

ANTIOXIDANT ACTIVITY AND FREE RADICAL SCAVENGING POTENTIAL OF *PIPER NIGRUM* AND *PIPER LONGUM*

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The antioxidant activities of the Ether extracts from the fruits and leaves of *Piper longum* and *Piper nigrum* (Piperaceae) were assessed in an effort to validate the medicinal potential of the subterranean part of the herb. The antioxidant activity of the Piper was determined by the DPPH method and was compared with the standard antioxidants ascorbic acid and butylated hydroxytoluene (BHT). The radical scavenging activity of ether extracts of *Piper* and the standard compounds followed the order of Ascorbic acid > BHT > *P. nigrum* fruit > *P. longum* fruit > *P. longum* leaves. Present study reveals that the selected plants would exert several beneficial effects by virtue of their antioxidant activities and could be harnessed as drug formulations.

Keywords: Antioxidant; Free radical scavenging activity; *Piper nigrum*; *Piper longum*.

Antioxidants are widely used as food additives to provide protection against oxidative degradation of foods by free radicals¹. In order to preserve food various synthetic antioxidants such as butylated hydroxytoluene (BHT) and Butylated Hydroxyanisole (BHA) are used. However it has been suggested that these compounds have some side effects^{2,3}. In addition it has been suggested that there is an inverse relationship between dietary intake of antioxidant rich foods and the incidence of human disease⁴.

In recent years, there has been great interest in screening various plant extracts for natural antioxidants because of their good antioxidant properties⁵. Since ancient times, spices added to different types of food to improve flavors and are also well known for their antioxidant capacities⁶. Among the plants investigated to date, one showing enormous potential is the pepper family otherwise known as Piperaceae⁷. *P. nigrum* and *P. longum* is a flowering vine of Piperaceae. It is native to India and has been a prized spice since ancient times.

The present research is focused on evaluation of antioxidant activity of ether extract of *P. nigrum* fruit and *P. longum* leaves and fruits. The study would offer basic data on the natural antioxidant potential of *Piper nigrum* and *Piper longum* for the food or pharmaceutical industries and is an effort to validate the medicinal potential of the subterranean part of the herb.

Dried fruits of plants were collected and reduced to fine powder using mortar and pestle. The powdered

sample is preserved in air-tight container for further use. Evaluation of in vitro antioxidant activity done by using DPPH (2, 2-diphenyl-1-picrylhydrazyl) radical scavenging assay⁸.

DPPH radical scavenging assay was selected due to its straight forwardness, quickness, sensitivity and reproducibility⁹.

DPPH is a nitrogen centered free radical scavenger that shows strong absorbance at 517 nm. Deep violet coloured methanolic DPPH solution changes to yellow colour in presence of DPPH radical scavengers. DPPH radical accepts an electron or hydrogen radical to become a stable diamagnetic molecule. Extent of DPPH radical scavenged was determined by the decrease in absorbance at 517 nm induced by antioxidants. The decrease in absorbance of DPPH radical caused by antioxidants, due to the reaction between antioxidant molecules and free radicals, which results in the scavenging of free radicals by hydrogen donation¹⁰.

Fig 2 shows the dose-response curve of DPPH radical scavenging activity of the ether extracts of the leaves and fruits of *P. longum* and *P. nigrum* fruit. The results were compared with the standard antioxidants Ascorbic acid and BHT (Fig 1).

It was observed that ether extract of *P. nigrum* fruits had higher activity than that of the leaves and fruits of *P. longum*. At a concentration of 1000 µg/ml, the scavenging activity of ether extract of the *P. nigrum* fruit reached

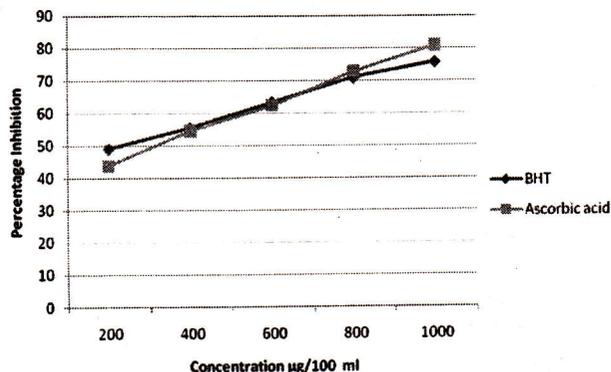


Fig.1. DPPH Assay of Standards prepared in Ether.

74.38%, while at the same concentration, that of the leaves of *P. longum* the scavenging activity reached 51.71%.

The radical scavenging activity of ether extracts of *Piper* and the standard compounds followed the order of Ascorbic acid > BHT > *P. nigrum* fruit > *P. longum* fruit > *P. longum* leaves.

All of the extracts in this research exhibited different extent on antioxidant activity. *P. nigrum* extract showed equal potency of scavenging DPPH free radical when compared with BHT (synthetic antioxidant). This may be related to the high amount of phenolic compounds in plant extract. In the longer term, plant species (or their active constituents) identified as having high levels of antioxidant activity *in vitro* may be of value in the design of further studies to unravel novel treatment strategies for disorders associated with free radicals induced tissue damage.

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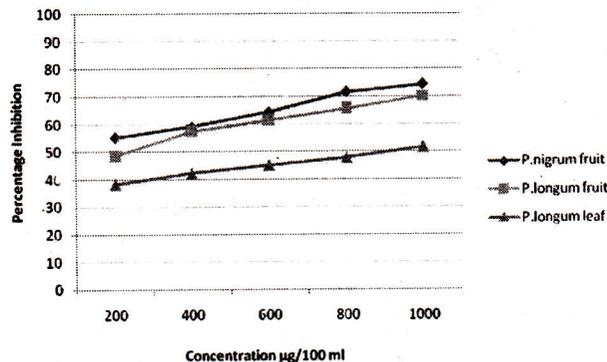


Fig.2. DPPH Assay of Ether Extract of *Piper* species.

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