TEXTURAL PROPERTIES OF GELATINE GELS DESCRIBED BY FT-RHEOLOGY

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Gelatine is widely used in food systems as e.g. thickener or for mechanic stability. The use as a mechanic stabilizer has a desired influence on the mechanic stability of the shape of food systems. Large Amplitude Oscillatory Shear was used to determine the non-linear rheological properties of such gelatine samples. The focus of this analysis was on the mechanical behaviour in the non-linear regime, including the induced aging of the gelatine gels and the texture of these gels. Textural properties are influenced by the geometrical properties of the material, the mechanical properties, the content of solids, liquids, and gases. The texture and mouthfeel of food is an important property for the perception and the acceptability of food products. Both these processes can take place in the non-linear rheological regime. The non-linear rheological analysis performed in this work is based on the FT-rheology technique. In this method the oscillatory stress-strain data is analysed by characteristic functions method which is based on FT-Rheology [3]. Here the stress can be described as a sum of higher harmonics. The non-linear information can then be described by a simple superposition of four characteristic functions that correlate the rheological behaviour to physical effects (see Figure 1).

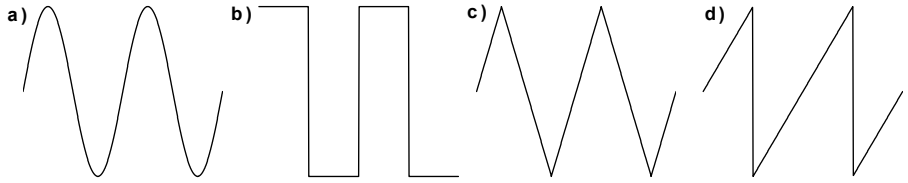

FIGURE 1. The four characteristic functions: a) sine (linear), b) rectangular (strain softening), c) triangular (strain hardening), d) and saw tooth (slip).

The data is then plotted as a function of the strain amplitude. The gelatine samples analyzed here show high non-linearities, and it can be shown that the characteristic functions method is a good method to analyze the non-linear behviour of gelatine samples.

Conclusions

In this study we have investigated the non-linear mechanical behaviour and the aging of gelatine samples and we described and analysed these LAOS data by characteristic functions (which is based on FT-Rheology). We could show that the method of the characteristic functions is a useful tool to analyze both the linear regime and the non-linear behavior and the aging of gelled gelatine samples.

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3. Klein, C.O., et al., Separation of the Nonlinear Oscillatory Response into a Superposition of Linear, Strain Hardening, Strain Softening, and Wall Slip Response. Macromolecules, 2007. 40(12): p. 4250-4259.