NIR SPECTROSCOPY AND MULTIVARIATE CALIBRATION TO SIMULTANEOUS DETERMINATION OF GLUCOSE, TRIGLYCERIDES AND HDL OF RAT BLOOD PLASMA

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The vast majority of the biochemical analysis of rat hematological parameters, including glucose, triglycerides and cholesterol levels are performed by enzymatic methods [1,2], however these methods suffer from inherent difficulties such as the need for specific reagents, temperature control, problems with chemical interferences and time of analysis, that substantially affect the results of the analysis. To overcome these problems, NIR spectroscopy and multivariate calibration has been applied successfully for the analysis of several biological parameters, *e.g.* glucose, triglycerides and cholesterol [3-5]. In this work, the quantitative analysis of glucose, triglycerides and high-density lipoprotein (HDL) in rat blood plasma was studied without previous sample pre-treatment using direct near-infrared spectroscopy. A comparison of several multivariate calibration techniques, lots of different pre-processing data and variables selection algorithms, such as partial least squares (PLS), interval Partial Least Squares (iPLS), genetic algorithm (GA), successive projections algorithm (SPA) was performed. The variables selection showed good results for correlation coefficient and RMSEP values for the three parameters, specially, triglycerides. The RMSEP values for glucose, triglycerides and HDL found by PLS model were 6.08, 16.07 and 2.03 mg dL^{-1}, respectively. F test and t-test were carried out in order to compare the model results in between each other and to the reference method. These results suggests that PLS method can be successfully applied to determine simultaneously the concentrations of glucose, triglycerides and HDL in complicated biological fluids by using NIR spectroscopy, offering an alternative analysis in animals.

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