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Proanthocyanidin-rich date seed extract protects against chemically induced hepatorenal toxicity (Article)

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Abstract

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A hydroacetone extract was prepared from seeds of Phoenix dactylifera L. var. Khalas, which is an industrial by-product of date processing. The proanthocyanidin nature of the extract (coded as DTX) was characterized by phytochemical and nuclear magnetic resonance (NMR) analyses. The total phenol/proanthocyanidin content and antioxidant activity of DTX were estimated by Folin-Ciocalteu, vanillin-sulfuric acid, and 2,2-diphenyl-1-picrylhydrazyl (DPPH) assays, respectively. The hepatorenal protective activity of DTX was evaluated using CCl4-induced toxicity model in rats, in comparison with silymarin (SYL). Results of the histopathological examination and measurements of various hepatorenal serum indices and tissue biochemical markers demonstrated that DTX displayed marked protective potential against CCl4-induced liver and kidney injury at 100mg/kg/rat. Relative to the control CCl4-intoxicated group, pretreatment with DTX significantly (P<.001) suppressed the elevated serum levels of alanine aminotransferase and aspartate aminotransferase (ALT and AST), alkaline phosphatase (ALP), γ-glutamyl transferase (GGT), total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), bilirubin, creatinine, and calcium, whereas it significantly (P<.001) increased the diminished serum levels of high-density lipoprotein cholesterol (HDL-C) and total protein (TP). Moreover, DTX significantly decreased malondialdehyde (MDA) formation and increased TP synthesis in hepatorenal tissues compared with the intoxicated control. The improvement in biochemical parameters by DTX was observed in a dose-dependent manner and confirmed by restoration of normal histological features. The acute toxicity test of DTX in rats revealed safety of the extract. This study reveals that DTX enhances the recovery from xenobiotics-induced toxicity initiated by free radicals. © Mary Ann Liebert, Inc. and Korean Society of Food Science and Nutrition 2015.

SciVal Topic Prominence

Topic: Carbon Tetrachloride | Rats | Antioxidants

Prominence percentile: 64.183

Author keywords

antioxidant | hepatoprotective | nephroprotective | phenolics | Phoenix dactylifera | proanthocyanidins

Indexed keywords

EMTREE drug terms: alanine aminotransferase | alkaline phosphatase | aspartate aminotransferase | bilirubin | calcium | cholesterol | creatinine | gamma glutamyltransferase | high density lipoprotein cholesterol | low density lipoprotein cholesterol | malonaldehyde | Phoenix dactylifera extract | plant extract | proanthocyanidin | protective agent | silymarin | unclassified drug | very low density lipoprotein cholesterol | 2,2-diphenyl-1-picrylhydrazyl | antioxidant | biological marker | biphenyl derivative | carbon tetrachloride | phenol derivative | picric acid | plant extract | proanthocyanidin

EMTREE medical terms:

alanine aminotransferase blood level | alkaline phosphatase blood level | animal experiment | animal model | animal tissue | antioxidant activity | Article | aspartate aminotransferase blood level | bilirubin blood level | calcium blood level | carbon nuclear magnetic resonance | cell infiltration | cholesterol blood level | comparative study | controlled study | creatinine blood level | date (fruit) | derivatization | DPPH radical scavenging assay | gamma glutamyl transferase blood level | high performance thin layer chromatography | histopathology | in vivo study | inflammatory cell | lipid peroxidation | liver cell | liver protection | liver toxicity | nephrotoxicity | nonhuman | oxidative stress | plant seed | priority journal | rat | renal protection | toxicity testing | animal | blood | chemically induced | chemistry | drug effects | Drug-Induced Liver Injury | Kidney Diseases | liver | male | metabolism | pathology | Phoenix (plant) | phytotherapy | plant seed | Wistar rat

Species Index:

Phoenix dactylifera | Rattus

MeSH:

Animals | Antioxidants | Biomarkers | Biphenyl Compounds | Carbon Tetrachloride | Drug-Induced Liver Injury | Kidney Diseases | Liver | Male | Phenols | Phoeniceae | Phytotherapy | Picrates | Plant Extracts | Proanthocyanidins | Rats, Wistar | Seeds

Chemicals and CAS Registry Numbers:

alanine aminotransferase, 9000-86-6, 9014-30-6; alkaline phosphatase, 9001-78-9; aspartate aminotransferase, 9000-97-9; bilirubin, 18422-02-1, 635-65-4; calcium, 7440-70-2, 14092-94-5; cholesterol, 57-88-5; creatinine, 19230-81-0, 60-27-5; gamma glutamyltransferase, 85876-02-4; malonaldehyde, 542-78-9; proanthocyanidin, 18206-61-6; silymarin, 65666-07-1; carbon tetrachloride, 56-23-5; picric acid, 14798-26-6, 88-89-1;

2,2-diphenyl-1-picrylhydrazyl; Antioxidants; Biomarkers; Biphenyl Compounds; Carbon Tetrachloride; Phenols; Picrates; Plant Extracts; proanthocyanidin; Proanthocyanidins

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