

## The comparative phytochemical investigation and in vitro bioactivity studies of two *Astrophytum* species.

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### Abstract

Antioxidants are free radical scavengers used to modulate the consequences of oxidative damage in the human body. Due to safety concerns with synthetic antioxidants, there is a great tendency to substitute them by natural ones. Medicinal plants are considered a hallmark source of natural antioxidants, accredited to their variable bio-active constituents. *Astrophytum* is a genus of leafless cacti with few reports concerning the chemical composition and biological relevance of its species. Herein, we aimed to investigate the phytochemical composition and the antioxidant-linked biological significance of two *Astrophytum* species viz; *A. myriostigma* Lem. and *A. ornatum* (DC) Britton & Rose. The preliminary phytochemical screening adopting the standard methods showed the presence of carbohydrates and/or glycosides, tannins, flavonoids, sterols, triterpenes, coumarins, and saponins in both species. Each species was separately extracted with 80% aq. MeOH followed by defatting using petroleum ether. The latter was subjected to GLC analysis and the results tentatively identified n-heptadecane as the abundant hydrocarbon (9.00%-9.75%), while tridecanoic (14.03%, *A. myriostigma*), lauric (15.81%, *A. ornatum*) and linoleic (4.14%-5.59%) are the dominant saturated and unsaturated fatty acids, respectively. Moreover, the total phenolic and flavonoid contents of the defatted extract were estimated by the Folin-ciocalteau and Aluminum chloride assays, respectively. The analysis indicated that, *A. ornatum* exhibit higher total phenolic and flavonoid contents (28.74±0.07 mg GAE/g and 20.16±0.04 mg QE/g, respectively) than its counter-species (23.70±0.42 mg GAE/g and 12.03±0.04 mg QE/g, respectively). Moreover, the qualitative investigation of the phytoconstituents was achieved using UPLC-MS/MS which confirm the identification of approximately 20 compounds in both species that are related to various classes of secondary metabolites. Concerning the biological screening, the total extract of *A. ornatum* showed promising free-radical scavenging (IC<sub>50</sub>= 289.8 µg/ml), anti-aging (IC<sub>50</sub>= 60.6 µg/ml), anti-arthritis (IC<sub>50</sub>= 32.6 µg/ml), anti-diabetic (IC<sub>50</sub>= 47.8 µg/ml), anti-tuberculosis potential (MIC= 11.94 µg/ml), and anti-helicobacter pylori (MIC= 15.6 µg/ml). In the MTT cytotoxicity screening on panel of cancer cell lines, generally the *ornatum* treatments being more effective than the *myriostigma* on all cell lines especially, the HepG-2 cells (IC<sub>50</sub>=77.8±1.8 µg/ml). Ultimately, *A. ornatum* displayed superlative biological significance which may be due to both the abundant and the synergistic interactions among its various bioactive constituents that could modulate the consequences of oxidative damage-related disease.

Received: July 13, 2022; Accepted: July 20, 2022; Published: July 27, 2022

### Biography

Dr. Heba Elsayed Abouelyazid received her B. Pharm degree from Faculty of Pharmacy, Helwan University where she employed as a teach. asst. since 2004. She received the master's degree in Pharmacognosy from the Faculty of Pharmacy, Helwan University in 2007. Dr. Heba granted a 2-years fellowship through a channel system to the University of Louisiana at Monroe, USA (2013-2015) after which she received her PhD

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