

Accepted Manuscript

Extensional and shear rheology of okra hydrocolloid–saliva mixtures

Bo Yuan, Christos Ritzoulis, Jianshe Chen

PII: S0963-9969(17)30906-7
DOI: <https://doi.org/10.1016/j.foodres.2017.12.051>
Reference: FRIN 7257
To appear in: *Food Research International*
Received date: 4 July 2017
Revised date: 14 December 2017
Accepted date: 16 December 2017

Please cite this article as: Bo Yuan, Christos Ritzoulis, Jianshe Chen , Extensional and shear rheology of okra hydrocolloid–saliva mixtures. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Frin(2017), <https://doi.org/10.1016/j.foodres.2017.12.051>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Extensional and shear rheology of okra hydrocolloid–saliva mixtures

Bo Yuan, Christos Ritzoulis*, Jianshe Chen

School of Food Science and Biotechnology, Zhejiang Gongshang University, Xiasha, Hangzhou, Zhejiang 310016, China

Abstract

This is an investigation of the shear and extensional properties of okra polysaccharide–saliva mixtures, intended to model the mechanical behaviour a food hydrocolloid during oral processing. Shear measurements show that incorporation of okra mucilage in saliva interferes with the self-assembly of salivary mucins, with partly detrimental effects on the low-shear viscosity of the mixture. This is counteracted by excluded volume effects, as the overall concentration of macromolecules in the mixture reaches the semi-dilute regime. Particle tracking confirms the lack of direct interactions between the two polymeric populations. The contribution of extensional viscosity to the overall behavior of okra hydrocolloid–saliva mixtures is dominant, at about one to two orders of size higher than the equivalent shear values. The Trouton ratio values are in the order of tens or hundreds for the range of concentrations and deformation rates under study. Although the extensional viscosity dominates viscous flow, the two types of flow are equally important concerning the elastic behavior, giving insight on the mechanical behavior of mucilages in the oral cavity.

Keywords: Okra; saliva; oral processing; mucilage; extensional rheology; shear rheology; Trouton ratio; particle tracking.

1. Introduction

Swallowing of a liquid consists of fluid accumulation in the oral anterior with a hollowed tongue, which is followed by the raising of the tongue tip as to touch the palate and contracting as to bring the body of the tongue back along the palate (Ferguson, 2006). During that time, the food interacts with the saliva of the oral cavity and gives away sensory notes such as chemical (“flavor”) and mechanical (“texture”) stimuli. Saliva pH can range from 5.3 to 7.8, with a daily flow in health between approximately 1 L and 1.5 L (Humphrey & Williamson, 2001); it consists of about 99.5% water and 0.5% solids, while its main

Download English Version:

<https://daneshyari.com/en/article/8889331>

Download Persian Version:

<https://daneshyari.com/article/8889331>

[Daneshyari.com](https://daneshyari.com)