

ACOUSTICS2008/1052
**Ultrasonic and acoustic method for viscoelastic complex media
characterization**

Georges Nassar, Fabrice Lefebvre, Alain Skaf and Bertrand Nongaillard
IEMN - DOAE, Université de Valenciennes, Le Mont - Houy, 59313 Valenciennes, France

In this paper, the potentialities of a low frequency ultrasonic/acoustic technique devoted to the study and characterization of the viscoelastic complex media is investigated. This work shows the limit of the use of ultrasound in a viscoelastic media with a complex matrix. In this context the cheese was indicated as a model of propagation medium, such a product having a very complex matrix in term of texture, openings, crystallization, moisture..... Theoretical basis of sound attenuation in cheese is recalled, especially the effects of the matrix viscoelasticity and the scattering of ultrasonic energy by holes and cracks. Depending on the degree of openness, ultrasonic velocity or attenuation is chosen to represent the evolution of the cheese. For very high degree of openness, ultrasounds are no longer usable and a tap-test acoustic technique is employed and allows a quality indicator to be constructed. Experimental validations were done with optical images of cut cheeses and rheological measurements. The results indicate that a high degree of sensitivity can be reached with ultrasonic / acoustic non destructive technique.