Polyphenol-Rich Date Palm Fruit Seed (Phoenix Dactylifera L.) Extract Inhibits Labile Iron, Enzyme, and Cancer Cell Activities, and DNA and Protein Damage

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Abstract

Date palm fruit seed (Phoenix dactylifera L.) extract (DSE), an under-utilized resource, is
a rich source of polyphenols with high potency for disease prevention and antioxidative activities.
For the first time, the present study demonstrated that DSE inhibits labile iron activity and DNA
and BSA damage and inhibits acetylcholinesterase and tyrosinase activities. Moreover, DSE reduces

the proliferation of hepatic, colorectal, and breast cancer cells dose-dependently through apoptotic
mechanisms. Furthermore, DSE significantly suppressed the expression of both BCl-2 and P21 genes
and increased the P53 expression level when compared with the untreated cells and the 5-FU treated
cells. These findings suggest a strong potential for DSE in protecting against the iron-catalyzed
ferroptosis that results in programmed cell death. The results also confirm the efficacy of DSE against
cancer cells. Therefore, DSE constitutes a valuable candidate for developing functional foods and for
natural compound-based chemotherapy for the pharmaceutical and nutraceutical industries.
Keywords: date seed extract; labile iron inhibition; DNA and BSA damage; enzyme inhibition;
Anticancer

Nutrients2022,14, 3536. https://doi.org/10.3390/nu14173536