

Poster 8

Bioactive peptides from milk protein as functional food ingredient - focus on antioxidant and ACE-inhibitory peptides

Jessica Malinowski, Ingrid Clawin-Rädecker, Martin Klempt, Peter Chr. Lorenzen and Hans Meisel

Department of Safety and Quality of Milk and Fish Products, Max Rubner-Institut (MRI), Kiel, Germany

Introduction

Bioactive peptides are protein fragments which may exert a biological activity in the body, regardless of the nutritional value. Most of the bioactive peptides consist of 2 to 20 amino acid residues. In milk and milk products, a number of bioactive sequences have already been identified. Whereas ACE-inhibitory peptides with hypotensive activity have been thoroughly examined [1], antioxidant peptides from milk proteins need further investigations [2, 3, 4]. In the frame of the network of excellence FoCus (Food Chain Plus, www.focus.uni-kiel.de), besides others, bioactive peptides from milk proteins will be generated and characterised.

Materials and methods

Proteolysis with β -casein / β -lactoglobulin (both attained on pilot plant scale) and different enzymes were carried out by the pH-stat method for 4 hours and the resulting proteolysates were separated into fractions by ultrafiltration at different NMWCO (5 kDa & 1 kDa). All samples were screened by a cell-based assay for getting information about possible anti-inflammatory effects. Furthermore, all fractions were screened for radical scavenging activity (TEAC) and complex-forming ability (FRAP). Some fractions were also screened for ACE-inhibitory activity. The IC50 values were calculated.

Results and discussion

When comparing different proteolysates, which were generated by trypsin or an alkaline protease from *Bacillus licheniformis*, the ultrafiltrated fractions > 5 kDa showed good complex-forming properties, whereas the peptides < 5 kDa indicated improved radical scavenging properties. Regarding the ACE-inhibitory activity, the lowest IC50 values were calculated for the fractions < 1 kDa (approximately 50 mg/l). With a cell-based assay, the proteolysate from β -casein and trypsin indicated anti-inflammatory potential. In prospect, selected fractions will be analysed by ESI-LC-MS/MS to identify respective peptide sequences.

References

- [1] Meisel et al., NPPHD – Chapter ACE inhibitory peptides, 269 – 315 (2006)
- [2] Kudoh et al., NSKKK 48, 44 – 50 (2001)
- [3] Rival et al., J. Agric. Food Chem. 49, 287 – 294 (2001)
- [4] Suetsuna et al., J. Nutr. Biochem. 11, 128 – 131 (2000)