

# Using ultrasound velocity in liquids as rapidly measurable parameter for food safety information systems

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*Abstract – Information systems dedicated to food safety include many parameters, and some of them can be difficult to rapidly measure in the field using inexpensive instrumentation. Use of the ultrasound velocity as such an information parameter is discussed here along with some preliminary experimental data that backs this use.*

Information systems for assessment of food safety are maintained by relevant international (e.g., Codex Alimentarius commission) and national (e.g., Food and Drug Administration in the US, Food Safety Agency in the UK) bodies. They include variety of reference data related to content of particular chemicals, regulations for foodstuffs handling, transportation and storage, etc. An important function of these information systems is to determine reliable food safety assessment procedures that are applicable in the field using inexpensive instruments. These instruments can be used by food inspectors, custom officials, business and cautious consumers well before the food product can be considered unsafe due to its smell or appearance.

We investigate the possibility of using ultrasound velocity in liquidified foodstuffs as a possible parameter for a.m. information systems. This velocity was found distinct enough for different aqueous solutions when measured using high accuracy ultrasonic instrumentation and a dipstick ultrasonic probe featuring a water filled cavity [1].

Preliminary experiments were conducted for drinking water samples obtained from bottles produced by various manufacturers at different times. The measured ultrasound propagation delays in water samples were plotted against delays in the cavity (fig.1).

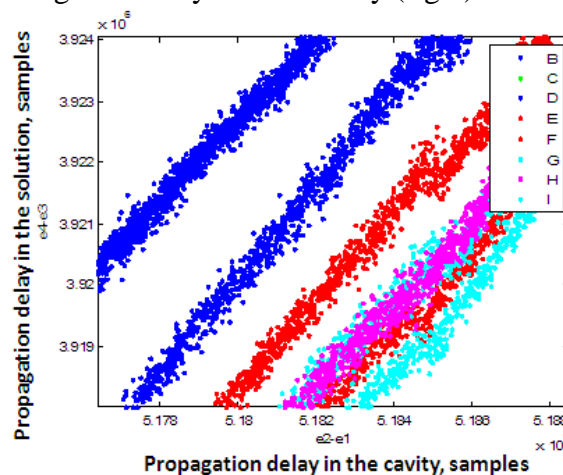


Fig.1. Ultrasound propagation delays measured in different drinking water samples

These results show that most of the samples exhibited quite distinct ultrasound velocities even though their chemical compositions were very similar.

Measurement procedures, used instrumentation and additional experimental results concerning water samples produced by the same manufacturers but purchased in different countries will be discussed in detail at the presentation.

#### REFERENCES

- [1] A. Afaneh, S. Alzebda, V. Ivchenko, and A. N. Kalashnikov, "Ultrasonic Measurements of Temperature in Aqueous Solutions: Why and How," *Physics Research International*, vol. 2011, Article ID 156396, 10 pages, 2011. doi:10.1155/2011/156396



