L.9.- Methods for detection of central nervous tissue in meat products

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The main infectivity in transmissible spongiform encephalopathies (TSE) can be found in tissues of the central nervous system. The most efficient measure for preventing contamination of the food and feed chain with TSE agents is the removal and destruction of specified risk materials (SRM) in combination with post-mortem testing of cattle. In addition, the European Directive 2001/101/EC prescribes the listing of all ingredients of food products where meat is defined only as skeletal attached muscle. Other animal parts for human consumption such as heart, liver, or fat have to be labelled as such but not as meat. Brain or CNS tissues – if not specified as SRM – i.e. brain of calves younger than 12 months, pigs, or poultry may still be used as an ingredient in meat products but must be labelled indicating also the animal species.

In order to enforce legislation, there is a strong need for reliable analytical methods for the detection and determination of CNS tissues in meat products such as sausages, and to indicate failure of complying with the ban on SRM.

Several methods for the detection of CNS tissues have been described so far in the literature. Due to technological processes, CNS material can be morphologically destroyed, rendering it undetectable by food histology and conventional neuro-histological staining [1]. Immunochemical methods using neurone specific enolase (NSE) or glial fibrillary acidic protein (GFAP) as markers for detection have been developed [2-4] and have been recently validated [5-7]. In addition a surface plasmon resonance bio-sensor has been developed [8]. A high cholesterol content could also be a possible indicator of the presence of CNS tissue. Although cholesterol shows no absolute specificity with reference to NSE or GFAP, it might be used within the scope of being a low-cost and fast screening procedure [2]. As nervonic acid (15-rtetracosenoic acid) is a quantitatively contained constituent of brain and characteristic part of CNS tissue, it has been proposed as an alternative specific marker to reveal brain material in meat-derived food [9]. Analytical methods based on solid-phase extraction (SPE) clean up and gas chromatography – mass spectrometry (GC-MS) have recently been published for the determination of CNS material in meat products suing marker fatty acids including nervonic acid from sphingolipids and phospholipids [9-12]. An on-line liquid chromatography (LC) – GC method has been recently developed for the determination of markers of CNS tissue in meat products at trace levels [13].

The methods described here and results of their validation (as far as available) will be presented in more detail.

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Key words

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