Potent anticancer, antioxidant and antibacterial activities of isolated flavonoids from *Asplenium nidus*

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**ABSTRACT**

Bioactive flavonoids derived from *Asplenium nidus* (fern) possess potent tumoricidal, antibacterial, anti-oxidant activities that are responsible for their chemo-preventive potential against multidrug-resistant (MDR) pathogens, *Proteus mirabilis, Proteus vulgaris* and *Pseudomonas aeruginosa*. Fractionation and recognition of the flavonoids were attained through gas chromatography and mass spectrometry (GC/MS). Twelve known and three unknown compounds were revealed by fractions 1 & 3, representing 13.12% and 2.61% out of the total composition (15.12%). Gliricidin 7-O-hexoside was found 3.83% followed by quercetin 7-O-rutinoside (3.09%) keampferol 3-O-rutinoside (0.19%) and myricetin 3-O-rhamnoside (1.10%). The anti-bacterial and anti-oxidant activities of present fractions along with pure bioactive constituents were tested against three MDR pathogens through microbroth dilution: MIC\(_{50}\) ranges for amoxicillin, gliricidin 7-O-hexoside and quercetin 7-O-rutinoside were 0.0003–0.06 μg/mL, 0.004–0.06 μg/mL and 0.005–6.0 μg/mL, respectively. Gliricidin 7-O-hexoside and quercetin 7-O-rutinoside’s inhibitory activities were comparable to standard antibiotic, amoxicillin (\(p > 0.05\)). Herein we report for the first time a number of flavonoids that may act as the source of therapeutically useful compounds against MDR pathogens. In addition, the most extracted flavonoids (gliricidin 7-O-hexoside (78.1%) and quercetin 7-O-rutinoside (69.2%) showed a significant *in vitro* antioxidant activity i.e. DPPH radical scavenging activity. Both fractions of *A. nidus* showed obvious cytotoxic effects on human hepatoma HepG2 and human carcinoma HeLa cells. Moreover, the anti-cancer activity generally enhanced with ameliorating antioxidant and antibacterial potential of fern’s flavonoids. These findings illustrate the potential of this fern as a probable source of bioactive constituents and provide a scientific basis for its folklore or ethno-medicinal uses for infectious diseases and cancers.

**KEYWORDS:**

*Asplenium nidus;* Flavonoids; Anti-oxidant; Anti-cancer; Anti-bacterial