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(57) Abstract :
Rhus mysorensis, a plant belonging to the Anacardiaceae family, is utilized in approximately 250 species widely utilized in Indian traditional health care system. It is recognized for its therapeutic potential due to its rich polyphenolic compounds. The purpose of this investigation was to enhance the Rhus mysorensis extraction procedure. Among various extraction methods, ultrasound-assisted extraction (UAE) proved as the best efficient. For the optimization the three-level factor Box-Behnken statistical design was employed, quadratic model with a regression value of 0.9955 for the experimental configuration, yielding an optimized extraction condition with a solvent-to-drug ratio of 21.65 (v/w), an extraction time of 46.724 minutes, and an extraction temperature of 45.833°C, resulting in a 6.874% w/w extraction yield. On the other hand, under the revised experimental setup R. mysorensis extract yield was 6.76% w/w. Subsequently, a HPTLC technique was developed for simultaneous evaluation of fisetin, baicalein, and quercetin content with the mobile phase of ethyl acetate: toluene: formic acid (5:4:1 v/v) and the stationary phase as silica gel F254 HPTLC plate. Additionally, the nutritional composition of Rhus mysorensis was determined, and found Energy, kcal/100gm 321.0, Carbohydrate, kcal/100gm 81.42, Protein, kcal/100gm 17.92, Fat, kcal/100gm 1.69, and the samples were tested for pesticide content, aflatoxins, and microbial contamination, all found within permissible limits. The total content of flavonoids (represented as quercetin equivalent) and phenolic content (represented as gallic acid equivalent) was found to be 83.73 ± 0.02 and 57.46 ± 0.01 respectively. The docking studies were performed using 1HCK; 1MWT; 5TZ1 and 6KZV PDB IDs for selected phytoconstituents Baicalein; Fisetin; and Quercetin. The molecular dynamics performed on 1HCK protein, which shows the Quercetin among all the three is more stable for 1HCK protein among all the three phytoconstituents. Antioxidant activity was assessed using DPPH test, with an IC50 value equivalent to 15.63931 ± 1.94 µg/mL with respect of ascorbic acid equivalence. Furthermore, antimicrobial efficacy of R. mysorensis extract was demonstrated against E. coli, S. aureus, and A. niger, leading to the lysis and eradication of bacteria by degrading their cell walls.

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