

International Conference on

Lipid Science & Technology

November 30 - December 02, 2015 San Francisco, USA

The relationship between hardness and solid fat content of palm oil-based shortening during storage

Xiaoxi Li and Ling Chen

South China University of Technology, China

Shortenings are usually fats composed of oil, whose nutritional and functional properties have been modified to provide desirable textural properties to a food product. Palm oil (PO) which is considered health without Trans fatty acid is commonly used as one of the ingredients of the fat phase in shortening due to its easy availability, excellent physical characteristics, and price competitiveness. However, PO-based shortenings experienced undesirable textural property changes due to the unstable temperature during transportation and storage.

In this study, two model palm oil-based shortenings which are denoted as shortening A (melting point of 43.51°C) and shortening B (melting point of 53.54°C) were used, and their solid fat content and hardness during storage at constant temperatures (0°C, 10°C, 20°C, 30°C, 40°C, respectively) and fluctuant temperatures (0°C 12 h-20°C 12 h, 10°C 12 h-20°C 12 h, 30°C 12 h-20°C 12 h, 40°C 12 h-20°C 12 h, respectively for a cycle) for 28 days were evaluated by pulsed Nuclear Magnetic Resonance and Texture Analysis. The relationship between hardness and solid fat content of model PO-based shortenings was discussed.

When stored at constant temperature, as the temperature increased, the solid fat content values of two PO-based shortenings have been found to decrease linearly, the hardness decreased in an exponential manner; with the extension of the storage time, the solid fat content values of the two PO-based model shortenings did not change, the hardness increased when the temperature $\leq 20^{\circ}\text{C}$ and decreased when the temperature $> 20^{\circ}\text{C}$. When stored at fluctuant temperatures, as the temperature increased, the solid fat content values of two model PO-based shortenings were constant in the temperature range from 0°C to 20°C and then decreased (30°C-40°C), the hardness decreased when the temperature was higher than 10°C; with the extension of the storage time, the solid fat content values of the two PO-based model shortenings did not change and the hardness decreased in a logarithmic manner. For hardness and solid fat content, their changes with storage time and temperature are different, indicating a positive relation exists between them. These findings have important implications on the storage stability and functional properties of palm oil-based shortenings.

Notes: