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Lacunae area/fragment area ratio as a marker in distinguish between terrestrial animal vs. sea mammals

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In term of traceability and authentication the characterization of feed ingredients is a key issue not only for control and labelling purpose but also for feed safety reason. In light of this aim of this study was to evaluate the potential of image analysis measurements in combination with the official analytical method for the detection of constituents of animal origin in feedstuffs [i.e. the microscopic examination technique as described in Regulation EC/2009/152. Commission Regulation of 27 January 2009 laying down the methods of sampling and analysis for the official control of feed] in distinguishing between land mammals vs. sea mammals. For this purpose, pure samples containing poultry (AV) terrestrial mammalian (TMAM) and Sea mammals (SMAM) material (Sources : Walloon Agricultural Research Centre, Belgium,; VSA, University of Milan and SAFEED-PAP Project) were analysed. Sediment fractions of each sample were observed with a compound microscope (Olympus BX41, Germany) at several magnifications. Through a digital camera and an image analysis software (Image-for Plus 4.5.1, Media Cybernetics Inc., Silver Springs, USA), we obtained 772 bone fragment lacunae images at X40. Images have been processed and elaborated in order to obtain for each lacuna a monochrome mask on which several measurements were performed. On each lacuna 30 geometric variables plus the lacunae area/fragment area ratio were obtained. Data were analysed by ANOVA (GLM procedure) and by LDA procedure of SAS statistic software. Results obtained in the present study indicated that even though most of variables measured were significantly (<.001) different between TMAM and SMAM vs. poultry in term of mean, no differences between TMAM and SMAM have been detected. However when lacunae area/fragment area ratio was considered some differences have been observed. SMAM material have shown the lowest the ratio lacunae area/fragment area (13.47) compared to the TMAM and AV (23.03 and 26,58, respectively). In both measured variables and lacunae area/fragment area ratio porpoise was the main source of misclassification. In conclusion, data here presented indicate that some of the variables/descriptors provided by image analysis related to lacunae dimensions and features have some potential in distinguish poultry material from mammal's material, but not in distinguish between Av and TMAM from SMAM. By contrast lacunae area/fragment area ratio appears promising for distinguishing between terrestrial animal vs. sea mammals.

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