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# Toppings facilitate oral processing behavior of bread and crackers

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Many foods that are frequently consumed consist of multiple food components, for example bread with toppings such as cheeses or mayonnaises. Such foods are referred to as composite foods. The individual components of composite foods can differ considerably in composition, mechanical properties and sensory characteristics. During oral processing the components are broken down differently and mixed together in the mouth to form a bolus. Limited knowledge is available about the oral processing behavior and sensory perception of composite foods. The aim of this study was to investigate the effect of different toppings on oral processing behavior and dynamic sensory perception of carrier foods when consumed as composite foods. Two carriers (bread and cracker) and three toppings (semi-hard cheese, cheese spread and mayonnaise) were used and six carrier-topping combinations were prepared. Mastication behavior (chewing duration, number of chews, chewing frequency), bolus properties throughout mastication (moisture content, saliva incorporation, mechanical properties) and dynamic sensory perception (progressive profiling of 4 attributes) were determined for the individual carriers and the six carrier-topping combinations. Carriers with soft toppings (cheese spread and mayonnaise) were chewed for a significantly shorter duration and with fewer chews than the individual carriers bread and crackers although twice the mass of food was orally processed. These toppings contributed to a faster bolus formation by providing moisture to the bolus, and therefore less saliva was incorporated into the bolus. As a result of the moisture incorporation, carriers with soft toppings were perceived less firm than carriers without toppings. In addition, all three toppings decreased the dryness perception of carriers at any moment during oral processing. We conclude that both the properties of carriers and toppings impacted oral processing behavior and dynamic sensory perception of composite foods. Carriers dominated the oral processing behavior rather than the toppings.