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Stability of *Cotinus coggygria* Scop. extract-loaded liposomes: the impact of storage on their physical and antioxidant properties

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INTRODUCTION & AIM

Smoke tree (*Cotinus coggygria* Scop., Anacardiaceae family) is an important source of essential oil and extracts, with a wide range of health-promoting effects, such as antioxidant, antibacterial, antigenotoxic, antimicrobial, hepatoprotective, and anti-inflammatory potential. The antioxidant activity of plant products is of great interest due to their ability to preserve food, pharmaceutical, and cosmetic formulations from the toxic and degrading influence of oxidants or free radicals. The encapsulation of various plant extracts within delivery systems can provide prolonged and controlled recovery and protection of their antioxidants. The stability of *C. coggygria* extract-loaded liposomes (non-treated and UV-irradiated) was monitored for 60 days *via* the impact of storage on liposomal physical and antioxidant properties.

METHOD

- *C. coggygria* extract-loaded liposomes were prepared using phospholipids and proliposome procedure
- The vesicle size, polydispersity index (PDI), and zeta potential were measured using photon correlation spectroscopy
- The antioxidant capacity was determined in the ABTS and DPPH assays

RESULTS & DISCUSSION

- The liposome size varied in a narrow range, from 3131.0±17.0 nm to 3078.0±42.0 nm (for non-treated) and from 2092.0±22.0 nm to 2136.0±37.0 nm (for UV-irradiated)
- PDI values were between 0.273±0.089 and 0.313±0.051 (for non-treated), and 0.829±0.074 and 0.911±0.078 (for UV-irradiated)
- The zeta potential was -28.2±0.4 mV on the 1st day and -29.6 mV on the 60th day for the non-treated sample, while for UV-irritated liposomes, the zeta potential was -21.5±0.8 mV on the 1st day and -22.0±1.1 mV on the 60th day
- The obtained liposomes with extract neutralized 81.9±0.4% of free DPPH radicals before UV irradiation, and 80.9±0.4% after irradiation
- In the case of ABTS assay, UV irradiation also significantly reduced the antioxidant capacity of liposomes with extract, from 12.02±0.54 µmol Trolox equivalent (TE)/mL to 10.55±0.28 µmol TE/mL
- ABTS and DPPH radicals' scavenging activity of UV-irradiated liposomes significantly decreased after 60-day storage, whereas in the non-treated sample, the mentioned drop in the antioxidant capacity was not noticed.

FUTURE WORK

- Development of the strategy for improvement of the liposome stability
- *In vitro* testing of antimicrobial and anti-inflammatory properties
- *In vivo* testing on animal models
- Development of film carriers with incorporated extract-loaded liposomes and their characterization