A series of kokumi peptides impart the long-lasting mouthfulness of matured Gouda cheese

Comparative sensory analysis revealed that a 44-week-matured Gouda cheese (GC44) exhibited a much more pronounced mouthfulness and long-lasting taste complexity when compared to a young Gouda cheese ripened for only 4 weeks (GC4). To identify the molecules underlying that so-called kokumi sensation, a sensomics approach was applied on the water-soluble extract (WSE44) of GC44 by combining gel permeation chromatography (GPC) with analytical sensory tools.

HPLC-MS/MS experiments on GPC fractions inducing a kokumi sensation when tasted in an aqueous biomimetic taste recombinant solution (rWSE44) enabled the identification of 8 alpha-L-glutamyl and 10 gamma-L-glutamyl dipeptides as candidate kokumi-enhancing molecules. Among those, only the gamma-L-glutamyl dipeptides were found to impart an enhanced kokumi sensation to the matured cheese, whereas none of the alpha-glutamyl peptides were found to be active. Among the gamma-L-glutamyl peptides, the candidates gamma-Glu-Glu, gamma-Glu-Gly, gamma-Glu-Gln, gamma-Glu-Met, gamma-Glu-Leu, and gamma-Glu-His, present in GC44 in concentrations between 4.11 and 17.66 micromol/kg, were identified for the first time as the key kokumi molecules enhancing mouthfulness and complex taste continuity of the matured cheese.