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Bioactivity of methanolic extract of *Piper longum*

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Piper longum L ('Long Pepper') holds a significant place in traditional medicine due to its medicinal properties. This study focuses on investigating the medicinal potential of methanolic crude extracts from fruits, leaves, and roots of *P. longum*. The dried and ground samples of fruits, leaves, and roots were separately subjected to a 24-hour reflux with methanol. The crude extracts were evaluated for antioxidant activity (2,2-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging assay), α-amylase inhibition assay, α-glucosidase inhibition potential and phytotoxicity (lettuce seed germination assay). IC_{50} values obtained from the DPPH radical scavenging assay of roots, fruits, leaves and positive control (ascorbic acid) were 462.11 ± 9.38 mg L^{-1}, 769.83 ± 8.66 mg L^{-1}, 931.28 ± 4.02 mg L^{-1}, 6.11 ± 0.1 mg L^{-1} respectively. In α-Amylase inhibition assay, the IC_{50} values observed were: leaves; 534.26 ± 6.83 mg L^{-1} roots; 1258.43 ± 9.46 mg L^{-1} and fruits; 2212.07 ± 2.92 mg L^{-1}. Acarbose was used as the positive control in both α-amylase (IC_{50} 62.87 ± 7.62 mg L^{-1}) and α-glucosidase (IC_{50} 74.44 ± 10.05 mg L^{-1}) assays. The α-Glucosidase inhibition assay revealed IC_{50} values for leaves (3940.12 ± 4.72 mg L^{-1}), roots (6110.31 ± 18.45 mg L^{-1}), and fruits (7014.72 ± 12.83 mg L^{-1}). Phytotoxicity assessments for shoot inhibition resulted in IC_{50} values of 1224.23 mg L^{-1} for fruits, 1623.55 mg L^{-1} for roots, and 2977.5 mg L^{-1} for leaves. Root inhibition assays yielded IC_{50} values of 1311.2 mg L^{-1} for fruits, 1843.82 mg L^{-1} for roots, and 4086.29 mg L^{-1} for leaves. These results were compared to the positive control, abscisic acid, which showed IC_{50} values of 0.99 mg L^{-1} for root inhibition and 1.11 mg L^{-1} for shoot inhibition. Considering the IC_{50} values obtained for the methanolic extracts of *P. longum*, it can be concluded that *P. longum* leaf-extract is showing a mild antioxidant and α-amylase inhibition potential.

Keywords: *Antioxidant activity, α-amylase inhibition, α-glucosidase inhibition, Piper longum, phytotoxicity*