Abstract: This study presents a comprehensive pharmacognostical evaluation of the root of *Brassica oleracea* var. *botrytis* L (cauliflower), focusing on its phytochemical constituents and antimicrobial potential. The methodology encompassed systematic collection, authentication, washing, drying, and pulverization of the plant root. Subsequent analyses included determination of physical and physicochemical parameters, followed by maceration extraction using methanol. Preliminary phytochemical screening revealed the presence of bioactive compounds such as flavonoids, phenolics, alkaloids, terpenoids, and glucosinolates, aligning with findings from related Brassica species. Analytical techniques, including Thin Layer Chromatography (TLC) was employed to profile the chemical constituents. Pharmacogenetic studies corroborated these findings, highlighting the root's rich phytochemical composition. The antimicrobial efficacy of the methanolic root extract was assessed using the Minimum Inhibitory Concentration (MIC) method against various pathogenic microorganisms. The extract demonstrated significant inhibitory activity, particularly against *Candida albicans* and other fungal pathogens, suggesting its potential as a natural antimicrobial agent.

In conclusion, the root of *Brassica oleracea* var. *botrytis* L exhibits a diverse array of bioactive compounds with notable antimicrobial activity. These findings support its potential application in the development of plant-based therapeutic agents.

Keywords: *Brassica oleracea* var. *botrytis* L, pharmacognostical evaluation, phytochemical constituents, Thin Layer Chromatography (TLC), Minimum Inhibitory Concentration (MIC).