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Oral processing behavior of composite foods: interplay between carrier and topping properties

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Oral processing behavior is influenced by structural and textural properties of foods. Consumers frequently combine single foods and consume them together in one bite, for example carrots with dip or coleslaw. Such foods are referred to as composite foods. The individual components of composite foods can differ considerably in composition, mechanical properties and sensory characteristics. Limited knowledge is available about the influence of physical-chemical properties of individual food components on oral processing behavior of composite foods. The aim of this study was to investigate the effect of topping properties on oral processing behavior of carriers presented in different shapes. Carriers (carrots cut in cubes and julienne) and toppings (mayonnaises varying in fat content and viscosity) were combined to create composite foods. Mastication behavior (chewing duration, number of chews, chewing frequency) and bolus properties throughout mastication (recovered bolus mass, saliva content, particle size distribution) were determined for the individual carrots and carrot-mayonnaise combinations. Carrot cubes were chewed for a shorter duration and with fewer chews than carrots cut julienne. Interestingly, these results suggest that pre-cutting does not facilitate oral processing behavior of carrots. Addition of mayonnaise with high fat content or low viscosity decreased total eating time and number of chews until swallowing. Bolus properties were affected by both carrot shape and presence of mayonnaise. We conclude that oral processing behavior of composite foods was dominated by the presence of the carrier rather than the topping. Oral processing behavior of composite foods was affected by its individual food properties including carrier shape, topping fat content and topping viscosity. These insights allow to tailor oral processing behavior and subsequent consumer perception of composite foods.