international symposium on food rheology and structure

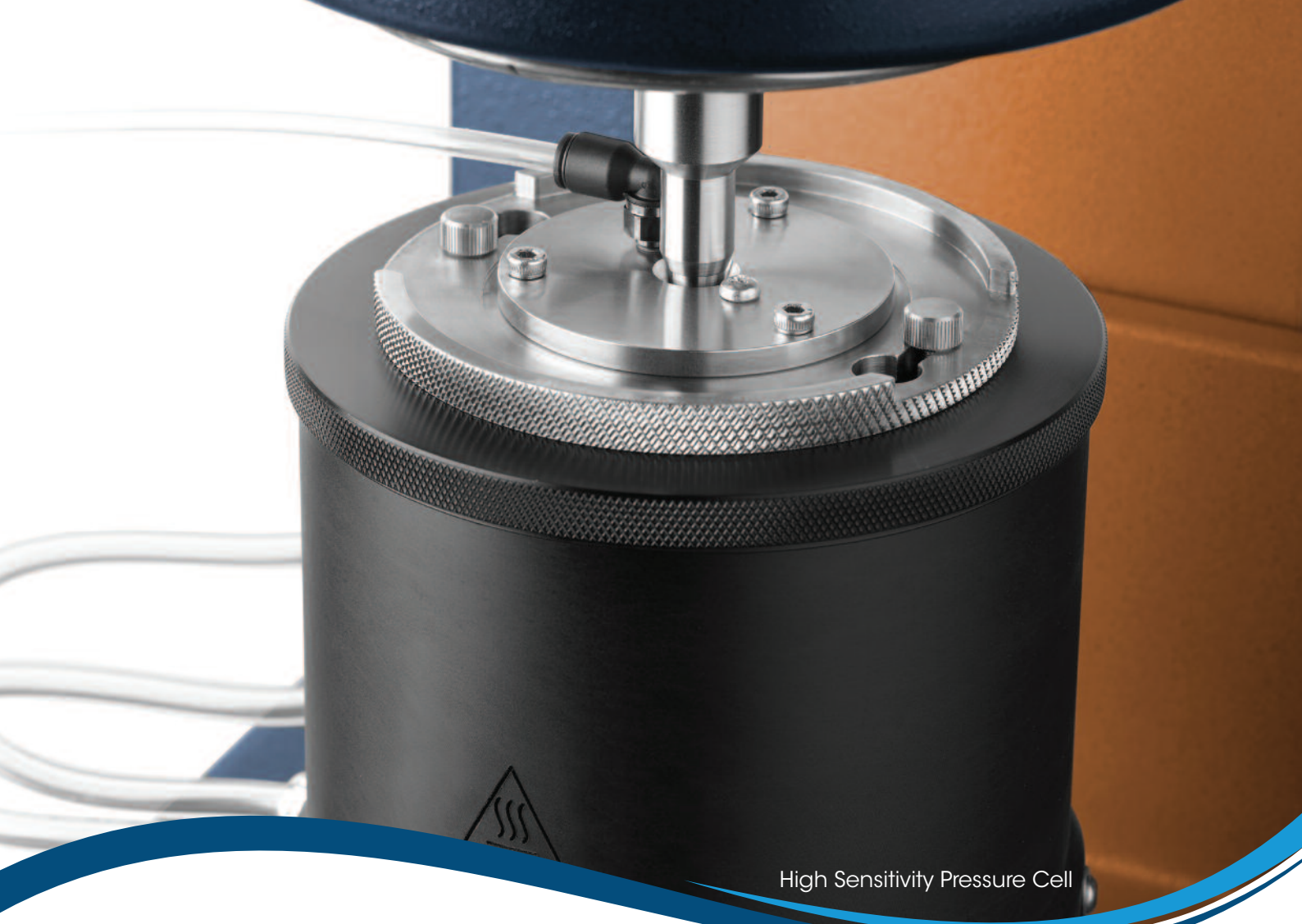
ISFRS 2019

ABSTRACT BOOK OF THE 8TH INTERNATIONAL SYMPOSIUM ON FOOD RHEOLOGY AND STRUCTURE

JUNE 17 - 20 2019
ZURICH
SWITZERLAND

EDITORS:
PETER FISCHER
ERICH J. WINDHAB

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich
Laboratory of Food Process Engineering
Institute of Food, Nutrition and Health



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BUILDING LFO E19
ETH ZURICH
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Laboratory of Food Process Engineering · Institute of Food, Nutrition and Health · ETH Zurich
Building LFO E19 · 8092 Zurich · Switzerland
Fax: x.41.44.632 1155
E-mail: secretary@isfrs.ethz.ch
URL: http://www.isfrs.ethz.ch

Symposium MA | Meat Analogues

Extrusion 3D printing of nutraceutical oral dosage forms formulated with oleogels and phytosterols mixtures

Ivana M. Cotabarren[1], Sofia Cruces[2], and Camila A. Palla[1]

[1]Departamento de Ingeniería Química - UNS, Planta Piloto de Ingeniería Química, PLAPIQUI, UNS-CONICET, Bahía Blanca, Buenos Aires 8000, Argentina; [2]Departamento de Ingeniería Química, Universidad Nacional del Sur, Bahía Blanca, Buenos Aires 8000, Argentina

Within the concept of personalized nutrition arises the demand for "tailor-made" technological solutions that combine nutrients and functional compounds. In this regard, 3D printing emerges as a group of technologies capable of producing customized formulas with the desired shape, dimension, and microstructure. The extrusion-based 3D printing (E3DP) method is the most widely adopted for obtention of foods and pharmaceutical forms. The aim of this work was to evaluate the production of nutraceutical solid forms by E3DP using mixtures of monoglycerides (MG) oleogels and phytosterols (PS) as printing materials. To this purpose, molten oleogels were prepared using MG (10 or 20 %wt) and high oleic sunflower oil. Printing materials were obtained adding variable amounts of PS to oleogels, between 0.2 and 0.5 wt PS/wt oleogel. An ad-hoc extrusion 3D printer composed of a heated syringe and a cooling build platform was used. The hot mixtures were introduced into the syringe and the solid forms were printed under previously defined parameter setting. Oscillatory temperature sweep tests were carried out to determine the mixtures gel point in order to select appropriate printing temperatures. Mechanical properties of printed solid forms were obtained by compression test. The mixtures gelation temperature increased with the increase of PS content. Values ranged between 70.3 and 91.1°C and 55.3 and 95.2°C for oleogels formulated with 10 and 20 %wt of MG, respectively. Furthermore, it was found that solid forms were successfully printed when using mixtures containing a maximum of 0.3 wt PS/wt oleogel and 0.4 wt PS/wt oleogel for oleogels formulated with 10 and 20 %wt of MG, respectively. All these solid forms were structurally stable, with hardness values that increased with the rise in PS and MG content. The highest value of hardness was 12.55 N, obtained for the mixture formulated with 0.4 wt PS/wt oleogel and 20 %wt of MG.