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INFLUENCE OF WALL MATERIAL CONCENTRATION AND CORE-TO-WALL MATERIAL RATIO ON THE ENCAPSULATION OF POMEGRANATE SEED OIL BY COMPLEX COACERVATION

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Pomegranate seed oil (PSO) is rich in bioactive compounds, such as conjugated linolenic acids (CLnA). Encapsulation is a packing technology that enables the application of highly oxidizable oils in food matrices. Technological properties of particles produced by this method are highly influenced by wall material (WM) concentration and core:WM ratio. The objective of this study was to evaluate the effects of the WM concentration and the core:WM ratio in the microencapsulation of PSO by complex coacervation. Whey protein isolate (WPI) and arabic gum (AG), in a 2:1 (w/w) proportion, were used as wall materials. Rotatable central composite design (RCCD) was used, considering 2 factors: WM concentration in the feed emulsion (2.2-7.8%), and core:WM ratio (1:0.5- 1:5.0), giving a total of 11 formulations. Coacervates were dried in a mini spray-dryer and the particles obtained were evaluated according to the following

parameters (response factors): PSO yield (Sohxlet extraction), microencapsulation efficiency (ME) (solvent extraction), punicic acid content (GC-FID), peroxide value (PV) (spectrophotometric method), moisture content (moisture balance), water activity (aw) (aw analyzer) and particle size (PS) (laser diffraction). PSO yield was high in all formulations (mean: 88.8%), except in formulation 5 (60.3%), EM varied widely (38.5-76.7%) and the central point formulations showed the highest content of punicic acid (63.7%). PV was similar in all formulations (7.4-19.4 mEq O2/ kg). Formulations showed moisture, aw and PS results similar to non-coacervated particles produced by spray-drying. According to RCCD, WM concentration and the core:WM ratio influenced particles retention, ME, punicic acid content, moisture and PS. Maximum punicic acid content was observed, as this variable was influenced by the negative quadratic coefficient for WM concentration. The optimum condition to encapsulate PSO was 5% WM concentration and 1:2.75 core:WM ratio (formulation 9). Encapsulation of PSO by complex coacervation was effective and resulted in particles with good technological properties.