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Lactolipos – liposomes as nutraceutical carrier for application in functional dairy products

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Liposomes can be used for the fortification of foods with nutraceuticals for enhanced bioavailability as well as targeted and controlled release. Furthermore liposomes can provide protection against chemical and physical degradation processes in food matrices.

Lactolipos aims to produce coated liposome systems as carriers for phenols and n-3 fatty acids for the application in fuctional dairy products like yoghurts and milk drinks. To design carriers of continuous quality different methods for liposome production and finishing treatment were compared with respect to size, narrow size distribution, zeta potential and encapsulation effiency (EE). cTEM images were conducted for confirmation of size measurements based on dynamic light scattering (DLS).

As an example of a possible polyphenole encapsulated in soy liposomes quercetin (Quc) was chosen. Liposomal solutions were produced by thin-film evaporation method (TFM) with subsequent probe-sonication, high pressure homogenization or membrane extrusion for downsizing or by ethanol-injection method. EE was determined by size exclusion chromatography with Sephadex and subsequent HPLC analysis. The results show that TFM liposomes without downsizing are large and polydisperse while extruded liposomes are approximately 120 nm in diameter and very homgenous. Sonicated liposomes are of similar size whereas homogenized and ethanol-injection particles are even smaller. Taking into account that the ethanol-injection-method leads to residual ethanol in the liposomes extrusion and sonication are the methods of choice. A very homogenous particle distribution is confirmed by cTEM.

The optimal phospholipid to quercetin ratio resulting in a high EE and load was evaluated for sonicated liposomes. Over a period of eight weeks liposomes remain stable in size, zetapotential and EE when using 50mM sodium acetate buffer at pH 5.

In the future, the developed liposomal systems will be stabilized by a biopolymer coating and incorporated into a dairy product.