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PHYTOCHEMICAL STUDY OF *Benincasa cerrifera*

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ABSTRACT

Investigations of the triterpenes of plants belonging to the family Cucurbitaceae reveals the presence of cucurbitacins, a group of tetracyclic compound. Coarse powder of *Benincasa cerrifera* root was extracted with different solvents, each solvent extract was passed through qualitative test. Each solvent was further subjected to thin layer chromatography (TLC). The qualitative tests and TLC indicates presence of atleast 2 sterols in the roots. Alkaloids were found to be absent. Further, the detailed study was performed by UV and IR spectrophotometer. Therefore, the work on *Benincasa cerrifera* root according to ethno-pharmacognostic information may give us a fruitful result.

Keywords: TLC, *Benincasa cerrifera*, UV and IR absorption, sterol A and sterol B.

INTRODUCTION

Benincasa cerrifera belongs to the family Cucurbitaceae[1], which consists of about 100 genera and more than 850 species. Plants of this family are grown in tropical and sub tropical regions[1].

Benincasa cerrifera (Kusmandu in Sanskrit, White kaddu or petha, Sanchi kumro) is an annual herb grown in the month of May-June, whose roots are collected in the month of Oct-Nov[2]. Seeds, fruits and fruit juices are reported as nutritive, laxative, diuretic and in the treatment of internal organ haemorrhage[3,4]. Moreover, investigation of the triterpenes of plant revealed the presence of tetracyclic compound, designated as chemotaxonomic characters of the cucurbitaceae. Fruit juice possesses a strong cytotoxic action against human carcinoma cell of the flore of the mouth[3].

Traditionally, over the ages the tribals and Vaidyas have used the roots of this plant in powder form for the prompt relief of "Asthma attach". No information till date is available on the phytochemical nature of *Benincasa cerrifera* root. Therefore, in view of above lacunae the present study has been undertaken to envisage its phytochemical nature.

MATERIAL AND METHODS

All the materials used were of analytical grade.

Processing of the roots:

The roots were collected from bad region of Mathura in the month of Sept.-Oct. since this is the major crop of this region. After collection, the roots were cleaned and dried under shade properly.

The coarse and fine powder in a solvent were extracted by Soxhlet apparatus[4-9]. The powder was further extracted with petroleum ether (60-80°C), benzene, chloroform, alcohol (95%) and chloroform water I.P. After completion of extraction the solvent was checked in order to ensure that no residue was left after evaporation of solvent.

The extract obtained was further subjected to qualitative analysis for plant constituents and phenolic compounds.

Thin layer chromatography

Thin layer chromatography studies were made in order to evaluate the number of constituents 105°C for 30 min. followed by the application of the spot above the lower edge of plates.

Table 1 : Characteristics of *Benincasa cerrifera* root extract obtained by successive solvent extraction

S. No.	Plant Constituents	Successive solvent extract				
		A	B	C	D	E
1.	Alkaloid	-	-	-	-	-
2.	Carbohydrate & Glycosides	-	-	-	+	-
3.	Phytosterol	+	-	-	-	-
4.	Phenolic compound	-	-	-	-	-
5.	Protein & Amino acids	-	-	-	-	-
6.	Mucilage	-	-	-	+	+

A - Petroleum ether extract B - Benzene extract
C - Chloroform extract D - Ethanol (95%) extract
E - Chloroform water IP extract + = *Present;* - = *Absent*

Measurement of Infra-Red absorption spectra

Infra-red absorption spectra is usually obtained by placing the sample in one beam of a double beam infra-red spectrophotometer and thereby measures the relative intensity of transmitted light energy vs wavelength[11,12].

RESULTS AND DISCUSSION

The analysis of fine powder is depicted in Table -1. The qualitative analysis revealed the presence of important active constituents like glycosides and phytosterols.

Phytosterols

Petroleum ether extract, which gave a positive qualitative test was run through TLC in chloroform: Acetone (1:1) solvent, two clear spots with a sharp RF value was observed when treated with Libermann Buchard reagent.

Glycosides

TLC of the alcoholic extract was also performed in n-Butanol; acetic acid and water 4:1:5 solvent system. This gave two clear spots with 40% H_2SO_4.

The TLC analysis have revealed that at least two sterol (and two glycosides) were present. Further study was carried out to determine the melting point of the sterols. It was observed that after the separation and isolation the m.p. of two sterols were found as follows:

1. Melting point of sterol obtained before saponification - 232°C
2. Melting point of sterol obtained after saponification - 52°C

The peaks of sterol A and B is summarized in Table 2.

The Spectrophotometric analysis of the constituents of *B. cerrifera* roots have shown that highest peak was found at 230 nm at the absorption of 1:7. This reveals that COOH group or NH2 group might be present. The second peak was found at 255 nm which further indicated that H or NH^{3+} group might be there.

The UV absorption spectrum as well as the IR absorption spectrum is depicted in figure 1 and 2. In conclusion, by the UV interpretation at 230 nm the absorbancy is log 1:7, secondary peak is found at 250 nm, the absorbancy was log 4.5. This indicates that the sterol is containing COOH and -H, it might have NH_2 group also. On the other hand, by IR interpretation the groups, which shows the presence are alcohol intermolecularly bonded single bridge compound.

Table 2 : Peaks of Sterols A and B

Peaks	Interpretation of peaks
Sterol A	
3450	Alcohol, water intermolecularly bonded single bridge compound
2960-2919	-C-H- stretch and - COOH
1560	Aromatic
1440	$-CH_2-$
1370	$-CH_3-$
1040	OH Bonding and C-O stretching
720	$-CH_2-$ rocking and C-O stretching primary alcohol
3460	Alcohol, intermolecular hydrogen bonded single bridge compound
2930	$-CH_2-$
1670	Imide a B- unsaturated 6 membered ring cyclic lactams
1010	OH

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