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Importance of asiaticoside in the medicine for the treatment of kidney disease: A phytotherapeutical approach with molecular simulation study

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Objectives: Herbal plant materials have been used in the field of medicine for the treatment of kidney disorders. Asiaticoside is a pentacyclic triterpenoid saponin which has anti-inflammatory, anti-oxidant and wound healing properties.

Methods: In the present investigation all the information of asiaticoside with respect to their medicinal values and pharmacological activities have been collected and analyzed for the treatment of kidney disorders. Molecular mechanism of asiaticoside on nephropathy of rats has been investigated in the scientific research and data were presented. Molecular simulation study of asiaticoside against xanthine oxidase and other antioxidant enzymes such as superoxide dismutase (SOD), catalase and glutathione peroxidase (GPx) were analyzed and reported in the present investigation. Further interaction between asiaticoside and ligand molecules was also analyzed and determined the binding energy and type of interaction through molecular simulation study.

Results: From the analysis of data of different experiment presented in the scientific research, we found that asiaticoside enhance the protein levels and decreased urine protein excretion in the rats. Analysis of data also revealed the importance of asiaticoside against production of nitric oxide. Present study revealed the importance of asiaticoside for the treatment of kidney disorder through different mechanism against oxidative damage, antioxidant level and anti-inflammatory potential. Molecular docking study revealed the importance of asiaticoside against xanthine oxidase, which is the main factor for the production of uric acid in the body responsible for the kidney damage and disorders. Result of molecular simulation study revealed the better binding of asiaticoside against xanthine oxidase, superoxide dismutase and catalase which further support the claimed treatment option of asiaticoside against various form of kidney disorders.

Conclusions: Present work is supportive to the scientists who are trying to develop some novel medicine for the treatment of kidney disorders from natural sources.