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Topic of Research: High-throughput screening and metabolomic profiling for identification of antidiabetic compounds from medicinal plants

Findings

The research revealed substantial insights into how medicinal plants effectively combat diabetes. In this study, aqueous and methanolic extracts viz, methanolic heartwood extract of *Pterocarpus marsupium* (MPME), methanolic leaf extract of *Gymnema sylvestere* (MLGS), methanolic root extract of *Rubia cordiofolia* (MRRC), methanolic seed extract of *Trigonella foenum-graecum* (MSTG), methanolic root extract of *Berberis aristata* (MRBA), methanolic stem extract of *Tinospora cordiofolia* (MSTC), aqueous heartwood extract of *Pterocarpus marsupium* (APME), aqueous leaf extract of *Gymnema sylvestere* (ALGS), aqueous root extract of *Rubia cordiofolia* (ARRC), aqueous methanolic seed extract of *Trigonella foenum-graecum* (ASTG), aqueous root extract of *Berberis aristata* (ARBA), and aqueous stem extract of *Tinospora cordiofolia* (ASTC) showed antioxidant, α-amylase and α-glucosidase activity. Further two potent plant extracts (MPME and MLGS) showing highest antidiabetic potential via inhibition of digestive enzymes, were selected for further analysis. The study revealed the presence of potent plant metabolites from MPME and MLGS using high throughput techniques. Molecular docking and molecular dynamic simulation analysis showed the antidiabetic potential of many identified compounds of MPME and MLGS with different antidiabetic targets. It was found out that the treatment of MLGS (93.75 µg/ml) and MPME (93.75 µg/ml) improved the glucose uptake in HepG2 cells significantly as compared to control (untreated). Dual *(AO/EB)* staining showed therapeutic potential of MPME and MLGS treatments in high glucose (HG) treated HepG2 cells. The protective effect of selective extracts was also visualized by propidium iodide (PI) and 4',6-diamidino-2-phenylindole staining.