

Honey, Water content and NanoCuvette™ One

NanoCuvette™ One offers a quick and easy way to investigate honey quality and moisture content.



1. Honey

Honey is a natural sweet food substance produced by bees from the sugary segregation of plants, also known as floral nectar. The major component of honey is sugar, primarily glucose and fructose. However, it also contains a wide range of other substances, including proteins, vitamins, minerals, phenol compounds and a small amount of water. The physical properties vary for every honey product depending on water content, type of flora used, temperature and sugar content.

2. Water content

Moisture content is a very important parameter for honey stability. Low moisture content (< 20%) protects the honey from microbial activity and allows it to be preserved for longer periods. For this reason, it is important to have knowledge of water content in the sample during quality control. Moisture content in honey is usually determined based on refractive index measurements. Knowing the refractive index at 20 °C, the percentage of water in a set of honey samples can be calculated using the Wedmore equation¹.

3. Principle

Traditionally a specialized refractometer has been required for determination of the refractive index. However, with the innovative NanoCuvette™ One, a nanosensor has been developed and implemented in a cuvette, allowing determination of the refractive index to be carried out in a standard spectrophotometer. This way even compounds that do not absorb

light in the UV-visible spectrum can be quantified with a conventional spectrophotometer.

4. Safety precautions

This method does not entail any safety precautions. Please refer to common laboratory practices.

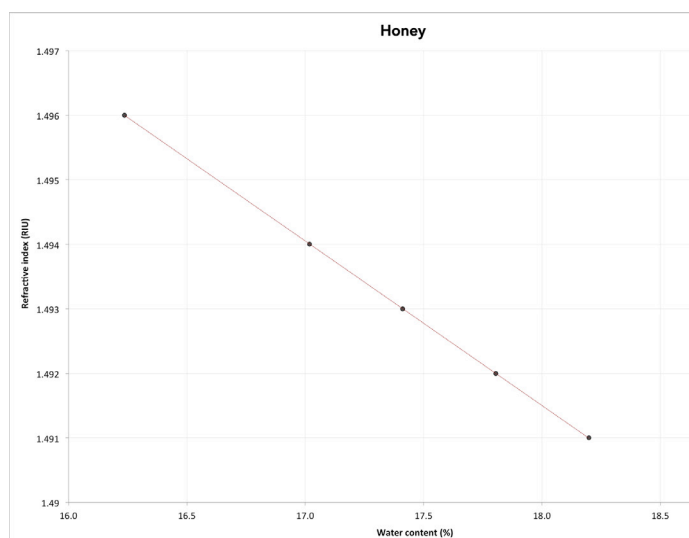


Figure 1 The sensor response, shown as refractive index, is linearly proportional to honey concentration, which the free software will display.

5. Measurement

5A. Materials and apparatus

The only apparatus required is a standard spectrophotometer and a computer with internet access. For each measurement a NanoCuvette™ One is required.

5B. Sample preparation

Seven types of honey having different colors and sugar content have been used. Pure samples with known water content ranging between 16.2% to 18.2% have been used to verify the results.

5C. Measurement procedure

The spectrophotometer and computer are switched on and the free NanoCuvette™ One software is opened. For each sample a new NanoCuvette™ One is used according to the software guidance. Following the last measurement, the software will present the data as a variable of absorbance or refractive index, depending on the experimenter's preferred choice of representation (Figure 1).

6. References

Giulio Sesta, Lorenzo Lusco. Refractometric determination of water content in royal jelly. *Apidologie*, Springer Verlag, 2008, 39 (2), pp.225-232. <hal-00892298>

7. Contact

Copenhagen Nanosystems
Diplomvej 381
DK-2800 Kgs. Lyngby

Tel: +45 36 99 27 46
info@cphnano.com
www.nanocuvette.com

Updated March 2018



Figure 2 NanoCuvette™ One measures refractive index and absorbance on the same sample, using only a standard spectrophotometer and the free NanoCuvette™ One software.