The effect of particle size on the determinability of maize composition in reflection mode.

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Maize, in Hungary, is the fodder-plant grown in the biggest quantity. It is not only used as a fodder but other products such as iso-sugar are made from it, too. The quality of the fodder and the produce is largely dependent on the composition of the supplied maize to the processing site. The examination of quality parameters besides conventional methods are investigated and measured by NIR spectroscopy on a routine basis. The investigated parameters are the following: water, total protein, starch and oil content. The accuracy and precision of determining these parameters are, apart from the wet chemical methods, influenced by sample preparation to a great extent. One of the main features of this is the sample particle size and its distribution across the sample. The uneven distribution of particle size negatively influences the measurement accuracy, decreases model robustness and prediction ability. With these in mind the aim of our experiment was to investigate the effect of particle size on the accuracy of maize composition determination using reflection measurement setup. In addition, we tested different spectrum transformations, which are suitable for canceling this effect. In our experiment 47 samples were analyzed with three different mesh sizes (1.5mm, 1.8mm and 2mm). The results of our findings are presented here.