Quality assessment of Slovenian virgin olive oils with FT-NIR

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Laboratory of the Institute for Oliveculture is accredited for methods for olive oil quality and purity assessment, developed by International Olive Council and adopted in Commission Regulation (EEC) No 2568/91 and subsequent amendments and changes. However, most of these methods are time consuming, expensive instrumentation and a big amount of chemicals must be used. Near-infrared spectroscopy is an excellent alternative for several of those methods, as it enables a very fast and much cheaper simultaneous determination of several quality parameters. A comparison between accredited and NIR methods for free fatty acids, peroxide value, K232, K270, and fatty acids in Slovenian virgin olive oils was made. Two calculation approaches were applied for determination of free fatty acids: first, results were obtained using producer’s calibration curve with bias correction (bias determination based on measurement in Slovenian olive oils), and second, a new calibration curve was constructed using data of 207 Slovenian virgin olive oils. Producer’s calibration curve with bias correction gave much lower results than accredited method. Much better results were obtained with calibration curve based on Slovenian oils. The peroxide value results obtained with NIR and producer’s calibration curve were also too low, but in all samples the difference between accredited and NIR result was lower than the measurement uncertainty of accredited method. On the other hand, differences between NIR and accredited results for K232 and K270 were five times bigger than the measurement uncertainty for accredited method; therefore, a new calibration curve should be constructed. A new calibration curve is needed for fatty acids determinations as well. As it is showed in the case of free fatty acids determinations, NIR spectrometer can be a very useful tool for olive oil quality assessment, but suitability of producer’s calibration curves must be checked, and if necessary, a new calibration curve must be constructed.

**Keywords:** olive oil, near-infrared spectroscopy, quality parameters, free fatty acids