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## Investigation of phytochemical activities of *saussurea lappa* C.B. clarke root extract

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### ABSTRACT

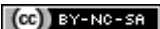
The aim of the present study was to investigate the presence of phytochemical and Flavo-Glycosides in Ethonolic extract of *Saussurea lappa*. *Saussurea lappa*, a plant of the Asteraceae, one of the best-known species within this genus, was commonly known as costus in English. In India this plant was endemic in the sub-alpine regions of Jammu and Kashmir, Himachal Pradesh and Uttaranchal, from an altitude of 3200–3800 m. After authentication, the collected plant root material it was reduced into small pieces. The plant material was extracted by using ethanol by the cold maceration method. The study concluded that the root extract have potential bioactive substances that may be used to formulate new drugs. The Flavo-Glycosides content in Ethonolic extract of *Saussurea lappa* root extract was determined. However further investigation was required for structural elucidation and pharmacological properties.

**Keywords:** *Saussurea lappa*, Asteraceae, Ethonolic, Glycosides

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## INTRODUCTION

*Saussurea lappa* [1] was found at an altitude of 2,500 to 3,000m in Kashmir and neighboring Himalayan regions. It was found wild in Jammu and in Chenab and Kishenganga Valley it has been successfully cultivated in Kashmir and Uttar Pradesh as shown in **Fig. 1** and **Fig. 2**. From the literature review [2-10] plant was reported to be rich in Costunolide, Dehydrocostus Lactone, Linoleic acids,  $\beta$ -Sitosterol,  $\alpha$  and  $\beta$ -Cyclocostunolide, Alantolactone, Isoalantolactone,



**Fig. 1: Saussurea lappa Plant**

Isohydrocostuslactone, Isozaluzanin C, Guaiainolides, Cynaropicrin, Reynosin, Saussurealdehyde, Isohydrocostus-Lactone-15-Aldehyde, 11,13-Epoxy-IsozazulaninC, Santamarine 11,13 Epoxydehydro Isozaluzamine,11, Sesquiterpenoides, Saussureal, Steroids, Pregnenolone,  $\beta$ -Sitosterol, Daucosterol, Syrine, Lignin Glycoside, 12-Octadecadienoic acid, (Z,Z)-9,12-Octadienoic acid-2-hydroxy-1,3-propanediny ester, Sesquiterpenes, Guaiainolides, Lappalone and 1, 6-Dihydroxycostic acid ethyl ester.



**Fig. 2: Saussurea lappa Roots**

## MATERIALS AND METHODS

**Collection and Authentication:** The aerial plants of *Saussurea lappa* (Asteraceae) a branched herb were collected from the Tirupathi region, A.P. India. It was authenticated and certified by Department of Botany, Sri Venkateswara University, Tirupathi.

**Preparation of Plant Extract:** The collected plant root material was washed with tap water to removing adhering dust followed by distilled water, shade dried, and size reduced into small pieces. Dried materials were coarsely powdered and macerated with petroleum ether for 72 hrs. The plant material was extracted by using ethanol by the cold maceration method. The final product was filtered, dried and stored in polythene bags for use.

**Pharmacognostical Evaluation:** All root samples were subjected to morphological and physicochemical [11,12] studies. Proximate values like foreign organic matter, moisture content, total ash value, acid insoluble ash value, alcohol soluble extractive values and water soluble extractive values were determined.

**Morphological Identification:** The dried and fresh roots of *Saussurea lappa* plant were subjected to morphological identification based on colour, odour, and taste. However the physicochemical values were found to be within the prescribed limit. The results were seen in **Table 1**.

**Table 1: Morphological Features of Fresh Roots.**

Characteristics	Fresh roots of <i>Saussurea lappa</i>
Colour	Outer skin with brownish and inner part is whitish.
Odor	Characteristic herbaceous
Taste	Bitter with slightly sweet.

**Extraction by Successive Solvent Extraction:** About 2 kg of air-dried plant material was extracted in soxhlet assembly successively with Petroleum ether, chloroform, ethyl acetate and methanol (order of increasing polarity). Each time before extracting with the next solvent, the powdered material was dried. Each extract was concentrated by using a rotary vacuum evaporator. The extract obtained with each solvent was weighed and the percentage yield was calculated in terms of the dried weight of the plant material. The color and consistency of the extract were also noted. All the solvents used for this entire work were of analytical reagent grade (Merck, Mumbai). The % yields were shown in **Table 2**.

**Solvent- Solvent Separations:** The dried root powder was dried under shade and used for maceration by ethanol solvent in a closed container at room temperature for 7 days. This involves a rough clarification by decanting, which is usually followed by a filtration step. Centrifugation may be necessary if the powder is too fine to be filtered.

The dried extract should be weighed and % yield was found to be 60%.

**Table 2: % yields of Successive Solvent Extraction.**

S.No	Solvent Fraction	% Yield
1	Petroleum ether	0.4
2	Chloroform	0.6
3	Ethyl acetate	0.6
4	Ethanol	1.5
5	Water	1.2

Ethanol extract was taken in a separating funnel to this add chloroform solvent agitated for 12hrs. After that kept aside for 30 min. Chloroform fraction layer and precipitated layers separated. After that precipitate taken in separating funnel added methanol agitated for 12 hr. After that it was kept aside for 30 min. Methanol fraction layer and precipitated layers separated. These were collected separately in beakers. After that phytochemical evaluation to chloroform fraction and methanol fraction was done and the results are given in the **Table 3.**

**Table 3: Phytochemical Evaluation of Ethonolic Extracts.**

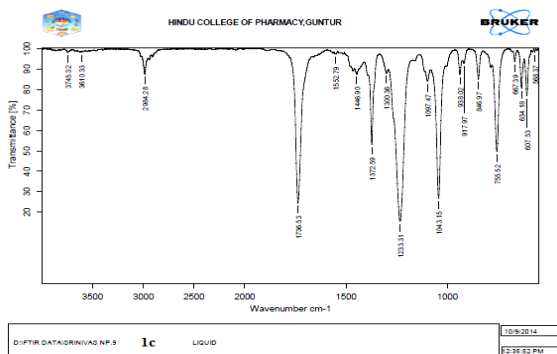
S.No	Constituents	Extracts		
		Ethonalic	Chloroform	Methonalic
1	Alkaloids	+	-	+
2	Amino acids	+	-	-
3	Carbohydrades	+	+	-
4	Flavones	+	+	-
5	Glycosides	+	+	-
6	Phenols	+	-	+
7	Proteins	+	-	+
8	Saponins	-	-	-
9	Resins	+	+	+
10	Fixed oils and fats	-	-	-
11	Steroids	-	+	-
12	Tannins	+	-	+
13	Triterpenoids	+	-	-

(Note: + = indicates presence of phytochemical and - = indicates absence of phytochemical.)

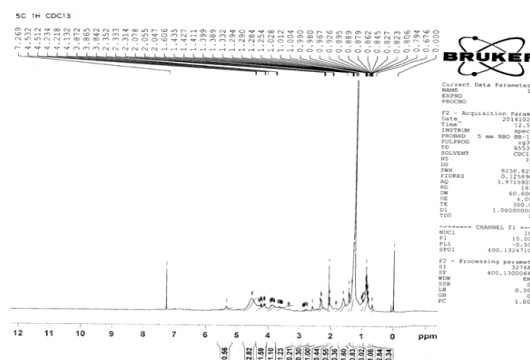
**SPECTRAL ANALYSIS**

Spectral analysis was being carried out in order to find out the exact components present in the plant and to characterization of active constituents in the

compound by spectral analysis. These fractions were tested by IR as shown in **Fig. 3**, <sup>1</sup>H NMR as shown in **Fig. 4** and <sup>13</sup>C NMR as shown in **Fig. 5**, and Mass Spectroscopy as shown in **Fig. 6**.



**Fig. 3: IR spectrum of Fraction**



**Fig. 4: <sup>1</sup>H NMR of Fraction**

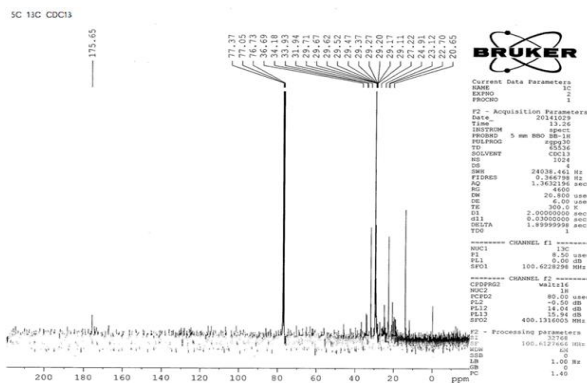


Fig. 5: <sup>13</sup>C NMR of Fraction

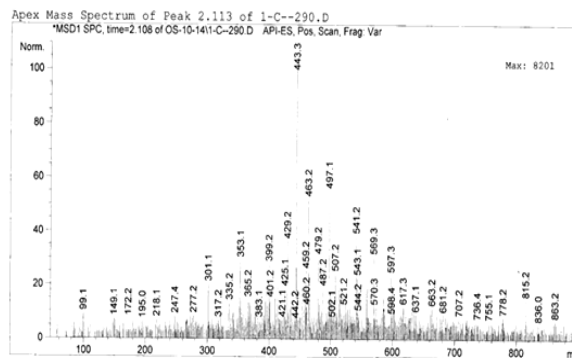


Fig. 6: Mass spectrum of Fraction

**CONCLUSION**

*Saussurea lappa* appear to be rich in secondary metabolites, widely used in traditional medicine to combat and cure various ailments. Based on the literature survey, it was reported that various pharmacological activities were reported on *Saussurea lappa*. The *Saussurea lappa* root was extracted, separated and isolated. The Ethonolic extract was first prepared and was screened for various phytochemical constituents. From this Ethonolic extract Ethyl acetate fraction was obtained using Solvent- Solvent separation technique. The fraction was screened for spectral

studies of Phyto-constituents. The Ethyl acetate fraction of the methanol extract was found to contain Flavonoids and Glycosides. Further evaluation was needed to isolate the bioactive substances which can be used for the welfare of the mankind.

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