

NOTE

Chemical Investigation of the Seeds of *Echinops echinatus* Roxb.

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Various carbohydrates and amino acids were obtained by chemical examination of the seeds of *Echinops echinatus* plant.

Key words: *Echinops echinatus*, Family Compositae, Carbohydrates, Amino acids.

*Echinops echinatus*¹⁻³ belongs to the family Compositae which is known as "Gokhru" or "Utakanta" in Hindi. It is distributed throughout India and Afghanistan, ascending to 5000 ft on the hills. It is used in hoarse cough, hysteria, dyspepsia and ophthalmia. The powdered root of this plant is applied to wounds on cattle to destroy maggots. Mixed with acacia gum, it is applied to hair.

The powdered seeds of the plant (2 kg) and a small quantity of calcium carbonate were taken in a round-bottomed flask and refluxed with distilled water for 6 h on a water bath. The contents were decanted. After decantation, 10% solution of lead tetraacetate was added in the aqueous extract till the completion of precipitation. The solution was filtered and made alkaline with ammonia and hydrogen sulphide gas was bubbled through the filtrate to remove the excess of lead acetate as lead sulphide. The neutral solution of the filtrate was concentrated under reduced pressure to give a viscous mass. This was subjected to paper chromatography examination using (i) *n*-butanol : acetic acid : water (4 : 1 : 5 v/v)⁴, and (ii) *S*-collidine⁴ as solvents and aniline hydrogen phthalate as spraying reagent. The results are recorded in Table-1 and Table-2. The identity of the sugars was confirmed by comparison of their R_f values with those of authentic sugars.

TABLE-1

Solvent System (I): <i>n</i> -Butanol : Acetic acid : Water [4 : 1 : 5 v/v]			
S.No.	Sugar	R_f found	R_f reported ⁴
1.	L-Rhamnose	0.39	0.37
2.	D-Galactose	0.15	0.16
3.	D-Fructose	0.24	0.23
4.	D-Glucose	0.17	0.18
5.	D-Arabinose	0.23	0.21
6.	D-Xylose	0.29	0.28
7.	D-Ribose	0.33	0.31

TABLE-2

Solvent System (II): S-Collidine

S.No.	Sugar	R _f found	R _f reported ⁴
1.	D-Arabinose	0.42	0.43
2.	L-Rhamnose	0.57	0.59
3.	D-Galactose	0.32	0.34
4.	D-Fructose	0.40	0.42
5.	D-Glucose	0.38	0.39
6.	D-Ribose	0.54	0.56
7.	D-Xylose	0.51	0.50
8.	D-Mannose	0.48	0.46

Identification of amino acids

The seeds of the plant (100 g) were hydrolyzed with 6 N HCl for 24 h at 108-110°C. The hydrolysate was diluted with 100 mL water and filtered. The filtrate was concentrated to dryness. The excess of acid was removed by repeated evaporation and was finally dissolved by 10% isopropanol. The solution was concentrated and subjected to paper chromatography examination using *n*-butanol : acetic acid : water (4 : 1 : 5 v/v) as solvent and ninhydrin as spraying reagent. The results are reported in Table-3. The identity of amino acids was confirmed by authentic specimens of amino acids.

TABLE-3

S.No.	Amino acids identified	R _f found	R _f reported ⁴
1.	Aspartic	0.029	0.0030
2.	Valine	0.0243	0.0241
3.	Leucine	0.0334	0.0337
4.	Glutamic	0.0048	0.0050
5.	Glycine	0.0059	0.0057

The quantitative estimation of amino acids (expressed in mg of glycine per mg of nitrogen) was done by photometric method⁵. The results were shown in Table-4

TABLE-4

S.No.	Amino acids identified	Quantity (mg)
1.	Aspartic	2.28
2.	Valine	2.89
3.	Leucine	1.52
4.	Glutamic	1.80
5.	Glycine	2.75

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Complexes of N-(4-Methoxy-benzilidene)-2-(4-aminophenyl) Benzimidazole with Zn(II), Cd(II) and Hg(II) Halides

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