidermis and upper epidermis.

POWDER CHARACTERISTICS (Fig.2)

The leaf powder is pale greenish grey in colour, having characteristic odour and slightly bitter in taste. It shows following powder characteristics.
1. Thick walled unicellular trichomes
2. Paracytic stomata,
3. Palisade cells,
4. Loosely arranged spongy parenchyma

The histo chemical colour reactions of the leaf of *Coldenia procumbens* Linn. and quantitative microscopical analysis such as vein-islet, vein-termination numbers and stomatal index are reported in Table No. 1&2. Physico chemical standards such as ash values, extractive values, loss on drying, crude fibre content are shown in table No 3&4. The results of preliminary phytochemical tests show the presence of phytoconstituents of different extracts of reported in table No.5. The Fluorescence characteristics of various extracts of leaf powder with different chemical reagent under UV light are tabulated in Table No. 6&7.

DISCUSSION

The histological studies and powder microscopy showed characteristic diagnostic features such as unicellular trichomes and paracytic stomata. Quantitative microscopical studies also give valuable informations regarding specific leaf constants such as vein-islet, vein termination numbers and stomatal index. These microscopical characters along with other physicochemical standards such as ash values, extractive values, crude fibre content and fluorescence analysis will be useful to identify the authenticity of the drug even from the crushed or powdered plant materials.

The alcohol (90%) soluble extractive is high as compared with water soluble extractive, The chlorform extract shows minimum extractive value where as alcoholic extract shows maximum extractive value. The preliminary phytochemical studies showed the presence of glycosides, phytosterols, proteins, amino acids, fixed oils flavonoids, gums and mucilage. Thus the present study well be more useful for the pharmacognostical identity of the leaf of *Coldenia procumbens* Linn. and also helps in the detection of adulteration.

ACKNOWLEDGMENT

The authors are thankful to AICTE, New Delhi, for providing financial assistance to carryout this work and the president, Manamigu. K. Veeramani, M.A., B.L., for this constant encouragement and support.

REFERENCES:

1. Sudarsanam, G and Prasad G.S., J. herbs, spices, Med. Plants, 31, 57-66,1955.
2. Saluja, A.K. and kakrani, H.K.N., Fitoterapia, 66(5), 427-430, 1994.
3. Bhat, R.B. Adeloye, A.A and Etejere, E.O., J.Econ. Taxon. Bot., 6(1)-165, 1985.
4. The Wealth of India Vol. II, Publications & Information Directorate CSIR, Hill side road, NewDelhi-110 012,307-308,1950.

5. Chopra, R.N. ., Nayar,S.C. and chopra, Z.C. Glossary of Indian medicinal plants, 1st edition 74,1956.

6. Kirthikar, K.R. and Basu, B.D., Indian Medicinal Plants, Vol II 2nd edition, 1683 -1684, 1994.

7. Johansen, D.A., Plants microtechnique, 1st edition, MC Graw Hill Book com. Inc., New York 182,20,1940.

8. Trease, G.E. and Evans, W.C., Pharmacognosy, 12th edition, 203, 1983.

9. Krishnamoorthy, K.V. Methods in plant histochemistry, 1st edition , 30-45,1998

10. Kokate, C.K. Practical pharmacognosy 4th edition 115-117, 1994.

11. Pharmacopoeia of India, 2nd edition, 947-950, 1966.

12. Wallis, T.E., Text Book of Pharmacognosy 4th edition, 536-549, 1989.

13. Chase, C.R. and Pratt, R.J., Flourescence of powdered vegetable drugs with particular reference to development of a system of indentification J.Am. Pharm Assoc., 38,324-31,1949.

14. Kokoshi, C.J. Kokoshi, R.J., Sharma, F.J., J A m. Pharm. Ass., 47, 715-717, 1958.

15. Kotate, C.K. Practical pharmacognosy 4th edition, 108-109, 1994.

16. Kirthikar, K.R. and Basu, B.D., Indian Medicinal Plants, vol III 2nd edition, 1684,1994.

**TABLE NO 1**
**HISTOCHEMICAL COLOUR REACTIONS OF THE LEAVES OF Coldenia procumaens LINN**

| S. NO | REAGENTS       | TEST FOR          | NATURE OF CHANGE        | HISTOLOGICAL ZONE                           | DEGREE OF CHANGE |
|-------|----------------|-------------------|-------------------------|--------------------------------------------|------------------|
| 1     | Toludine Blue O| Carboxylated Poly Saccharides | Pink to reddish Purple | Epidermis and Palisade layer               | +++              |
| 2     | Fast Green FCF | Basic Protein      | Bright Green            | Palisade layer and mesophyll cells         | +++              |
| 3     | Coomassie Brilliant Blue R(CBB) | Total protein | Reddish Pink | Trichomes, Palisade layer and mesophyll cells | +++              |
| 4     | Nile-Blue A    | Steriods           | Blue                    | Trichomes and upper epidermis             | +++              |
### TABLE NO 2
QUANTITATIVE MICROSCOPICAL ANALYSIS OF LEAVES OF *Coldenia procumbens* Linn

| SL. NO | VEIN ISLET NUMBER | VEIN TERMINATION NUMBER | STOMATAL INDEX |
|--------|-------------------|-------------------------|----------------|
|        |                   |                         | UPPER SURFACE  | LOWER SURFACE |
| Minimum| 9                 | 12                      | 8.6            | 9.5           |
| Average| 11                | 15                      | 9.8            | 10.8          |
| Maximum| 14                | 19                      | 11.1           | 12.0          |

### TABLE NO 3
EXTRACTIVE VALUES OF THE LEAVES OF *Coldenia procumbens* Linn

| PLANT NAME | PART USED | METHOD OF EXTRACTION | YIELD IN PERCENTAGE |
|------------|-----------|-----------------------|---------------------|
|            |           | PET. ETHER | BENZENE | CHLOROFORM | ACETONE | ALCOHOL |
| *Coldenia procumbens* Linn | Leaves | Continuous Hot Percolation using Soxhlet apparatus | 2.72 | 1.80 | 0.63 | 0.75 | 2.75 |
## TABLE NO 4
PHYSICO CHEMICAL STANDARD VALUES OF THE LEAVES OF *Caldenia procumbens* Linn

| SL.NO. | TOTAL ASH % | WAHER SOLUBLE ASH % | ACID INSOLUBLE ASH % | SULPHATED ASH % | LOSS ON DRYING % | WATER SOLUBLE EXTRACTIVE % | ALCOHOL SOLUBLE EXTRACTIVE % | CRUDE FIBRE CONTENT % |
|--------|--------------|---------------------|----------------------|----------------|----------------|--------------------------|---------------------------|---------------------|
| 1.     | 22.50        | 9.00                | 6.00                 | 20.00          | 2.50           | 5.00                     | 16.70                    | 50.00               |
| 2.     | 22.15        | 8.70                | 5.60                 | 20.40          | 2.40           | 4.70                     | 16.20                    | 49.70               |
| 3.     | 21.94        | 9.20                | 6.10                 | 20.10          | 2.50           | 4.90                     | 16.50                    | 48.50               |
| 4.     | 21.98        | 9.40                | 5.40                 | 19.70          | 2.40           | 5.10                     | 17.10                    | 49.20               |
| 5.     | 22.2         | 8.80                | 6.40                 | 19.90          | 2.50           | 5.20                     | 16.60                    | 48.70               |
| Minimum| 22.15        | 8.70                | 5.40                 | 19.70          | 2.44           | 4.78                     | 16.24                    | 48.54               |
| Average| 22.11        | 8.96                | 5.90                 | 20.02          | 2.49           | 5.02                     | 16.64                    | 49.27               |
| Maximum| 22.5         | 9.20                | 6.40                 | 20.40          | 2.52           | 5.24                     | 16.72                    | 50.00               |
| CONSTITUENTS               | PET. ETHER | BENZENE | CHLOROFORM | ACETONE | ALCOHOL | AQUEOUS | LEAF POWDER |
|---------------------------|------------|---------|------------|---------|---------|---------|-------------|
| Alkaloids                 | -          | -       | -          | -       | -       | -       | -           |
| Carbohydrates & Glycosides| -          | -       | -          | +       | +       | +       | +           |
| Phytosterol               | +          | +       | +          | -       | -       | -       | +           |
| Phenolic compounds & Tannins | -          | -       | -          | -       | -       | -       | -           |
| Proteins & Amino Acids    | -          | -       | -          | +       | +       | +       | +           |
| Saponins                  | -          | -       | -          | -       | -       | -       | -           |
| Gums & Mucilages          | -          | -       | -          | -       | +       | +       | +           |
| Fixed Oils & Fats         | +          | +       | -          | -       | -       | -       | -           |
| Flavonoids                | -          | -       | -          | +       | +       | +       | +           |
| Lignins                   | -          | -       | -          | -       | -       | -       | +           |
### TABLE NO. 6
**FLUORESCENCE ANALYSIS OF LEAF EXTRACTS**

| EXTRACTS      | DAY LIGHT      | UV LIGHT       |
|---------------|----------------|----------------|
| Petroleum ether | Yellowish brown | Yellowish brown |
| Benzene       | Dark green     | Dark green     |
| Cholorform    | Pale green     | Dark green     |
| Acetone       | Yellow         | Yellowish green|
| Alcohol       | Yellowish brown| Yellowish green|
| Aqueous       | Reddish brown  | Brown          |

### TABLE NO. 7
**FLUORESCENCE ANALYSIS OF LEAF POWDER**

| CONTENT                  | DAY LIGHT      | UV LIGHT       |
|--------------------------|----------------|----------------|
| Leaf powder as such      | Pale green     | Green          |
| Leaf Powder + 1 N NaoH (aq) | Brown      | Greenish brown |
| Leaf Powder + 1 N NaoH (al) | Green       | Green          |
| Leaf Powder + 1N Hcl     | Pale grey     | Dark green     |
| Leaf Powder + 50% H2So4  | Grey          | Grey           |
| Leaf Powder + 50% HNo3   | Pale Yellow   | Pale green     |
| Leaf Powder + Methanol   | Green         | Dark green     |