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O/W emulsions stabilized by OSA-modified starch granules versus non-ionic surfactant: Stability, rheological behaviour and resveratrol encapsulation

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1 **O/W emulsions stabilized by OSA-modified starch granules versus non-ionic**
2 **surfactant: stability, rheological behaviour and Resveratrol encapsulation**

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11
12 **Abstract**

13 Resveratrol is a natural phenol with many positive effects for human health. However it is a
14 photosensitive molecule with geometric isomerism, easily oxidised with short biological half-life
15 and rapid metabolism and elimination. Thus, encapsulation of resveratrol is necessary. It has low
16 solubility in water and in most of common oils. The goal of this work was to prepare oil-in-water
17 emulsion stabilized by quinoa starch particles containing resveratrol. Quinoa starch particles were
18 modified with Octenyl Succinic Anhydride (OSA) (degree of substitution 1.8%) to make them less
19 hydrophilic. In order to compare starch effectivity as stabilizer, a common non-ionic surfactant
20 Tween 20 was used to formulate surfactant stabilized emulsions. As dispersed phase a mixture of
21 miglyol and orange oil in a volume ratio 1:9 was used in order to increase resveratrol solubility in
22 the oily phase. Both types of emulsions were formulated in full coverage conditions with similar
23 mean droplet size. Thus, differences in the emulsions properties observed only depend on the type
24 of emulsifier.

25 Pickering emulsions stabilized by OSA-modified quinoa starch granules resulted more stable
26 against creaming phenomena. The rheological behaviour was influenced by the type and the amount
27 of dispersed phase used. Resveratrol encapsulation results revealed that formulations based on
28 starch Pickering emulsions are an appropriate resveratrol carrier system for further use in functional
29 food formulations, better than surfactant stabilized emulsions, leading to encapsulation efficiency
30 (EE) values up to 98%, being more than twice that of the surfactant stabilized systems.

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