

Ability of silybin and its derivatives to prevent protein oxidation in different model systems - DTU Orbit (09/11/2017)

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Flavonolignan silybin is a major component of silymarin isolated from seeds of the milk thistle (*Silybum marianum*). Natural silybin is a mixture of two diastereoisomers - silybin A and silybin B. Besides hepatoprotective effects, silybin was lately reported as anticancer, chemoprotective, dermatoprotective and hypocholesterolemic agent. Silybin plays an important role as antioxidant and free radical scavenger as well. Therefore, the antioxidant activity of silybin, dehydrosilybin, 23-O-butanoyl and 23-O-palmitoyl esters of silybin (respectively C4 and C16) was investigated. Especially their ability to prevent activation of hemoglobin (Hb) to highly reactive hypervalent heme protein species (ferrylHb and perferrylHb) was examined. Indeed, Hb cytotoxicity has been associated with the generation of protein radicals, which are formed when the ferric iron of Hb (Fe³⁺) is oxidised by H₂O₂ to (Fe⁴⁺) to form perferrylHb and ferrylHb, with the later also bearing a radical on its protein. The relationship between the structural properties of silybin and its derivatives and their ability to prevent oxidation of Hb was investigated in model system in the presence or the absence of lipids. The antioxidant activities of silybin, dehydrosilybin, 23-O-butanoyl and 23-O-palmitoyl silybin derivatives were correlated with their interaction with Hb species. Results are discussed in relation to the potential of dehydrosilybin, silybin and C4 and C16 derivatives to prevent activation of Hb to hypervalent heme protein species.

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