Analysing chocolate using the Pearl™ accessory

The Pearl™ liquid IR transmission accessory is perfect for chocolate quality-check analysis.

COCOA BEANS are a versatile foodstuff that produce tasty treats and sweet scents. Confectionaries like chocolate bars can be made with different fat, sugar and water ratios.

Food industries want a fast, reliable and non-destructive method to analyse chocolate chemical composition.

This note demonstrates that the Pearl™ IR transmission accessory can be used to determine the quality and content of chocolate in post-production, for quality assessment purposes.

Methods and results

A small sample of a well known milk chocolate (~10 mg) was warmed gently and pasted onto the bottom ZnSe window of the Pearl™ Oyster Cell. The pathlength of the cell was 25 µm but longer pathlengths are available for weaker absorbing samples.

Figure 1 shows the FTIR spectrum of the chocolate, as recorded using the Pearl™ in a spectrometer and with a resolution of 2 cm^{-1} over an average of 10 scans.

The fingerprint region in Figure 1 displays the hall marks of cocoa products, most notably the C=O stretch at 1758 cm^{-1}, typical of an ester and the CH_2 absorption from fat at 1462 cm^{-1}. Other significant peaks include the absorption bands at 2924 & 2854 cm^{-1}.

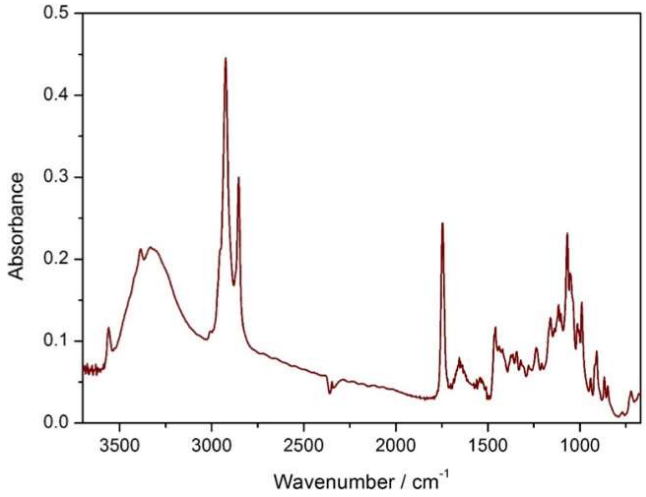


Figure 1: chocolate recorded using the Pearl™

The intensities of these bands can be used to assess the quality of the chocolate.

A published FTIR spectrum of cocoa butter is shown in Figure 2, recorded using the Specac Golden Gate™ ATR accessory.[1]

This spectrum was taken from a study featured in Analytica Chimera Acta, which is available on the World Cocoa Foundation's website.

Figure 2 is complementary to the spectrum recorded using the Pearl™. Moreover, the ability to distinguish the fat content for different cocoa butter samples is demonstrated.

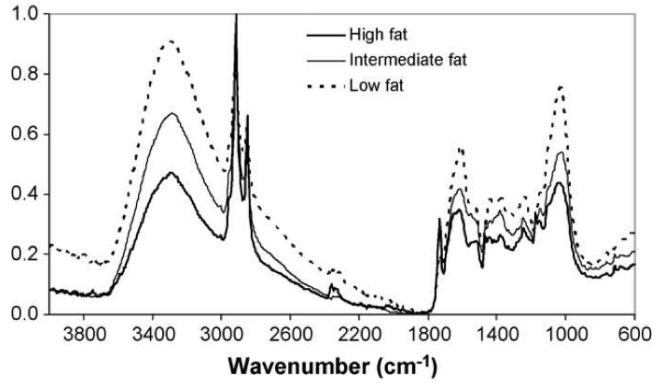
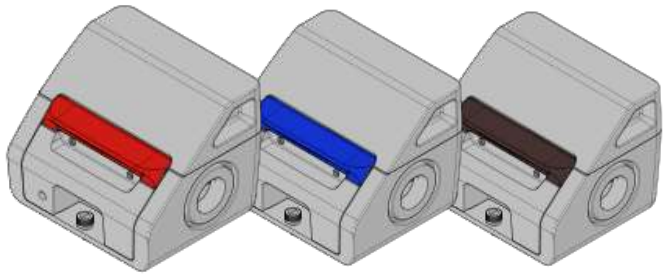


Figure 2: reference spectrum[1] of cocoa butter recorded with Golden Gate™

Conclusions

Recording FTIR spectra using the Pearl™ is a quick method to determine the chemical composition of cocoa products. Moreover, the Pearl™ offers a user-friendly way of recording reproducible and reliable spectra.



The Pearl™ IR transmission accessory comes in different colours

The recorded spectrum matches quite well with the literature and therefore the Pearl™ would be suitable for the cocoa industry.

References

[1] A.Veselá, A.S. Barros, A.Synytsya, I.Delgadillo, J.Čopíková, M.A.Coimbra, "Infrared spectroscopy and outer product analysis for quantification of fat, nitrogen, and moisture of cocoa powder," *Analytica Chimica Acta,* 601,(1),77-86, 2007.