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Mechanical properties affect detectability of perceived texture contrast in heterogeneous food gels

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It is known that many people enjoy to consume foods with texture contrast, such as cookies with soft, creamy fillings or processed cheeses with crispy crackers. Products providing contrasting texture sensations within a bite are generally liked. Little is known about the properties of food components that lead to the perception of texture contrast. The aim of this study was to identify mechanical and physical-chemical properties of foods contributing to the detection of texture contrast as a perceptual heterogeneity within a single bite. Gel-based model foods consisting of two layers were used to systematically vary mechanical and physical-chemical properties between the layers of the foods. By changing the concentration of different gelling agents (agar, k-carrageenan and gelatine) gel layers varying in fracture stress and strain were obtained. The gel layers were combined to gain composite gels differing in mechanical contrast (difference in fracture stress between layers). The detection limit of texture contrast for the food gels was determined using ranking tests where consumers (n=33) were asked to rank the gels in order of increasing perceived heterogeneity. It was found that the detection limit of texture contrast, the perception of heterogeneity within one bite of a composite gel, was largely influenced by the mechanical and physical-chemical gel properties. The detection limit varied between brittle and elastic gels and between soft and hard gels. In soft and brittle gels, heterogeneity was perceived already when the difference in fracture stress between the layers was small. In soft and elastic gels, heterogeneity was perceived only when the difference in fracture stress between the layers was large. In hard gels, the difference in mechanical properties has to be larger in order to be perceived as heterogeneous. We conclude that mechanical and physical-chemical properties of food impact texture contrast and the detection of perceived heterogeneity.