

FTIR spectroscopic analysis of crude extract of roots of *Vetiveriazizinioides*: A medicinale mentioned in Atharvaveda

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Abstract: Herbs have always been the principal form of medicine in India and presently they are becoming popular throughout the world. Hence, the present study aims to screen the phytochemical compounds and determine the functional group through the Fourier transform Infrared spectroscopy of the *Vetiveriazizanioides*, a medicinal plant mentioned in Atharvaveda. The extract was prepared using methanol. The result showed that the crude extract of root contained alkaloids, Anthracene glycosides, flavonoids, polyuronoid, reducing compounds, saponin, steroids, triterpenoids and volatile oil. The major functional group found in the root extract were Alcohol (O-H), Amine (N-H), Alkane (C-H), Acid (O-H), Alkene (C=C), Alkane (-C-H-) etc.

Keywords: FTIR Spectroscopy, Atharvaveda, *Vetiveriazizanioides*

Introduction-

World is endowed with a rich wealth of medicinal plants and India is sitting on a gold mine of well recorded and traditionally well- practiced knowledge of herbal medicine. Approximately 80% of the World's population relies on traditional medicine for health care and most therapies use plant extracts and their active compounds (Winston, J.C., 1999). *Vetiveriazizanioides*(L.) Nashx (Khus) belonging to family Poaceae, is one of the medicinal plants mentioned in Atharvaveda (Arya, 2007). It is rich in anti-inflammatory, antiseptic, Aphrodisiac and healing properties (Balashankar et.al., 2013). *Vetiveriazizanioides* is widely cultivated in the tropical region of the world. Root pacifies hyperdipsia, ulcer, skin diseases, vomiting, nausea, cough, fever, low back pain and headache and general debility.

Hence, the present study aims to screen the phytochemical compounds and determine the functional group through the Fourier transform Infrared spectroscopy(FTIR) of root extract of *Vetiveriazizanioides*. FTIR is a method used to identify the functional groups in gaseous, liquid and solid materials via infrared radiation beams (Khan et.al., 2018).

Materials and Methods

Collection of Plant material

The plant material is collected from Bar RDIK and NKD College garden, Badenera of district Amravati in Maharashtra and some private gardens.

Plant identification and Extract preparation

The plant was identified with the help of the standard floras (Naik, 1998). After the proper identification, roots were shade dried at room temperature and made into coarsely powdered using mechanical grinder and preserved in air tight container. 150 grams of powdered materials of root samples were extracted in a Soxhlet apparatus with methanol. The extract was filtered and

subject to evaporation to get the crude extract. The crude extract was kept in refrigerator for further analysis.

For the phytochemical screening, the method of Chhabra (1984) was adopted. The FTIR analysis was conducted at the Central Instrumentation Laboratory, Punjab University at Chandigarh.

Result and Discussion

Plant Part	Test	Aqueous	Ethanol	Methanol
Root	Alkaloids	+	+	+
	Anthracene Glycosides	+	+	+
	Anthroquinone	-	-	-
	Aucubins	+	+	+
	Iridoids	-	-	-
	Carotenoids	-	-	-
	Coumarin	-	-	-
	Emodin	-	-	-
	Fatty Acid	-	-	-
	Flavonoid	+	+	+
	Polyuronoid	+	+	+
	Tannin	-	-	-
	Starch	-	-	-
	Polyoses	-	-	-
	Reducing compounds	+	+	+
	Saponin	+	+	+
	Steroids	+	+	+
	Triterpenoids	+	+	+
	Volatile oil		+	+

Table 1: Qualitative phytochemical analysis of *Vetiveriazizanioides* root extracts

IR spectrum of Roots of *V. zizanioides*

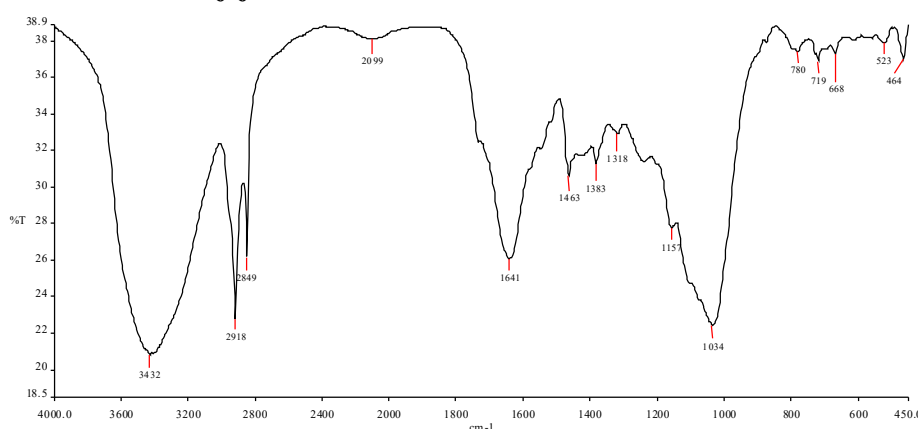


Figure 1: IR spectrum of methanol extract of roots of *V. zizanioides*

The IR spectra of roots of *V. zizanioides* showed 13 absorption peaks of various intensity and vibrations ranging from 3432cm^{-1} to 523cm^{-1} . Alcohol group with strong and broad (O-H) bond

of stretch and H- bonded vibration and of medium intensity Amine (N-H) with stretch vibration was observed at 3432cm^{-1} . Alkane (C-H bond) of strong intensity observed at 2918cm^{-1} . At 2849cm^{-1} , Acid (O-H bond) of very strong and broad intensity was observed. A variable intensity of Alkene (C=C bond) and Amide (N-H bond) was observed at 1641cm^{-1} . At 1463cm^{-1} , Aromatic (C=C bond) of medium to weak intensity was seen. At 1383cm^{-1} , Alkane (C-H bond) of variable intensity and bending type was observed. Acid (C-O bond) of strong intensity and stretch vibration was determined at 1318cm^{-1} and Amine (C-N bond) of medium to weak intensity and stretch type was determined. Amine (C-N bond) was also determined at 1157cm^{-1} and 1034cm^{-1} along with Alcohol (C-O bond) of strong intensity and stretch vibration. Alkylhalide (C-Cl bond) of strong intensity showed its presence at 780cm^{-1} , 719cm^{-1} and (C-Br bond) at 719cm^{-1} and 523cm^{-1} .

Conclusion and Discussion

Phytochemical screening of *Vetiveriazizanoides* using various extracts like aqueous, ethanol and methanol has been done. The qualitative analysis of root extract is presented in Table 1. The main objective behind this study is to identify various secondary metabolites along with the presence of various functional groups. The screening analysis showed the presence of alkaloids, Anthracene glycosides, flavonoids, polyuronoid, reducing compounds, saponin, steroids, triterpenoids and volatile oil. It explored the presence of a wide range of secondary metabolites, signifies that *Vetiveriazizanoides* act as a valuable natural resource of compounds which helps in maintaining health.

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