

Self-assembly levan, as a natural active bio-nanocarrier

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Levan, a homopolysaccharide, has great potential as a functional biopolymer in foods, feeds, cosmetics, and the pharmaceutical and chemical industries. Two types of nanocarrier of levan obtained from *Bacillus subtilis* strain, as potential delivery system carriers, are studied in this work. The first type of polymer nanoparticles are created in water by a self-assembly process directly from fermentation, while the second type are created after precipitating a levan powder and dissolving it in water. Both types of the obtained nanoparticles were of a size in the range of 214.10 ± 0.70 – 238.27 ± 1.72 nm with low polydispersity. The nanoparticle systems were found to be visually and kinetically stable. There were differences in the surface morphology of the carriers: the first type had an irregular surface while the second type were smooth. Differences in their ability to scavenge free radicals were also demonstrated: nanoparticles from culture supernatant scoured 8.57% more radicals than nanoparticles from precipitated polymer. Both types are able to encapsulate hydrophobic compounds and penetrate the stratum corneum. Analysis using Raman spectroscopy showed that the nanoparticles increased hydration in the deeper layers of the skin. The diversity exhibited by the two types of levan nanoparticles would indicate a wide range of potential applications in the cosmetics industry.

Słowa kluczowe

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