Halophyte plants as potential tool against toxicity of food contaminants

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Foods can be contaminated with toxic chemicals such as residues resulting from agricultural activities, components from food packaging or compounds formed during food processing and cooking at high temperatures [1]. The long-term consumption of contaminated foods can cause adverse effects such as increased production of reactive oxygen species (ROS) and reactive nitrogen species (RNS), promoting oxidative stress and inflammation in the gastrointestinal tract [2]. These events can cause oxidative damage to cellular constituents and potentially contribute to the development of diseases such as cancer [3].

The oxidative state caused by exposure to toxic chemicals present in food may be attenuated by the consumption of products rich in antioxidant phytochemicals such as (poly)phenols. Accordingly, plant-based foods rich in (poly)phenols, like fruits and vegetables, have been linked to lower cancer risk, mostly related to those of the gastrointestinal tract [4]. Hence, there has been an increasing effort to find efficient antioxidants that could prevent oxidative stress-related diseases, without causing deleterious effects. Plants exposed to constant abiotic stresses could be promising sources of antioxidant molecules, which is the case of halophyte species that live in saline conditions but can simultaneously be exposed to drought and intense ultraviolet light. In addition, many halophytes are consumed in the Mediterranean diet, which suggests that halophyte-based products could be safely consumed.

In this work, twelve extracts of halophyte species from the south of Portugal were evaluated for their antioxidant properties by testing their capability to scavenge 2,2-diphenyl-1-picrylhydrazyl (DPPH) and nitric oxide radicals. The species that exhibited higher antioxidant capacity were tested *in vitro* for their chemical composition by determining total phenol, ortho-diphenol and flavonoid contents. The best antioxidant performance was displayed by *Armeria pungens* (Link) Hoffmanns. & Link*, Pistacia lentiscus* L., *Carpobrotus edulis* L. and *Polygonum maritimum* L.*,* with the two latter species showing the best free radical scavenging capacity and also the higher content in total phenol and ortho-diphenol compounds. These results suggest that *P. maritimum* and *C. edulis* are good candidates to include in the human diet, either as (poly)phenol-rich food or as part of functional foods, to attenuate oxidative stress and inflammation generated along the digestive tract potentially involved in the development of malignancy.

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