

CHEMICAL AND MICROBIOLOGICAL ANALYSIS OF GOAT MILK, CHEESE AND WHEY BY NIRS

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Present Food Legislation compels dairy industry to carry out analyses in order to guarantee the food safety and quality of products. Furthermore, in many cases industry pays milk according to bacteriological or/and nutritional quality. In order to do these analyses, several expensive instruments are needed (Milkoscan, Fossomatic, Bactoscan). NIRS technology provides a unique instrument to deal with all analytical requirements. It offers as main advantages its speed and, specially, its versatility, since not only allows determine all the parameters required in milk analysis, but also allows analyse other dairy products, like cheese or whey.

The objective of this study is to develop NIRS calibration equations to predict several quality parameters in goat milk, cheese and whey. Three sets of 123 milk samples, 190 cheese samples and 109 whey samples, have been analysed in a FOSS NIRSystems 6500 I spectrophotometer equipped with a spinning module. Milk and whey were analysed by folded transmission, using circular cells with gold surface and pathlength of 0.1 m, while intact cheese was analysed by reflectance using standard circular cells.

NIRS calibrations were obtained for the prediction of chemical composition in goat milk, for fat ($r^2=0.92$; SECV=0.20%), total solids ($r^2=0.95$; SECV=0.22%), protein ($r^2=0.94$; SECV=0.07%), casein ($r^2=0.93$; SECV=0.07%) and lactose ($r^2=0.89$; SECV=0.05%). Moreover, equations have been performed to determine somatic cells ($r^2=0.81$; SECV=276.89%) and total bacteria ($r^2=0.58$; SECV=499.32%) counts in goat milk. In the case of cheese, calibrations were obtained for the prediction of fat ($r^2=0.92$; SECV=0.57), total solids ($r^2=0.80$; SECV=0.92%) and protein ($r^2=0.70$; SECV=0.63%). In whey, fat ($r^2=0.66$; SECV=0.08%), total solids ($r^2=0.67$; SECV=0.19%) and protein ($r^2=0.76$; SECV=0.07%) NIRS equations were obtained. These results proved the viability of NIRS technology to predict chemical and microbiological parameters and somatic cells count in goat milk, as well as chemical composition of goat cheese and whey.