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Research Article

**PHYTOCHEMICAL SCREENING AND TLC FINGERPRINTING
OF VARIOUS EXTRACTS OF ROOTS AND RHIZOMES OF
*COLLINSONIA CANADENSIS*****Manpreet Kaur^{1,2*} and Hayat M Mukhtar³**

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Abstract:

Collinsonia canadensis is a perennial medicinal herb in the mint family. Common names include Canada Horsebalm, Richweed, Hardhack, Heal-All, Horseweed, Ox-Balm and Stoneroot. Traditionally the roots and rhizomes of the plant are used for various diseases. The present study deals with phytochemical screening and thin layer chromatographic (TLC) fingerprinting of (petroleum ether, chloroform and methanol extracts) *Collinsonia canadensis* roots and rhizomes. In phytochemical screening maximum diversity of chemical constituents were found in methanol extract of roots and rhizomes of *Collinsonia canadensis*. Thin layer chromatographic (TLC) fingerprinting studies showed that all the three extracts i.e petroleum ether, chloroform and methanol extracts of roots and rhizomes of *Collinsonia canadensis* contains phytochemical components which were determined by Rf (Retention factor) values.

Keywords: *Collinsonia canadensis*, Phytochemical, Retention factor, Stoneroot, TLC fingerprinting

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INTRODUCTION:

Collinsonia canadensis is a perennial medicinal herb in the mint family. Common names include Canada Horsebalm, Richweed, Hardhack, Heal-All, Horseweed, Ox-Balm and Stoneroot. It is native to eastern North America from Quebec south to Florida and as far west as Missouri, although it is mainly found in east of the River Mississippi. *Collinsonia canadensis* plant contains tannins, resins, flavonoids and alkaloids [1,2]. *Collinsonia canadensis* was applied topically for number of dermatological issues, including boils and swollen breasts, and as a treatment of headaches. As a leg and foot soak, it was also considered useful in rheumatism. Internally, decoction of the root was used for kidney or heart troubles [3,4]. The flowers and leaves are often used as a fragrant deodorant, and an infusion of aerial parts used for headaches and rheumatism[5].

MATERIALS AND METHODS:**Collection and Extraction**

The roots and rhizomes of *Collinsonia canadensis* were purchased from Natural Botanicals Ghaziabad in July 2013 and were authenticated by the Dr. Sunita garg, chief scientist of CSIR-NISCAIR, New Delhi. A voucher specimen no (C. C-1) is deposited in the departmental herbarium of G. H. G. Khalsa College of Pharmacy, Gurusar Sadhar, Ludhiana. The roots and rhizomes were dried in shade and coarsely powdered. Dried coarsely powdered roots and rhizomes of *Collinsonia canadensis* (100g) were successively soxhlet extracted with petroleum ether, chloroform and methanol until extracts were obtained. Then each extract was filtered and the filtrates were concentrated under reduced pressure (Rotary vacuum evaporator). The percentage yield of the concentrated extracts were calculated and then the

extracts were subjected to phytochemical screening and thin layer chromatography fingerprinting. Plate-1 represents the photograph of *Collinsonia canadensis*.

Phytochemical Screening

The petroleum ether, chloroform and methanol extracts were screened for various classes of phytoconstituents such as alkaloids, glycosides, terpenoids, steroids and triterpenoids, saponins, tannins and polyphenols, coumarins, flavonoids, proteins, amino acids, vitamins, carbohydrates and starch using standard protocol[6,7].

Thin Layer Chromatography Fingerprinting

Ten milligram of each concentrated extract was dissolved separately in 3ml of respective solvents, so as to make solutions of the extracts, which were loaded using 2 microlitre capillary tubes (CAMAG) on Merck precoated aluminium TLC plates, silica gel 0.2 mm.

RESULTS AND DISCUSSIONS:

Table 1: Percentage yields of various extracts of *Collinsonia canadensis*

Extract	Rhizomes Yield (%w/w)
Petroleum ether extract	0.48
Chloroform extract	2.88
Methanol extract	9.6

The extraction yield calculated for petroleum ether, chloroform and methanol extracts of roots and rhizomes of *Collinsonia canadensis* showed that methanol extract registered higher percentage of yield. It may be due to high polarity of methanolic solvent which can draw high variety of plant constituents than the other solvents did.



Plate -1- Roots and Rhizomes of *Collinsonia canadensis*

Table-2 : Results of phytochemical screening of various extracts of *Collinsonia canadensis* rhizomes

Phytoconstituent	Petroleum ether extract	Chloroform extract	Methanol extract
Alkaloids	-ve	-ve	+ve
Antraquinone glycosides	-ve	-ve	-ve
Cardiac glycosides	-ve	-ve	-ve
Terpenoids	-ve	-ve	-ve
Steroids/Triterpenoids	-ve	-ve	-ve
Saponins	-ve	-ve	-ve
Flavonoids	-ve	+ve	+ve
Coumarins	+ve	+ve	+ve
Tannins and phenolic compounds	+ve	+ve	+ve
Proteins	-ve	-ve	+ve
Amino acids	-ve	-ve	-ve
Carbohydrates	-ve	-ve	-ve
Vitamin C	-ve	-ve	-ve
Starch	+ve	+ve	+ve
Resins	-ve	+ve	+ve
Waxes	+ve	-ve	+ve

-ve : absent; +ve : present

The phytochemical screening of petroleum ether extract showed the presence of coumarins, tannins and phenolic compounds, starch and waxes. Chloroform extract also showed the presence of coumarins, tannins and phenolic compounds and starch along with flavonoids and resins. Maximum diversity of chemical constituents were present in methanol extract that includes alkaloids, flavonoids, coumarins, tannins and phenolic compounds, proteins, starch, resins and waxes as shown in table-2.

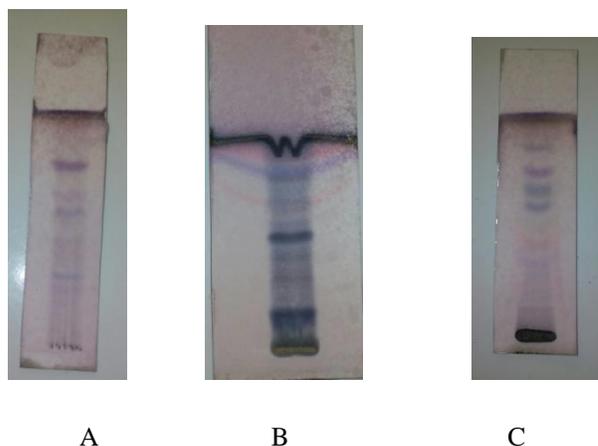


Plate 2: Representative photographs of TLC fingerprint profiles (silica gel G) of petroleum ether extract (A), chloroform extract (B) and methanol extract (C)

Table 3: TLC fingerprinting of various extracts of *Collinsonia canadensis*

Extracts	Solvent system	Visualization	Rf values
Petroleum ether extract	Dichloromethane : methanol : water 4 : 0.4 : 0.2	Anisaldehyde sulphuric acid reagent	0.28, 0.39, 0.41, 0.51, 0.55, 0.60, 0.70, 0.78
Chloroform extract	Dichloromethane : methanol : water 3.6 : 0.4 : 0.2	Anisaldehyde sulphuric acid reagent	0.17, 0.32, 0.42, 0.51, 0.57, 0.65, 0.77
Methanol extract	Dichloromethane : methanol : water 4.75 : 0.35 : 0.2	Anisaldehyde sulphuric acid reagent	0.14, 0.35, 0.42, 0.50, 0.57, 0.64, 0.74, 0.85

TLC fingerprinting of petroleum ether, chloroform and methanol extract showed impressive results as shown in plate 2 and table 3. All the extracts contains maximum diversity of components. TLC fingerprinting helps in the finding number of components in medicinal plants.

CONCLUSION:

The phytochemical screening and TLC fingerprinting revealed that various extract of roots and rhizomes of *Collinsonia canadensis* contains potential phytoconstituents. Maximum numbers of constituents were present in methanol extract followed by chloroform and then petroleum ether extract of roots and rhizomes of *Collinsonia canadensis*.

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