

## P23 ENZYMATIC CROSSLINKING OF CASEIN MICELLES UNDER ALKALINE CONDITIONS

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In the present study, we analyzed the potential of enzymatic crosslinking of casein micelles under alkaline conditions in order to prepare defined structured aggregates which have the potential to be used as nanocarriers. For this, microbial transglutaminase (mTG) [EC 2.3.2.13] which catalyzes an acyl transfer reaction between protein-bound glutamine and lysine, resulting in a stable, tridimensional network, was used [1]. Casein micelles, crosslinked by mTG (8 U/g protein, 40 °C, 5 60 min) at a pH value of 7.9 were compared to samples incubated at the physiological pH value of milk (pH 6.8). The extramicrocellular protein fraction (analyzed via Bradford assay and gel permeation chromatography, following ultracentrifugation), particle size distribution (Dynamic Light Scattering) and reactivity of each casein (HPLC) were investigated for sample characterization. During alkalisation, a swelling of the casein micelles was observed, which initially results in a higher hydrodynamic diameter, followed by a loss of casein due to dissociation from the micelles and final disintegration of the micelles. Enzymatic crosslinking in alkaline milieu compensates the destabilizing effect of the increased pH value: the original size distribution as well as the natural percentage of extramicrocellular casein are readjusted. In addition, the reaction behavior of individual caseins is affected. Beside  $\kappa$ - and  $\beta$ -caseins also the  $\alpha$ -caseins, which are located in the inner of the casein micelles, could be crosslinked by microbial transglutaminase. Our results present the possibility to modify the structure of nanocarriers like casein micelles under alkaline conditions by enzymatic crosslinking.

(1) C. Partschfeld, U. Schwarzenbolz, S. Richter, T. Henle, *Biotechnol. J.* 2007, 2, 456

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