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CAFFEINE CONTENT IN VARIOUS COFFEE SAMPLES DETERMINED BY INFRARED SPECTROSCOPY

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Object of Research: Caffeine and the evaluation of its dietary intake attract much attention in the food and nutrition industry because of its controversial impact on human health. Official methods for caffeine determination in coffee are based on chromatography and spectrophotometric measurement involving time-consuming sample preparation and use of large amounts of organic solvents. Therefore, the application of faster and more environmentally friendly analytical methods such as Furrier-transform infrared (FT-IR) spectroscopy offer a great advantage. This study reports the caffeine content in roasted and instant coffee of various trademarks purchased at the local market determined by a fast and reliable FT-IR procedure.

Materials and Methods: The caffeine was extracted from the coffee samples with a small volume of chloroform. All IR spectra were measured on a Brucker Tensor 27 FT spectrometer in a calcium fluoride IR cell at a resolution of 2 cm-1 and 64 scans.

Results: FT-IR spectroscopy offers a reliable way for caffeine determination, based on the absorbance of this compound at 1659 cm–1. This is usually the most intensive band in the spectra of pure caffeine solutions and coffee extracts. A series of standard solutions of caffeine in chloroform as well as the real coffee samples were analyzed and integrated area of the carbonyl band at 1658 cm–1 was determined by a curve-fit procedure. The caffeine content in real coffee samples was determined based on a standard curve for absorbance vs concentration of caffeine. All instant coffee samples showed higher caffeine content than the roasted coffee samples.

Conclusions: The caffeine content in various types of roasted and instant coffee can be conveniently determined by a simple FT-IR procedure after extraction with a small volume of chloroform that reduced drastically both the time required for sample preparation and the use of organic solvents.