

Executive Summary of UGC Minor Research Project
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ISOLATION AND CHARACTERIZATION OF BIOACTIVE COMPOUNDS
FROM PLANTS

Nature is a unique source of structures of high phytochemical diversity, many of them possessing interesting biological activities and medicinal properties. The plants selected for the present study includes *Piper chaba*, *Artemisia pallens* and *Amomum aculeatum*.

PIPER CHABA

Piper chaba fruits were reportedly used as pungent, aromatic, stimulant, anthelmintic, expectorant and carminative; improves appetite and taste and also useful in asthma, bronchitis, fever, inflammation, piles, pain in the abdomen etc.

For conducting phytochemical screening and antioxidant activity studies, the methanol extraction of aerial parts of *P. chaba* were carried out using Soxhlet extraction apparatus. The solvent was then removed using a rotary evaporator under reduced pressure.

From various colour reactions for the screening of phytochemicals, the presence of several components were confirmed in the methanol extract.

Various antioxidant assays were carried out such as the total phenolic content, total flavonoid content, reducing power, antioxidant activity by DPPH· assay, superoxide scavenging ability as well as nitric oxide scavenging ability on the methanol extracts of fruits and leaves of *P. chaba*. The absorbance was measured as per various reported literature procedures using Shimadzu TCC-240A UV-visible spectrophotometer. The anti-inflammatory activity studies were also carried out on their methanol extracts.

The present study confirms that the fruit extract of *P. chaba* has significant antioxidant activity especially as it has high phenolic content, high flavonoid content, good superoxide as well as nitric oxide radical scavenger. The leaf extract exhibited high reducing power, good DPPH radical scavenging activity and better anti inflammatory activity.

For studying the antimicrobial properties, essential oils were extracted from the leaves and fruits with the help of Clevenger apparatus Among the six micro organisms tested, two of them were deactivated by the leaf oil. The fruit oil exhibited good antimicrobial activity against all the six tested micro organisms.

The GC-MS analyses of the essential oils were carried out and several components were detected with their percentage abundance in the oil. This was evident from the gas chromatograms of both the leaf oil and fruit oil.

The thin layer chromatographic studies were also carried out which pointed to the presence of a large number of phytochemicals in the methanol extracts. On crystallisation, the well-known alkaloid piperine could be isolated from the methanol extracts of leaves and fruits of *P. chaba* which was characterised using various spectroscopic techniques.

Thus, the study on various phytochemical, biological and antioxidant activities of the leaves and fruits of *Piper chaba* have been carried out in detail and compared successfully.

ARTEMISIA PALLENS

The plant *Artemisia pallens* is known as “*Davana*” in ayurveda, is a versatile medicinal plant used singly or in combination with other medicinal plants for treating a variety of ailments. The leaves and flowers yield an essential oil known as ‘oil of *Davana*’. *Artemisia pallens* is a versatile plant which is well known for its fragrance and biological activities.

For studying the antimicrobial properties, the essential oil was extracted from the aerial parts of *A. pallens* with the help of Clevenger apparatus. The antimicrobial activity of the essential oil was also studied by screening against various micro organisms. Among the six micro organisms tested, four of them were deactivated by the plant oil. The oil was inactive against both of the tested fungal species.

The GC-MS analysis of the essential oil was carried out and several components were detected with their percentage abundance in the oil.

For conducting phytochemical screening and antioxidant activity studies, the methanol extraction of aerial parts of *A. pallens* were carried out using Soxhlet extraction apparatus. From various colour reactions for the screening of phytochemicals, the presence of several components were confirmed in the methanol extract.

Various antioxidant assays were carried out such as the total phenolic content, total flavonoid content, reducing power and antioxidant activity by DPPH[·] assay, superoxide scavenging ability as well as nitric oxide scavenging ability on the methanol extracts of the aerial parts. Anti-inflammatory activity studies were also carried out on the methanol extract of the aerial parts of *A. pallens*.

Thus, the study on various phytochemical, biological and antioxidant activities of the aerial parts of *Artemisia pallens* have been carried out.

AMOMUM ACULEATUM

Amomum aculeatum Roxb. is a herbaceous plant which is used as a folk medicine to treat fever and malaria.

In the present study, various phytochemical screening methods were used for the preliminary screening of bioactive components like alkaloids, flavonoids, terpenoids, steroids etc. The results obtained indicated the presence of several phytochemicals in the methanol extracts of the rhizomes, fruits and leaves of *A. aculeatum*. The methanol extracts of the rhizomes, fruits and leaves of *A. aculeatum* were subjected to various *in vitro* antioxidant activity studies like total phenolic content, total flavanoid content, FRAP assay, reducing power and DPPH radical scavenging activity. The antioxidant activities were evaluated and compared.

The total phenolic content and total flavanoid content of the fruit extract was found to be higher than that in the rhizome extract and leaf extract. The fruit extract also exhibited higher reducing power, ferric reducing antioxidant power and DPPH radical scavenging ability than the other two extracts.

The findings indicated promising antioxidant ability for the methanol extracts of the rhizomes, fruits and leaves of *A. aculeatum*. Moreover, the fruit extract of *A. aculeatum* can be used as an easily accessible source of natural antioxidants for reducing oxidative stress.

Sd/-

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