Innovative Method for the Detection of Bovine Blood Proteins in Feedingstuffs

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Introduction

Context: The use of animal **by-products in feedingstuffs** depends on their nature (defined by the **tissue/cell type** and the **species of origin**) and **on its destination.** e.g. In feed intended for non-ruminants, milk powder and porcine blood products are authorised while bovine blood products are prohibited. Currently, the detection of unauthorised ingredients is based on light microscopy and Polymerase Chain Reaction (PCR) methods. Nevertheless, some cases require additional methodology to determine the nature of the **processed animal proteins** present.

Objective: Even if the DNA content of some by-products is similar, they could be distinguished on a protein content basis. The objective of this study is the identification of **specific peptide biomarkers** using **tandem mass spectrometry** for the detection of **bovine blood proteins** in animal feed.
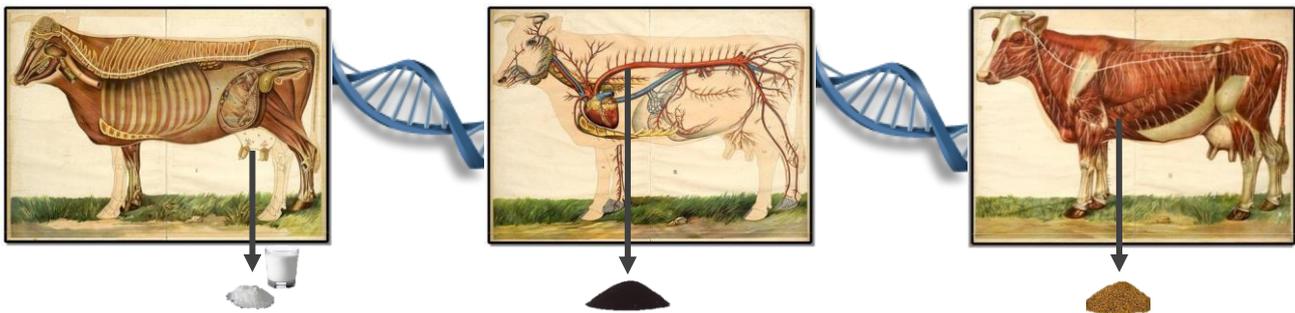

Figure 1: Various by-products derived from ruminants are indistinguishable by PCR analysis
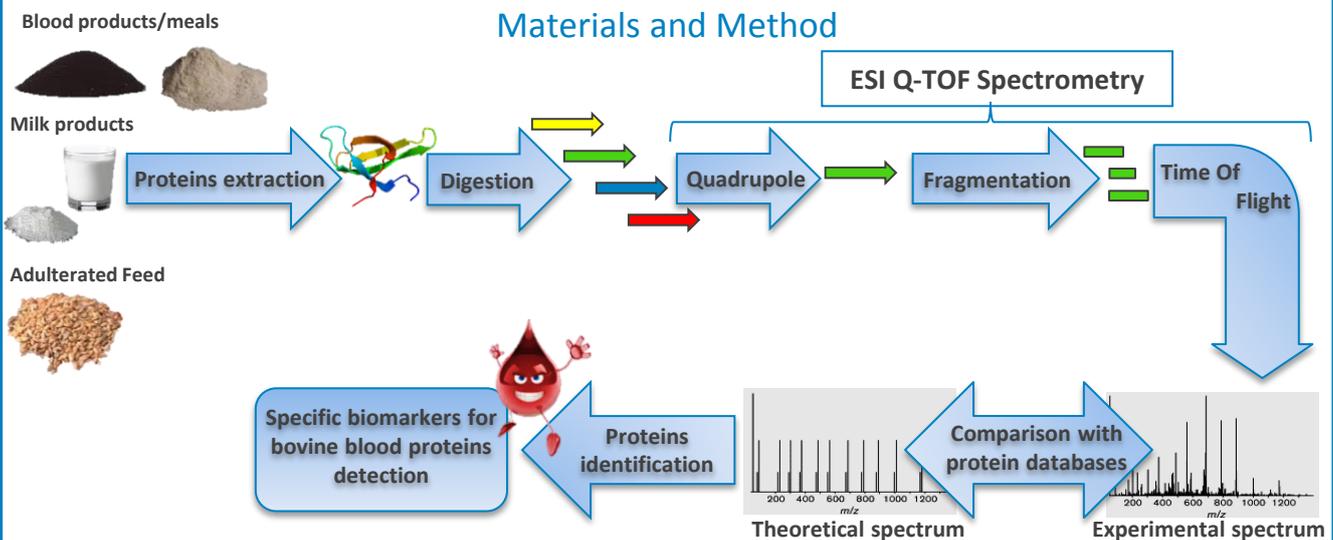
Materials and Method

Figure 2: Tandem mass-spectrometry for the selection of bovine blood biomarkers

Results

Five proteins of interest were highlighted: **Alpha-2-macroglobulin**, **Fibrinogen** (α, β and γ chains), **Hemopexin**, **Serotransferrin** and **Hemoglobin** (α and β chains). From these proteins, **14 peptides sequences** of 9-28 amino acids in length were identified as potential bovine blood biomarkers in feed.

Discussion

Preliminary results are promising. Efforts are now focused to evaluate the LOD of the method and to transfer the method to a "routine protocol" using triple-Q.