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Stigmasterol and its esters encapsulated in liposomes: Characterization, stability, and derivative formation

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Streszczenie

Dipalmitoylphosphatidylcholine liposomes were encapsulated with free stigmasterol (ST), stigmasteryl myristate (ME), and stigmasteryl oleate (OE). Their quality was determined using TEM, FT-IR spectroscopy, zeta potential and hydrodynamic diameter. The prepared liposomes were heated at 60 and 180 °C. The degradation of stigmasterol, fatty acids was determined, as was the formation of derivatives. The results show that the liposomes had been prepared successfully. The ST liposomes were the smallest, while the ME and OE liposomes were of similar size. The extent to which the compounds encapsulated in the liposomes degraded depended on their structure. When samples were heated to 60 °C, the degradation of stigmasterol ranged from 11 % in ST to 47 % in OE and 58 % in ME. After heating to 180 °C, the lowest level of degradation of stigmasterol was for OE (51 %), whereas the degradation of stigmasterol in ST and ME was 85 % and 90 %, respectively. In addition, the high level of oxyphytosterols in the samples heated to 180 °C is of concern, especially in the ST and ME samples. The level of SOP in liposomes heated to 60 °C ranged from 1.7 mg/g in liposomes encapsulated with free stigmasterol to 10.4 and 32.9 mg/g in liposomes with stigmasteryl myristate and oleate. After heating to 180 °C, the total content of SOP was much higher, ranging from 68.2 for OE to 111.7 and 135.7 mg/g for ME and ST, respectively.

Słowa kluczowe

Liposomes, Stigmasterol, Fatty acids, Oxidation, Heating, Stability

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