P35: NEUTRON ACTIVATION ANALYSIS FOR PROCESSED ANIMAL PROTEINS AND INSECT MEALS CHARACTERIZATION

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Neutron activation analysis (NAA) is a nuclear process used for determining the concentrations of elements in a vast amount of materials. The method is based on neutron activation and therefore requires a source of neutrons such as a nuclear reactor. Radioactive isotopes are formed in the sample after bombardment with neutrons. The radioactive emissions and radioactive decay paths for each element are well known. Using this information, it is possible to study spectra of the emissions of the radioactive sample, and determine the concentrations of the elements within it. Due to the penetrating nature of incident neutrons and resultant gamma rays, the technique provides a true bulk analysis. As different radioisotopes have different half-lives, counting can be delayed to allow interfering species to decay eliminating interference. This analytical method is useful multi-element analyses with minimum detection limits in the sub-ppm range providing an elemental fingerprint of the analyzed sample which can be used for the specific recognition of an unknown sample. In this work NAA was used to study systematic differences in the elemental composition of different zootechnical meals, including processed animal proteins (PAPs) of different species and insect meals. Chemometrics was exploited for variables' screening and data treatment. The scope of this work is to provide a very specific characterization of meal products that could be fraudulently add to compound feed in view of a species-specific recognition of unknown meals.