

How thick is that soup?

Using physics, you can easily measure how thick or viscous soup is. But that still doesn't tell you anything about the mouthfeel of the soup. A group of researchers from Wageningen, the University of Amsterdam and Unilever have solved that problem.

We gauge the thickness of liquid food like soup by moving our tongues to and fro over the roof of our mouths. Mechanical receptors on the tongue and the palate convert that mechanical pressure into electrical signals that are sent to the brain, where a perception of mouthfeel and thickness arises.

A new model correlates measurable physical characteristics of liquid food with the subjective perception of it. It is crucial to this model that the movements in the mouth are described more fully, explains Markus Stieger (Food Quality & Design). 'The tongue does not just move to and fro, pressing the soup against the palate, but also up and down, squeezing the soup and reducing its viscosity. Our model incorporates that complex bit of physics.'

Prediction

The new model translates all the mechanical processes in the mouth

'With this model we can predict the perception of liquid food'

'We can measure that stress and relate it to a tasting panel's perceptions of the thickness of the soup.'

into something known as shear stress on the surface of the tongue. Stieger:

The result makes it clear that mechanical receptors in the mouth work logarithmically. That means that a liquid that is 10 times more viscous only doubles the degree of thickness experienced. Receptors for light (in the eye) and sound (in the ear) work in the same way. But what Stieger finds really 'exciting' is the model that's been developed, and the physics used in it. 'With this model we can now predict the perception of liquid food.'

This paves the way for practical applications. Food technologists can now develop products that will create a perfect mouthfeel. БК

