Antioxidant and Hypoglycemic Activities of Leaf Extracts of Three Popular *Terminalia* Species

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Abstract: This study aimed to ascertain the antioxidant and hypoglycemic activity of methanolic extracts of the leaves of *Terminalia arjuna*, *T. bellerica*, and *T. chebula*. Extracts were evaluated for total phenolic, flavonoid, and tannin content, and *in vitro* antioxidant potential with DPPH, ORAC, and FRAP assays. The extracts’ hypoglycemic activities were evaluated by hypoglycemic screening and an oral glucose tolerance test (OGTT) in normal rats. The methanolic extracts of *T. chebula* leaves exhibited the highest quantity of total phenolic and flavonoid content, followed by those of *T. bellerica* and *T. arjuna*. *T. arjuna* contained more tannin than *T. bellerica* did, but less than that of *T. chebula*. The scavenging capacity of *T. chebula* for the antioxidant DPPH was the highest of the extracts tested, as it recorded the lowest *IC*50 value of all 3 extracts. Likewise, the results attributed the *T. chebula* extract with the highest oxygen radical absorption capacity (ORAC). In the FRAP assay, the extracts’ ferric reducing antioxidant abilities were *T. arjuna* > *T. chebula* > *T. bellerica*. This correlates the potential of polyphenolic content enriched with antioxidant capabilities and substantiates the results of the hypoglycemic screening and OGTT, which determined that the *T. chebula* extract had a better hypoglycemic effect in normal and glucose-induced hyperglycemic rats (*p* < 0.001) than that of *T. bellerica* and *T. arjuna*, respectively. The use of these *Terminalia* species as food supplements may help in reducing oxidative stress and related diabetic complications. The phytoconstituents responsible for the hypoglycemic activity need to be isolated to elucidate the relationship between the extracts’ antioxidant capacity and their hypoglycemic effects.

Keywords: Polyphenols, Antioxidant activity, Hypoglycemic activity, Oral glucose tolerance test, *Terminalia chebula*. 