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Antioxidant capacity and *in vitro* breast cancer cytotoxicity of aqueous extracts from *Arthrocnemum macrostachyum* are affected by drying method

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Arthrocnemum macrostachyum is a halophytic perennial shrub that is widespread across coastal zones in the Mediterranean basin, Middle East, and Asia. This plant can survive in arid desert climates where temperatures can sometimes exceed 60 °C in mid-summer days. In this study, we examine how drying method (oven vs. lyophilization) and drying temperature (40 and 60 °C) of macerated extracts (water and 50% aq. ethanol) from *A. macrostachyum* are affected in terms of antioxidant capacity and bioactivity (cytotoxicity towards MDA-MB231 cancer cells). Oven drying caused a 1.5-2 fold reduction in antioxidant capacity for both extracts (water and 50% ethanol) compared to lyophilization. The lyophilized 50% ethanol extract had the highest antioxidant capacity (DPPH IC₅₀=35.84 µg/mL) compared to all other treatments. Oven drying of extracts also resulted in a reduction in *in vitro* anti-cancer activity as measured using MTT assay on MDA-MB231 breast cancer cells. Lyophilized water extract showed the highest *in vitro* cytotoxic activity (LD₅₀=0.671 mg/mL) compared to all other treatments. These findings indicate that drying conditions impact bioactivity and suggest that *A. macrostachyum* is a potential source of anti-cancer agents.

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