Objective and subjective hardness of a test item used for evaluating food mixing ability

Type:

Article

Abstract:

The aim of this study was to compare objective and subjective hardness of selected common foods with a wax cube used as a test item in a mixing ability test. Objective hardness was determined for 11 foods (cream cheese, boiled fish paste, boiled beef, apple, raw carrot, peanut, soft/hard rice cracker, jelly, plain chocolate and chewing gum) and the wax cube. Peak force (N) to compress each item was obtained from force-time curves generated with the Tensipresser. Perceived hardness ratings of each item were made by 30 dentate subjects (mean age 26.9 years) using a visual analogue scale (100 mm). These subjective assessments were given twice with a 1 week interval. High intraclass correlation coefficients (ICCs) for test-retest reliability were seen for all foods (ICC > 0.68; P < 0.001). One-way ANOVA found a significant effect of food type on both the objective hardness score and the subjective hardness rating (P < 0.001). The wax cube showed significant lower objective hardness score (32.6 N) and subjective hardness rating (47.7) than peanut (45.3 N, 63.5) and raw carrot (82.5 N, 78.4) [P < 0.05; Ryan-Einot-Gabriel-Welsch (REGW)-F]. A significant semilogarithmic relationship was found between the logarithm of objective hardness scores and subjective hardness ratings across twelve test items (r = 0.90; P < 0.001). These results suggest the wax cube has a softer texture compared with test foods traditionally used for masticatory performance test, such as peanut and raw carrot. The hardness of the wax cube could be modified to simulate a range of test foods by changing mixture ratio of soft and hard paraffin wax.

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