

## Pharmacognostic Studies on the Roots of *Baliospermum raziana* keshav Et Yog.

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**ABSTRACT:** *Baliospermum raziana* Keshav. Et. Yog. Is a newly identified species belonging to the family Euphorbiaceae. It is a leafy shout monoecious, erect herb. The plant differentiates from the other species i.e *Baliospermum montanum* (Wild) Muell-Arg by the presence of extra floral nectaries found on the abaxial side all along the margins of the leaf lamina and long peduncled racemes. Histologically the root is differentiated in to periderm and stele. Groups of cortical fibres are randomly distributed among the inner layers of phelloderm. .Tanniferous content and crystals of calcium oxalate are found in the periderm. Simple starch grains are located in the stellar region. Vessel element occurring one at each end. Perforation plates are two in each element occurring one at each end. Phytochemical studies subjected the possibilities of the alkaloids, carbohydrates, flavonoids, triterpenes, tannins etc. The aqueous extract has shown mild purgative action (600 mg /kg body wt) in the animal models. Morphologically there are many similarities between *B. raziana* and *B. montanum* an important Ayurvedic herbal drug. In commerce both the drugs are being sold under the common name "Danti". In the present investigation diagnostic characters of both species have been discussed briefly.

### INTRODUCTION:

*Baliospermum raziana* keshav. Et. Yog. Is a namely identified species belonging to the family Euphorbiaceae. It was first reported in Karnataka. The Plant closely resembles *B. montanum* an important Ayurvedic drug. In commerce both the species are being sold under the common name "Danti". Danti is being used in Indian system of medicine for dropsy, jaundice. Liver disorders, piles, fever and constipation<sup>1</sup>. Even though the roots of *B. raziana* are having medicinal value, no attempt has been made so far to study this plant. Hence, it is worth to investigate on the roots of *B. raziana*. Present paper deals with the morphological, microscopical, preliminary photochemical and pharmacological studies of the roots of *B. raziana*

### MATERIALS & METHODS:

The roots of *B. raziana* were collected from the hills of Pavagadh, near Baroda, Gujarat and its correct identity was established at Dept. of Biosciences, Sardar Patel University. Some of the roots were fixed in FAA<sup>2</sup>, while the remaining were air dried for powder analysis. To study the anatomical details of the root customary methods were followed of dehydration, infiltration and embedding<sup>2</sup>. Sections were cut at 8 to 10 µm thickness and stained with safranin and fast green combination. Histochemical tests such as calcium oxalate crystals, tannins, starch lignins and proteins were carried out<sup>3</sup>. The air dried material was powdered, which was used for the Microscopical and preliminary phytochemical tests. Standard procedure was followed for estimation of ash values, extractive values and fluorescence analysis<sup>4,5</sup>. For the pharmacological studies 100 g of

powder was boiled with water thrice with the duration of 2 hr each. Using fine cheesecloth filtered the extracts and the filtrate was evaporated to dryness. Healthy male albino rats weighing between 95 to 110 g were selected and made in to four batches consisting of 5 rats in each batch. First batch was treated as control and batch 2 to 4 received 300 mg/kg, 600 mg/kg and 900 mg/kg of root extract respectively and the purgative action was evaluated<sup>6</sup>.

## RESULTS & DISCUSSION:

**Macroscopy:** Root is hard, cylindrical, some what twisted, up to 2 cm in diameter. Outer surface is grayish brown in colour, smooth or finely striated longitudinally and bearing small warty protuberances at some places. Debarked root exposes highly fibrous tissue. **Microscopy:** Histologically the root is differentiated into periderm and stele (Fig.5) Periderm consists of phellogen, phellem and phelloderm (Fig.1). Stele comprises the vascular cylinder (Fig.3).

Phellogen tissue seen at the lower side of Phellem is flattened. The cells in 4 to 6 rows of phellogen are not continuous but having interruptions. The phellem or cork tissue is of 8 to 14 layered thick. Its cells are tangentially elongated. The phelloderm consists of 4 to 8 layered parenchymatous tissues. Clusters of cortical fibres can be observed in the inner layers of phelloderm (Fig.2) They are distributed randomly among the inner layers of phelloderm. A part from it, tanniferous content (Fig.2) and prismatic crystals of calcium oxalate are also found in the inner layers.

Phloem is narrow and occupies a small portion on the outer periphery of the xylem where as xylem occupies a major part in the root (Fig.3). Starch grains are abundantly

present in the xylem tissue (Fig.4) Fibers of the xylem are lignified.

**Powder analysis:** cork is brown in colour, in surface view (Fig.6) the cells are markedly elongated, thin walled. Fragments in sectional view show from 6 to 8 or more layer of cells usually attached to part of the phellogen. Prisms of calcium oxalate crystals (Fig.7) are abundantly present in the powder. Starch grains (Fig.8) are simple and spherical or compound. Some of the granules show a faint, rounded or slit shaped hilum. Vessels occur singly or more usually in small groups. Cell walls are lignified, reticulately thickened (Fig.9) or marked with simple pits. Perforation plates are observed at both the ends (Fig.10). Fibre sclerids (Fig. 11). Are considerably elongated, rectangular cells, blunt ended with moderately thickened walls and numerous pits. Fibres (Fig12) are lignified, elongates, and moderately thick walled. In rare occasions they show biforked ends, which is one of the important diagnostic characters. Fluorescence analysis of the drug powder obtained from root responded in aqueous and alcoholic 1N NaOH treatment . In UV light both these tests have showed blue colour. The results of fluorescence are tabulated in table I .

Preliminary phytochemical studies have shown the presence of Anthraquinones Alkaloids, carbohydrates, triterpenoids, tannins etc. Limits for quality parameters are tabulated in table II.

Pharmacological studies reveal that the drug powder is a mild purgative. The average weight of stool in the experimental batch is 0.76g where in case of the other experimental batch i.e 300 mg/kg and 900 mg/kg the results are very close to the control batch. There is no sign of abnormal behaviour of animals during the experimental period. All the animals are in

good condition even after the experiment is over.

Morphologically *B. raziana* differs from *B. montanum* due to the presence of leaf marginal glands (extrafloral nectarines) and long peduncled racemes<sup>7</sup>.

Structurally roots of both the plants have some similarities. Starch grains are reported to occur heavily in the stellar region of *B. montanum* roots<sup>1</sup>. The same characters is found in the *B. raziana*. Raghunathan and Roma Mitra<sup>1</sup> reported the presence of Calcium Oxalate crystals in *B. montanum* root and they were found distributed in all the tissues except xylem. During the present investigation the root of *B. raziana* also

exhibits the prisms of calcium oxalate crystals. However they are restricted only in the inner layers of the phelloderm. Aqueous extract of the root when it is tested for its purgative action on animal models showed positive results at a dose of 600 mg/kg body weight. A preliminary phytochemical analysis of the drug powder shows the presence of anthraquinones and carbohydrates which are believed to be active constituents in the purgative action.

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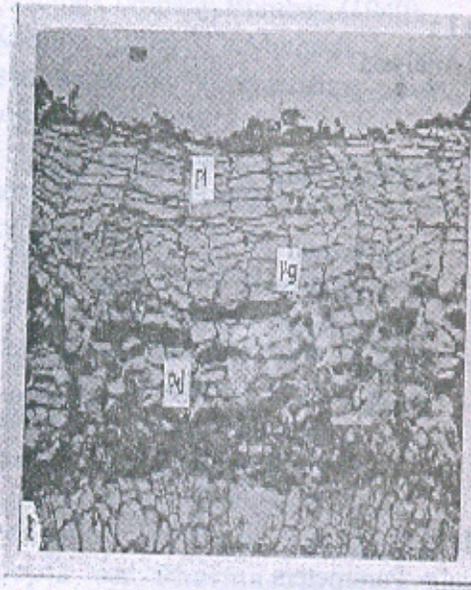
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**Table I**  
**Fluorescence Analysis**

Sr. no	Treatment	Ordinary light	UV light
1.	Drug powder (D.P.) as such	Light brown	No Charge
2.	D.P + aq 1N NaOH	Reddish Brown	Blue
3.	D.P + alco. 1N NaOH	Light yellow	Blue
4.	D.P + 1N HCl	Cream	No Charge
5.	D.P + 50% H <sub>2</sub> SO <sub>4</sub>	Black	No Charge

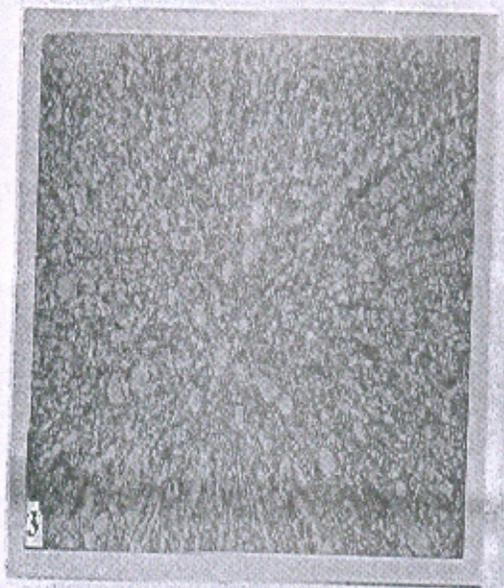
**Table II**  
**Limits for quality Parameters**

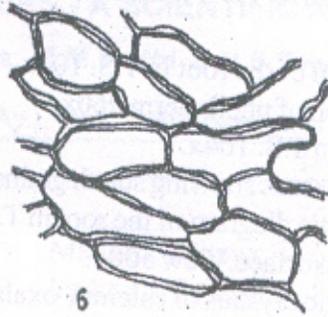
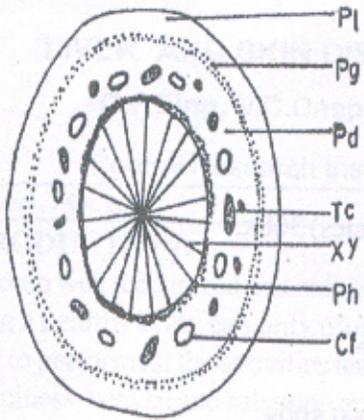
Foreign matter	: Not more than 2%
Total ash	: Not more than 10%
Acid insoluble extractive	: Not more than 0.6%
Alcohol soluble extractive	: Not more than 9%
Water soluble extractive	: Not more than 9.5%



(1997) *Journal of Plant Physiology*  
 : Not more than 2.5% water, acid-soluble  
 : Not more than 10% water, total ash  
 : Not more than 0.5% water, alcohol-soluble  
 : Not less than 9.5% water, water-soluble  
 : Not less than 9.5% water, water-soluble

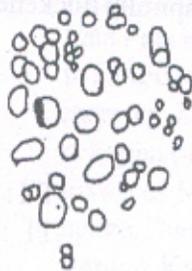
Foreign matter  
 Total ash  
 Acid-insoluble extractive  
 Alcohol-soluble extractive  
 Water-soluble extractive





5

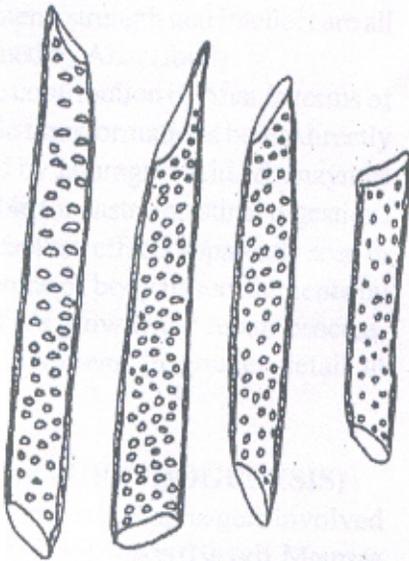
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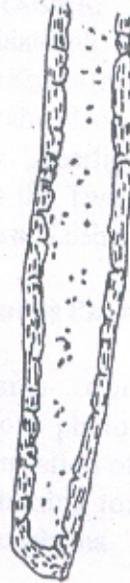
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11



12

## **ILLUSTRATIONS TO THE FIGURES**

Fig.1 A portion of the root in T.S. 104 x

Fig 2 A Portion of Phelloderm 960 x

Fig 3 Xylem in T.S. 104 x

Fig 4 Xylem tissues showing starch grains (in circles) 368x

Fig 5 Schematic diagram of the root in T.S

Fig 6 Cork in surface View 500x.

Fig 7 Prismatic crystals of calcium oxalate 500x

Fig 8 Starch grains 500x

Fig 9 Fragmented part of spirally thickened vessel 500x

Fig 10 pitted vessels 500x

Fig 11 Fibrous sclerids 500x

Fig 12 Fibres 500x.

Cf: Corticel fibres

Pd: Phelloderm

Pg: Phellogn

Pl: Phellem

Tc: Tannin content