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论文

葡萄籽多酚的分离鉴定及其对细胞DNA氧化损伤的防护作用

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摘要：

目的从葡萄籽中分离多酚化合物，进行抗氧化作用研究。方法采用Diaion HP-20，Toyopearl HW40柱色谱与制备型RP-HPLC相结合从葡萄籽乙酸乙酯萃取部位分离多酚物质，根据IR，MS，NMR，CD， X-射线单晶衍射等谱学数据并与已知化合物对照，确定化合物结构。对不同类型化合物经还原能力、DPPH·(*α*,*α*-diphenyl-*β*-picrylhydrazyl)自由基捕获试验进行抗氧化能力筛选，选择有抗氧化潜力的化合物施于小鼠脾细胞H_2O_2损伤模型，用单细胞凝胶电泳(SCGE，single cell gel-electrophoresis)技术分析化合物对细胞内DNA氧化损伤的防护作用。结果 共分离到11个化合物(包括3个新结构)，葡酚酮 A，B，C，抗氧化试验表明，原花青素B4、儿茶素、表儿茶素与没食子酸的体外抗氧化能力较强，且低浓度(10 μmol·L^{-1}，25μmol·L^{-1})均表现对细胞DNA氧化损伤的防护作用，但150 μmol·L^{-1}儿茶素导致细胞DNA氧化损伤。结论葡酚酮 A， B，C为首次报道。多酚类物质在低浓度有较好的细胞DNA氧化损伤的防护作用，可解释多酚物质的营养保健作用，而高浓度的多酚物质也可成为致氧化损伤物质，提示天然抗氧化剂的保健作用可能受剂量的影响。

关键词： 葡萄籽 抗氧化 葡酚酮 单细胞凝胶电泳

Isolation and structure identification of grape seed polyphenols and its effects on oxidative damage to cellular DNA

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Abstract:

AimTo isolate polyphenols from grape seeds and to evaluate their antioxidant effects. MethodsPure compounds were isolated by using Diaion HP20, Toyopearl HW40 chromatography repeatedly, as well as semi-preparative RP-HPLC, from ethyl acetate extract of grape seeds. IR, MS, NMR, CD, X-Ray crystal diffraction spectral analysis were used to identify the structures. The antioxidant effects of different type of structures were screened by reducing power and DPPH (*α*,*α*-diphenyl-*β*-picrylhydrazyl)free radical scavenging tests. Then, SCGE (single cell gel-electrophoresis) technique was used to investigate the effects of these potent antioxidant phytochemicals on cellular DNA oxidative damage with mice spleen cells, damage was induced by H_2O_2. ResultsEleven compounds were obtained including 3 novel structures, viniferones A, B and C. Proanthocyanidin B4, catecin, epicatechin and gallic acid showed strong antioxidant power, and at lower concentration (10 μmol·L^{-1}, 25 μmol·L^{-1}), they can prevent cellular DNA damage, while 150 μmol·L^{-1} catechin induced damage by itself. ConclusionViniferones A, B and C were reported for the first time. That polyphenols investigated were shown to be good cellular DNA oxidative damage-preventing phytochemicals at lower concentration, could be used to explain the nutrient effect of grape seed polyphenols at certain degree. At the same time, higher concentration of polyphenols can induce oxidative damage, suggesting that dose is one factor to determine the nutrient effects.

Keywords: antioxidant viniferone single cell gel-electrophoresis grape seeds

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