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Preliminary Phytochemical Analysis from the Bark of Plant *Boswellia Serrata* Roxb. Ex. Colebr.

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ABSTRACT:

Boswellia serrata Roxb. ex. Colebr. is one of the most primitive medicinal plant belongs to the family Burseraceae. The plant was undertaken to check phytochemical analysis based on ethnobotanical data collected from North East Region of Nashik District, Maharashtra. The bark of the plant has high medicinal value and used as anti-cancer and to cure joint pains, feet, spine, arthritis, swelling, sprains, bruises, back pain and as a stimulant for menstrual flow. The bark of the plant samples were collected from Malegaon taluka of Nashik District.

Key words – Phytochemical, Ethnobotany, *Boswellia serrata*, Medicinal

Introduction:

Phytochemical analysis of *Boswellia serrata* involves the study of the chemical components present in the plant species. *Boswellia serrata* also known as Indian frankincense, is a tree native to India, Pakistan, and the Arabian Peninsula. It has been used for centuries in traditional medicine due to its potential therapeutic properties. Phytochemical analysis aims to identify and quantify various bioactive compounds present in *Boswellia serrata*. These compounds include triterpenoids, essential oils, and flavonoids, among others. Triterpenoids, specifically boswellic acids, are considered the primary active constituents responsible for the plant's anti-inflammatory and anti-cancer properties. The analysis of *Boswellia serrata* involves extraction techniques to isolate the phytochemicals from the plant material. Different methods, such as cold extraction, hot extraction, solvent extraction or supercritical fluid extraction, may be employed to obtain the bioactive compounds. Once extracted, various analytical techniques are used to identify and quantify these compounds, including gas chromatography-mass spectrometry (GC-MS), high-performance liquid chromatography (HPLC), and nuclear magnetic resonance (NMR) spectroscopy.

The phytochemical analysis of *Boswellia serrata* helps in understanding the chemical composition of the plant and its potential bioactivity. It enables researchers to identify specific compounds responsible for the plant's medicinal properties and may aid in the development of therapeutic applications or standardized herbal preparations.

Material and Methodology

1. Extraction of powdered drugs

All the powdered drug samples were processed for the cold extraction by maceration with ultrasonication method. Five different solvents (water, methanol, ethanol, chloroform and petroleum ether) were used for the extraction. Cold extraction technique was intentionally used to restore the intactness of the phytoconstituents especially those are thermolabile in nature.

2. Experimental

For extraction, each powdered sample was weighed (20 gm) individually. These powdered samples were taken in stoppered conical flasks and 100 ml of specified solvents were added. The flasks were kept on orbital shaker for next 24 hrs with 5 min treatment of ultrasonication to each sample in between these shakings.

Sample No.	Drug quantity	Solvent used	Weight of crucible (gm)	Weight of crucible with extract (gm)	Weight of extract (gm)	Extraction yield (% w/w)
	20 gm	Water	66.13	67.53	1.4	**7**

Boswellia serrata Roxb. ex Colebr.	20 gm	Methanol	76.13	78.88	2.75	**13.75**
	20 gm	Ethanol	67.38	69.74	2.36	**11.8**
	20 gm	Chloroform	74.73	75.09	0.36	**1.8**
	20 gm	Pet. Ether	72.99	73.22	0.23	**1.15**

2. Preliminary Phytochemical Analysis

Above prepared extracts of each drug were used for preliminary phytochemical analysis. In this, chemical tests for the detection of some primary metabolites (carbohydrate, amino acid, protein, lipid and starch) and secondary metabolites (alkaloids, flavonoids, tannins, saponins, glycosides) were done.

Results for *Boswellia serrata* Roxb. ex Colebr.

Test for	Test	Observation	Inference	Pic of the test
Primary Metabolites -				
Carbohydrate	**Molisch's test (General test)** To 2-3 ml aqueous extract, add few drops of alpha-naphthol solution in alcohol, shake and add conc. H_2SO_4 from side of the test tube.	Violet ring is formed at the junction of two liquids.	Present	
Amino Acid	**Ninhydrin test (General test)** Heat 3 ml T.S. and 3 drops 5% Ninhydrin solution in boiling water bath for 10 min.	Purple / bluish colour appears.	Present	
Protein	**Biuret test (General test)** To 3 ml T.S. add 4% NaOH and few drops of 1% $CuSO_4$ solution.	Violet or pink colour not appeared.	Absent	
Lipid	Extract dropout on filter paper drought comes then lipids are present.	No permanent stain on filter paper	Absent	

Starch	**Iodine test:** Mix 3 ml test solution and few drops of dilute iodine solution. Blue colour appears, it disappears on boiling and reappears on cooling.	Blue colour does not appear	Absent	
Secondary Metabolites				
Alkaloids	Evaporated the aqueous, alcoholic and chloroform extracts separately. To residue, dilute HCI added. After shaking well and filtration, using filtrate, following test was performed.			
	Wagner's test 2-3 ml filtrate with few drops Wagner's reagent gives reddish brown ppt.	Reddish brown ppt	Present	
Flavonoids	**Shinoda Test** To dry powder or extract, add 5 ml 95% ethanol/t-butyl alcohol, few drops conc. HCI and 0.5 g magnesium turnings. Orange, pink, red to purple colour appears.	Orange red colour observed	Present	
Tannins	**5% $FeCl_3$ solution**	Deep blue-black colour	Present	
Saponins	Add water into sample and shake for 15 sec.	Foam is observed	Present	

Glycosides	**Legal's test (Test for cardenoloids)** To aqueous or alcoholic extract, add 1 ml pyridine and 1 ml sodium nitroprusside.	Pink to red colour appeared	Present	
	Test for deoxy sugar (Keller-Killiani test) To 2 ml extract, add glacial acetic acid, one drop 5% $FeCl_3$ and conc. H_2SO_4. Reddish brown colour appears at junction of the two liquid layers and upper layer appears bluish green.	No reddish brown colour appears at junction of the two liquid layers.	Absent	

Result and Discussion

The specific phytochemical profile of *Boswellia serrata* can vary depending on factors such as geographical location, climate, and extraction methods used. Phytochemical analysis helps in determining the composition and concentration of these bioactive compounds, which in turn provides insights into the potential therapeutic applications. The plant samples were tested to check the presence and absence of primary and secondary metabolites present in *Boswellia serrata*. The powdered drug sample was processed for cold extraction by maceration with ultrasonication method. Five different solvents (water, methanol, ethanol, chloroform and petroleum ether) were used for the extraction. Cold extraction technique was intentionally used to restore the intactness of the phytoconstituents especially those are thermolabile in nature. Carbohydrate, Amino Acid shows the presence, where Protein, Lipid and Starch is absent in bark of plant *Boswellia serrata*. Alkaloids, Flavonoids, Tannins, Saponins, Glycosides are present in Legal's test and absent in test for deoxy sugar (Keller-Killiani test).

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