

The extent of oral processing determines the nutritional value of bread: an in vitro investigation

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Food structure plays an important role in its digestion. As the first step of digestion, chewing determines how substantially food structure is disintegrated and subsequently, the rate of enzymatic digestion, release and absorption of macronutrients and micronutrients from food matrix. This study investigated the relation between the extent of oral processing and the kinetics of starch digestion, using bread as an example. Bread samples were artificially chewed to various extended using cutting and pestle method. The level of 'oral processing' was quantified as the size of bolus particles and amount of artificial saliva absorbed. Obtained boluses were subjected to the in vitro digestion that contained both gastric and intestinal phases. The kinetics of glucose release from the digesta were followed over a time course of 3-hour digestion. Results showed that both particle size and saliva amount played an important role in bread digestion during gastrointestinal digestion. This also implies that people response differently to the same food might be partially attributed to the different extend they orally processed their food. Results of this study also demonstrated that the oral stage of conventional in vitro digestion protocol should be revisited and carefully design for different types of products to incorporate and reflect the differences in extend of oral processing observed in population.