

Instrumental compression test of soft food gels between a soft artificial tongue and a hard plate

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Care foods whose mechanical properties are adequately modified and can be consumed without chewing by the teeth are increasingly required in our super-aged society. Since 2012, the Japanese Ministry of Agriculture, Forestry and Fisheries promotes new care foods for dysphagic, mastication-difficulty, malnutrition and future frailty people. Smile Care Foods with a red/yellow/blue mark are being advanced so that consumers can choose suitable care foods in each state for a storefront. One of the category of Smile Care Foods (yellow 3) is tongue-mashable level.

When a soft food is compressed between the tongue and hard palate, the tongue deforms considerably and then only food is fractured. To simulate the tongue compression, artificial tongues with a similar apparent modulus to the human tongue were made with clear soft materials. Soft gels as model foods with 20 mm in diameter and 10 mm high were prepared with mixing of high- and low-acylated gellan gums [1–4]. A piece of gel was placed on an artificial tongue (50×50×10 mm), and compressed at a constant rate of 10 mm/s using a texture analyzer. Deformation profile during compression test was obtained using a video capture system. The force–deformation curves measured using the soft material were better than those obtained from a conventional test between hard plates to correlate with natural oral processing of humans. The fracture force of food between an artificial tongue and hard plate is useful for evaluation of food texture that can be mashed using the tongue.

References: 1) *J. Texture Stud.*, 45, 354–366, 2014. 2) *ibid.*, 47, 152–160, 2016. 3) *ibid.*, 47, 496–503, 2016. 4) *ibid.*, 48, 66–75, 2017.