



## Research Article

### PHARMACOGNOSY AND PHYTOCHEMICAL EVALUATION OF ROOTS OF *ECHINOPS ECHINATUS* ROXB.

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Article Received on: 30/01/15 Revised on: 18/02/15 Approved for publication: 26/02/15

**DOI: 10.7897/2230-8407.06342**

#### ABSTRACT

The genus *Echinops echinatus* Roxb. belongs to family Asteraceae found in India. Commonly known Kantaphala as in Sanskrit Roots used as medicine. It is used in dyspepsia, scrofula, syphilis and fever. It is also advised to take paste internally for to quick and safe delivery. The present study was carried out to investigate morphological, microscopical and phytochemical screening of root revealed that the presence of d-Mannose, D-Glucopyranoside, O- $\alpha$ -D-glucopyranosyl-(fwdarw.3)- $\beta$ -D, fructofuranosyl, phenol, 3-hydroxy-1-propenyl)-2-methoxyphenol 4-(3-hydroxy-1-propenyl)-2-methoxy, Thianthrene, Anobin, 3,4-dihydroxy-1,5,7 guai-10(15),11(13)-diene-6, 12-olide, 2,2', 5', 2''-Terthiophene<sup>7</sup>. The result study was useful for drawing pharmacognostic parameters also detected phytoconstituent may proceed to find a novel drug for this species.

**Keyword:** *Echinops echinatus*, Pharmacognosy, Asteraceae

#### INTRODUCTION

*Echinops echinatus* Roxb. is an important medicinal plant belongs to family Asteraceae it is distributed in tropical and subtropical region in India. In literature review roots are carminative and diuretic which are used in cough. Powdered roots are mixed with *Acacia* and applied to the hair to destroy lice<sup>8</sup>. The root is used as abortifacient and aphrodisiac<sup>4</sup>. Infusion of the root is given in seminal debility, impotence, hysteria and its decoction is given in dyspepsia, scrofula, syphilis and fever<sup>1</sup>. An aqueous paste of the root is applied to the lower abdominal region to hasten the process of delivery. It is also advised to take paste internally for quick and safe delivery<sup>2</sup>.

#### Vernacular name

**Hindi:** Utakatira **Marathi:** Utkatarai, **Gujarat:** Utkanto, **Sanskrit:** Kantaphala, **Urdu:** Untkatar, **English:** Indian Globe Thistle, **Telugu:** Brahmadandi, **Kannada:** Brahmadande

#### *Echinops echinatus* Roxb.

Naik, Flora of Marathwada 475.1998; Shirodkar and Lakshmi in Singh *et al.*, Fl. Maharashtra St. Dicot. 2: 207. 2001.

Errect, annual herbs, 35-50 cm tall; branches covered with white cottony pubescence. Leaves alternate, sessile lyrate, lanceolate pinnatifid, oblong, 4-13 × 2-6 cm; ovate lobes, sinuate, spinous pointed. Heads globose compound, 2-3 cm in diameter in stout peduncles. Involucral bracts of individual simple heads scale-like; outer oblanceolate, 4-6 mm long, glabrous, spinous tipped; intermediate bracts often turned into sharp spines 1.5-3 cm long; capitula 1 flowered in dense globose, involucral bracts spinescent, intermediate bracts spiny. Florets white bisexual with tubular, 5-lobed; corolla lobes linear, 4-5 mm long, acute, achenes elongated, villous, 3-4 mm long (Figure 3).

#### MATERIALS AND METHODS

The root of *Echinops echinatus* Roxb. were collected from Aurangabad Maharashtra state, India. The plant was authenticated and voucher specimen were deposited at Vivekanand Arts College Sardar Dalip Singh Commerce and Science College Aurangabad Maharashtra state, India.

#### Maceration

Root was studied by maceration techniques. The root pieces were boiled in Jeffery fluid (chromic acid 10 % and nitric acid 10 % in (1:1 proportion)<sup>3</sup>. The dimensions of the cells were measured with the help of microscope and by micrometry

#### Microscopy

Qualitative microscopic evaluation was carried out by taking free hand transverse section of fresh root. Section were dehydrated with different alcohol grade and stained with safranin and light green these permanent preparation were observed in microscope<sup>3</sup> of *Echinops echinatus*.

#### Plant sample extraction

25 gram of powder drug was extracted with methanol solvent using soxhlet extractor for 18 hours at 65°C. The extracts were filtered through a Whatman filter paper no. 42 (125 mm) and concentrated at 40°C by using an evaporator and stored in amber color bottle at 4°C. These extracts were sent to Sophisticated Analytical Instrumentation Facility, Indian Institute of Technology Bombay, Powai Mumbai, India. For GC-MS (Gas chromatography mass spectroscopy)

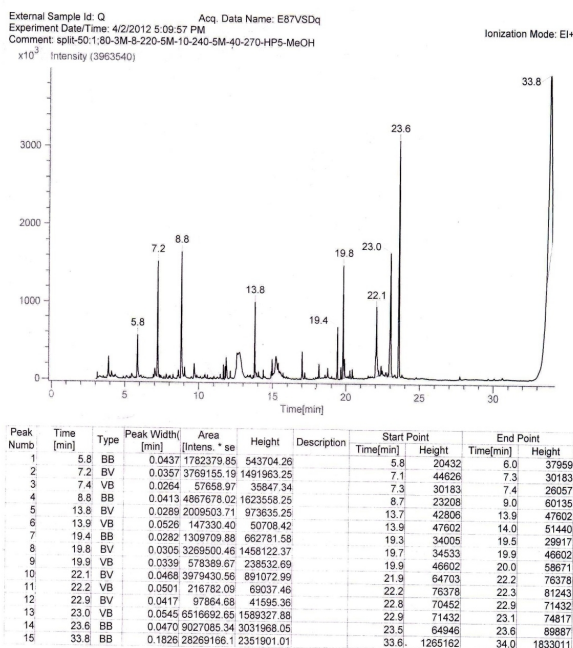


Figure 1: GC-MS chromatogram of methanolic extract of roots of *Echinops echinatus* Roxb.

Name of compound	Structure of compound	Retention time	Molecular formula	Molecular weight
2H-Fluo[2,3-H]-1-benzopyran-2-one		12.7	C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>	180.16
D-glucopyranoside, D-glucopyranosyl-D-fructofuranosyl		12.7	C <sub>18</sub> H <sub>32</sub> O <sub>16</sub>	504.17
4(1E)-3-hydroxy-1-propenyl-2-methoxyphenol		17.0	C <sub>10</sub> H <sub>12</sub> O <sub>3</sub>	180.12
4(1E)-3-hydroxy-1-propenyl-2-methoxyphenol		17.0	C <sub>10</sub> H <sub>12</sub> O <sub>3</sub>	180.12
Thianthrene		19.4	C <sub>12</sub> H <sub>8</sub> S <sub>2</sub>	256.22
Anobin		23.0	C <sub>15</sub> H <sub>20</sub> O <sub>5</sub>	280.13
Terthiophene		23.0	C <sub>12</sub> H <sub>8</sub> S <sub>5</sub>	248

Figure 2: Components identified in roots of *Echinops echinatus* Roxb.

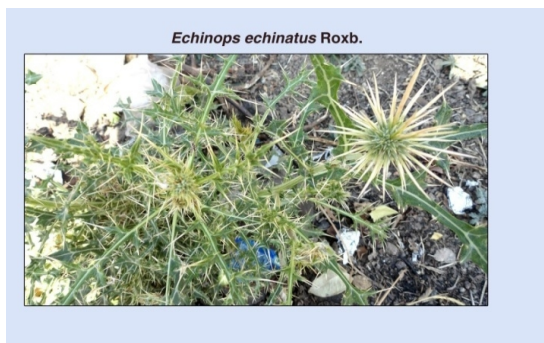


Figure 3: Photograph of *Echinops echinatus* Roxb.

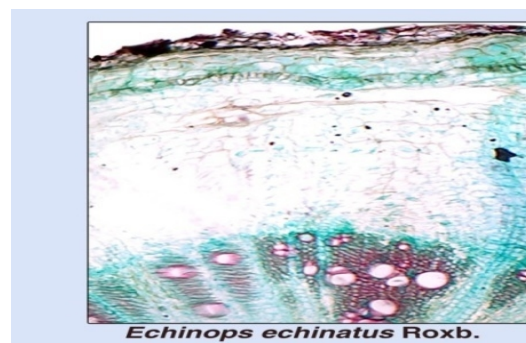
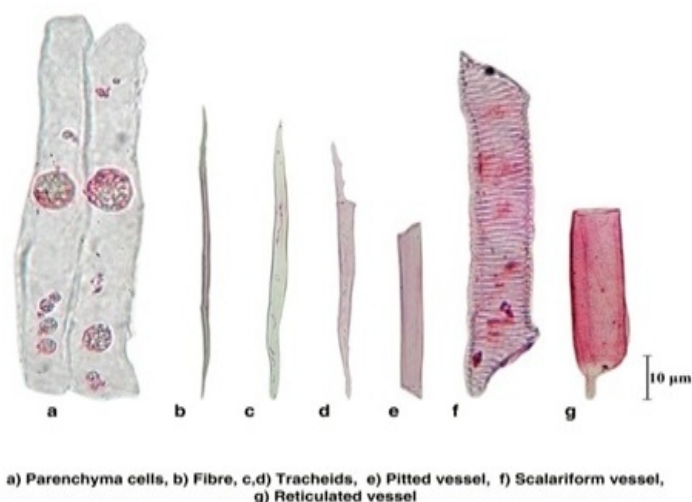


Figure 4: T. S of root of *Echinops echinatus* Roxb



Maceration of *Echinops echinatus* Roxb.

Figure 5: Maceration of root of *Echinops echinatus* Roxb.

### GC-MS analysis

For each sample the analytical method is same while the oven temperature is variable, Injection port temperature is 250, Carrier gas is Helium 1 ml/sec. Inter face temperature is 250, Ion source is at 200, Analysis was done by using  $E^+$  ionization with 70ev, The MS is Accu TOF GCV, Column through the sample passes is HP-5. The MS detection was completed in 36 minutes. The detection employed the NIST Ver. 2.0-year 2005 library.

### RESULT AND DISCUSSION

Transverse section of root shows circular in outline. Cork 1 - 3 layered composed of thick walled irregular parenchymatous cells ca 50 - 130 × 30 -200 µm. Phellogen indistinct epidermis single

layered unicellular hair composed of squarish to irregular parenchymatous cells ca 30 - 100 × 25 - 220 µm. Cortex 24 - 30 layered composed of circular to squarish parenchymatous cell 50 - 90 × 30 -10 µm. Endodermis distinct single layered composed of circular to squarish small cells ca 12 - 18 × 18 - 30 µm. Pericycle single layered composed of circular to squarish cells ca 10 - 12 × 15 - 20 µm. Vascular bundle present in centre xylem and phloem separated few layer of cambium xylem consist of patches of xylem vessels ca 50 -100 × 30 - 130 µm xylem parenchyma. Medullary rays of 2 - 4 extended from xylem to cortex region composed of squarish cell ca 10 - 12 × 15 - 20 µm. Phloem cells are composed of thin walled cells ca 10 - 12 × 10 - 20 µm devoid of starch grains (Figure 4).

### Maceration

Maceration result shows parenchyma cells are thin walled, rectangular, squarish or rhomboid pits few, circular to oval, distributed throughout cell, cell wall continuous ranges 180 -200 x 40- 60  $\mu\text{m}$  and average 145 x 32  $\mu\text{m}$  (Figure 5 a) Fibers are long, slender, tapering and sharply pointed at both ends pitted, outline irregular ranges 450 - 1000 x 15-20  $\mu\text{m}$  and average 638 x 19  $\mu\text{m}$  (Figure 5 b) Tracheids long, slender, ends pointed or blunt pits few-many, elongate, in one many rows alternate, outline irregular ranges 450 - 900 x 30 - 50  $\mu\text{m}$  and average 690 x 42  $\mu\text{m}$ . (Figure 5 c, d) Vessels are three types Pitted vessel element short long end wall oblique at both or one end or shifted to lateral side at one or both ends with simple perforation, pits are circular to oval, alternate, beaked at one or both end or absent ranges 220 - 300 x 30 - 60  $\mu\text{m}$  and average 273 x 52  $\mu\text{m}$  (Figure 5e) Scalariform vessel element short, broad, end wall oblique or horizontal with simple perforation, lateral wall scalariform beak short may present at one or both end or absent ranges 190 - 260 x 30-50  $\mu\text{m}$  and average 215 x 39  $\mu\text{m}$ . (Figure 5f) Reticulated vessel element short-long, end wall horizontal or oblique with simple perforation, pits reticulated, beaked at one end ranges 150 - 450 x 50 -180  $\mu\text{m}$  and average 373 x 110  $\mu\text{m}$ . (Figure 5g)

### GC-MS analysis

The results revealed that the presence of d-Mannose, D-Glucopyranoside, O- $\alpha$ -D-glucopyranosyl-(fwdarw.3)- $\beta$ -D-fructofuranosyl, 3-hydroxy-1-propenyl)-2-methoxyphenol, phenol, 4-(3-hydroxy-1-propenyl)-2-methoxy, Thianthrene, Anobin, 3,4-dihydroxy-1,5,7 guai-10(15),11(13)-diene-6, 12-olide, 2,2', 5', 2''-Terthiophene. (Figure 2) The spectrum profile of GC-MS confirmed the presence of ten major components with the retention time 5.8, 7.2, 8.8, 13.8, 19.4, 19.8, 22.1, 23.0, 23.6, 33.8 respectively (Figure 1)

### DISCUSSION

Systems like Ayurveda, Tibetan, Siddha, etc. have medicines that are mainly manufactured from herbal source are of greater necessity to have the raw materials checked through pharmacognostic means.<sup>5</sup> In the present investigation various standardization parameters such

as morphology, anatomy, maceration, phytochemical study could be help in authentication of root drug of *Echinops echinatus* the result of present study will also serve as reference material in preparation of monograph. However isolation of detected phytoconstituent may proceed to find a novel drug.

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### Cite this article as:

Salve S. D and Bhuktar A. S. Pharmacognosy and phytochemical evaluation of roots of *Echinops echinatus* Roxb. *Int. Res. J. Pharm.* 2015; 6(3):195-198 <http://dx.doi.org/10.7897/2230-8407.06342>

Source of support: Nil, Conflict of interest: None Declared