RADICAL SCAVENGING ACTIVITY OF SILYMARIN ENCAPSULATED IN LIPOSOMAL VESICLES: IMPACT OF UV IRRADIATION AND LYOPHILIZATION

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Abstract

Silymarin exhibits plenty of bioactivities that can promote human health and well-being. Nevertheless, silymarin is poorly soluble and possesses lower bioavailability, thus, its application is quite limited. Liposomes can increase the stability of encapsulated sensitive compounds and the bioavailability of poorly hydrosoluble components. Concerning potential implementation in various industries, liposomal sterilization, such as UV irradiation, remains a real challenge because of the carriers' particular sensitivity and physicochemical alterations. Lyophilization provides dried products with active compounds that are stable over a long period, due to the prevention of hydrolytic and oxidative degradation which can occur in the water surrounding. However, the lyophilization process can result in significant modifications of the liposomes, thus its effect should be examined as well. The radical scavenging activity of silymarin-loaded liposomes after different technological processes (UV irradiation and lyophilization) was investigated using DPPH and ABTS assays. In the DPPH method, the antioxidant capacity of pure silymarin was 84.03%, while it was lower after the encapsulation in liposomes; 81.63% after the formulation, 81.15% after UV irradiation, and 79.85% after lyophilization. The anti-ABTS potential was 3.04 µmol Trolox equivalent (TE)/mL for silymarin, 1.68 µmol TE/mL after the liposome preparation, 1.52 µmol TE/mL after UV irradiation, and 2.02 µmol TE/mL after lyophilization. UV irradiation did not cause significant changes in the antioxidant potential of liposomes, while ABTS scavenging activity was higher after lyophilization. Considering that the two used antioxidant assays are based on different reactions, the obtained data provide good insight into the overall antioxidant activity of silymarin-loaded liposomes.

Keywords: *antioxidants, liposomes, silymarin, lyophilization, UV irradiation.*