


Abstract

Method and Sensory System for Determination of the Liquids Surface Tension [†]

Sonia Amariei ^{1,*}, Gheorghe Gutt ¹ and Liliana Anchidin-Norocel ² 

¹ Faculty of Food Engineering, Stefan cel Mare University of Suceava, 720229 Suceava, Romania; g.gutt@fia.usv.ro

² Department of Health and Human Development, Stefan cel Mare University of Suceava, 720229 Suceava, Romania; liliana.norocel@usm.ro

* Correspondence: sonia@usm.ro

[†] Presented at the 8th International Symposium on Sensor Science, 17–28 May 2021; Available online: <https://i3s2021dresden.sciforum.net/>.

Abstract: A new method and related sensory system used to determine the surface tension (γ) of a liquid investigated based on the increase of the area (A) of a drop vibrated sinusoidally is presented. The materialization of the method consists in specific device placed on the table of a microscope or a stereomicroscope, both based on the principle of light reflection. A drop of the analyzed liquid deposited with a dispenser on a metal plate, vibrated electrodynamically under the action of a sinusoidal oscillation, of constant frequency and amplitude, increases its surface wetted on the metal plate with each applied sinusoidal oscillation. At each magnification of the droplet surface area, an image acquisition takes place through the optoelectronic system of the microscope or stereomicroscope, the frequency of the oscillations being strictly correlated with the acquisition frequency of the images. At a predetermined number of images/oscillations, using specific software, both the images of the droplets and the graph containing the number of pixels inside the outline of each image and the current number of vibration corresponding to that image are displayed. The surface tension is automatically expressed by the growth speed of the drops surface, speed given by the curve slope of the pixels number of the drops according to the current number of the oscillation. A collateral application is the possibility of using the sensory system and specialized software for rapid determination of solutions concentration, measuring the surface tension using the Szyszkowski relation.

Keywords: surface tension; dynamic measurement; concentration determination



Citation: Amariei, S.; Gutt, G.; Anchidin-Norocel, L. Method and Sensory System for Determination of the Liquids Surface Tension. *Eng. Proc.* **2021**, *6*, 82. <https://doi.org/10.3390/I3S2021Dresden-10101>

Academic Editors: Gianarelio Cuniberti and Larysa Baraban

Published: 17 May 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Supplementary Materials: The presentation file is available at <https://www.mdpi.com/article/10.3390/I3S2021Dresden-10101/s1>.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.