H62 Species Identification of Fragmented Bone: Evaluation of a New Method of Pyrolysis and X-ray Diffraction Analysis

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After attending this presentation, delegates will have been introduced to the method of pyrolysis and X-ray diffraction analysis for species identi- fication of bone.

The presentation will impact the forensic community through the avail- ability of a quantitative analytical technique for species identification and is of interest to a wide range of forensic investigators. It is relevant to a wide range of forensic situations such as murder investigations, mass fatality response, customs investigations, quality assurance of crematoria practices, and quality assurance of animal feed production.

When bone is recovered in forensic scene examinations or confiscated through customs investigations, the establishment of species identity is often crucial. In most cases, this is achieved by identifying unequivocal morphological features of a particular species on the recovered bone. However, species identification can be challenging when bone lacks any distinguishing morphological characteristics. Such situations arise, for example, with severely fragmented or powdered bone. In these cases, the limitations of the existing techniques that are currently available to forensic investigators restrict their success at species determination.

This paper introduces a new means of species identification of bone; a combined method of pyrolysis and X-ray diffraction analysis. Research and development of this technique has shown that variation in the crystallographic characteristics of bone mineral exist between different animal species. Human bone, in particular, is distinct from that of other species studied. The method quantitatively discriminates between species based on this variation in bone mineral chemistry.

The results of this research are evaluated and discussed with particular consideration of inter and intra species variation. The potential value of the method is also discussed in comparison with other techniques currently available to forensic investigators, in the context of their validity, reliability, and relevance as evidence in court.

Species, Identification, Bone

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