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**PHYTOCHEMICAL SCREENING AND TLC FINGERPRINTING OF VARIOUS
EXTRACTS OF *SYMPHYTUM OFFICINALE* ROOTS**

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ABSTRACT

Symphytum officinale is a perennial flowering plant of the genus *Symphytum* in the family Boraginaceae. Along with several species of *Symphytum*, it is commonly known as Comfrey. Comfrey has been used in folk medicine as a poultice for treating burns and wounds. The roots of the comfrey are used in case of pulmonary complaints. The present study deals with phytochemical screening and thin layer chromatographic (TLC) fingerprinting of (petroleum ether, chloroform and methanol extracts) *Symphytum officinale* roots. Phytochemical screening of various extracts showed the presence of alkaloids, anthraquinone glycosides, terpenoids, steroids/triterpenoids, flavonoids, tannins and phenolic compounds, proteins, carbohydrates, Vitamin C, gums and reducing sugars. TLC fingerprinting of petroleum ether and methanol extracts revealed the presence of seven components whereas chloroform extract showed the presence of nine components which were determined by R_f (retention factor) values.

Keywords: Phytochemical screening, Retention factor, *Symphytum officinale*, TLC fingerprinting

INTRODUCTION

Symphytum officinale is a perennial flowering plant of the genus *Symphytum* in the family Boraginaceae. Along with several species of *Symphytum*, it is

commonly known as Comfrey. To differentiate it from other comfrees, this species may be known as common comfrey [1], Quacker comfrey [1] and cultivated comfrey [1]. It is native to Europe and it is known elsewhere, including North America, as an introduced species and sometimes a weed. Comfrey has been used in folk medicine as a poultice for treating burns and wounds. The roots of the comfrey are used in case of pulmonary complaints. The leaves of the comfrey have been used for the treatment of rheumatism and gout [2].

MATERIALS AND METHODS

Collection and Extraction

The roots of *Symphytum officinale* 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 (SO-1) is deposited in the departmental herbarium of G. H. G. Khalsa College of Pharmacy, Gurusar Sadhar, Ludhiana. The roots were dried in shade and coarsely powdered. Dried coarsely powdered roots of *Symphytum officinale* (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 roots of *Symphytum officinale*.

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, reducing sugars and carbohydrates using standard protocol [3,4].

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 tube (CAMAG) on Merck precoated aluminium TLC plates, silica gel 0.2 mm.

RESULTS

Table 1 shows the percentage yield of petroleum ether, chloroform and methanol extracts of *Symphytum officinale* roots.

Table 2 shows the results of phytochemical screening of various extracts of *Symphytum officinale* roots.

Plate 1 : Roots of *Symphytum officinale*Table 1: Yields of various extracts of *Symphytum officinale* roots.

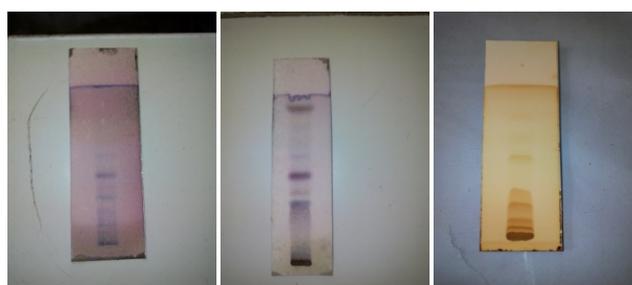
| Extract | Yield (%w/w) |
|-------------------------|--------------|
| Petroleum ether extract | 0.48 |
| Chloroform Extract | 0.68 |
| Methanol extract | 16.92 |

Table 2: Results of phytochemical screening of various extracts of *Symphytum officinale* roots.

| Phytoconstituent | Petroleum ether extract | Chloroform extract | Methanol extract |
|--------------------------------|-------------------------|--------------------|------------------|
| Alkaloids | +ve | +ve | +ve |
| Anthraquinone 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 |
| Gums | -ve | +ve | +ve |
| Reducing sugars | -ve | +ve | +ve |

Present :- (+ve), Absent :- (-ve)

Plate 2 shows the representative photographs of TLC fingerprint profiles (silica gel G) of petroleum ether extract (A), chloroform extract (B) and methanol extract (C) of *Symphytum officinale* roots.



(A)

(B)
Plate 2

(C)

Table 3 - TLC fingerprinting of various extracts of *Symphytum officinale* roots

| Extracts | Solvent systems | Visualization | Rf values |
|-------------------------|--|---|--|
| Petroleum ether extract | Toulene:methanol:acetone 8 : 0.5 : 0.5 | Anisaldehyde sulphuric acid reagent | 0.08, 0.12, 0.21, 0.29, 0.36, 0.44, 0.55 |
| Chloroform extract | Toulene:ethyl acetate:acetone 8.2 : 0.5 : 0.5 | Anisaldehyde sulphuric acid reagent | 0.12, 0.34, 0.40, 0.5, 0.59, 0.68, 0.77, 0.80, 0.86 |
| Methanol extract | Toulene:ethyl acetate:acetone 8.0 : 1.0 : 1.0 | Iodine vapours | 0.06, 0.09, 0.18, 0.25, 0.45, 0.58, 0.71 |

DISCUSSION

The phytochemical screening of petroleum ether extract showed the presence of alkaloids, anthraquinone glycosides and steroids/ triterpenoids. Whereas chloroform extract along with alkaloids, anthraquinone glycosides and steroids/ triterpenoids showed presence of terpenoids, tannins and phenolic compounds, carbohydrates, gums and reducing sugars. The methanol extract reveals the presence of alkaloids, terpenoids, steroids/triterpenoids, flavonoids, tannins and phenolic compounds, proteins, carbohydrates, Vitamin C, gums and reducing sugars as shown in table 2. TLC fingerprinting of petroleum ether, chloroform and methanol extracts of *Symphytum officinale* roots showed impressive results as shown in plate 2 and table 3. Chloroform extract contains maximum number of components.

CONCLUSION

The phytochemical screening and TLC fingerprinting revealed that various extracts of roots of *Symphytum officinale* contains potential phytoconstituents. Maximum number of constituents were present in

chloroform and methanol extract followed by petroleum ether extract of *Symphytum officinale* roots.

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