

ABSTRACT

This thesis focuses on determination of meat origins based on mass spectrometry MALDI-TOF (Matrix-Assisted Laser Desorption/Ionization Time-of-Flight) followed by principal components analysis (PCA). Today, this method is mainly used for microbiological purposes and not used often for verification of food authenticity. Although the technique is very fast and suitable for analysis of suspicious products, the investment costs are high which probably leads to the fact that the technique remain not well known in the food industry.

Eleven types of raw meat (fallow deer, beef, duck, goat, rabbit, chicken, coypu, fish, roe, pork and hare) were prepared as samples and dried out. All types of meat came from home-grown free-range animals or animals that were hunted in the wild. Proteins within the listed meats were enzymatically cleaved by trypsin. All mass spectra obtained by mass spectrometry were extracted and evaluated in computer program R. Same program was used for generating graphs (e.g. 3-D graph, cumulative graph and graph of variability). Based on these results it was decided if it is possible to differentiate between different types of meat. At first, all the samples were compared between each other and then were separated into two smaller groups and compared again. The samples that were not possible to differentiate even in the small groups were isolated and then compared with selected types of meat.

Ten of the eleven meat samples were successfully distinguished, which confirms that MALDI-TOF mass spectrometry is suitable for recognition of raw meat animal species origin.

KEYWORDS

meat, animal species, enzyme digestion, mass spectrometry, Principal Component Analysis