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Minerals and trace elements from milk of indigenous Portuguese goat breeds: Preliminary results

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Objectives: Concentrations of minerals and trace elements from the milk of indigenous Portuguese goat breeds and those of an exotic breed were determined. In Portugal, goat milk is mainly used in traditional cheesemaking. However, goat milk does not yet have an “image” in this country, a better scientific knowledge related with its health benefits being needed.

Methods: Goat milk aliquots from the 4 Portuguese breeds Serrana (SR: two ecotypes: SRR and SRT), Charnequeira (CH), Serpentina (SP) and Algarvia (AL) and from an exotic breed (Saanen) were dried and decomposed by dry ashing and wet acid dissolution using microwave technology. FAAS was performed to determine Ca, Mg, Na, K, Fe, Mn and Zn. Other elements (Al, Cr, Cd, Cu, Ni, Mo, V and Pb) were analysed by ETAAS and total P was determined by UV-Vis. Potentiometric titration was used to Cl quantification. Both efficiency and reliability of all the methods used were performed by simultaneous analysis of certified reference materials and overall recovery assays.

Results and discussion: Preliminary results for the oligoelements determined showed that there was no evidence of significant difference between the results obtained for milk from Saanen and the indigenous Portuguese breeds. However, milk from SRT goat appears to present the highest values for Ca, Mg, Na, P, Cr, Mn and Zn. Confirmations of these results along with a relationship with the feed and production area are under study.

Validation and quality assurance applied to goat milk chemical composition

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Objectives: ISO/IEC 17025:2005 requires that laboratories should be able to report analytical results with uncertainty estimation as a way to achieve comparability and demonstration of fitness for purpose. In this work an intralaboratory approach for uncertainty evaluation based on method validation studies and quality control data was applied to mineral and trace elements of goat milk after performing validation and quality assurance and quality control programs.

Methods: Goat milk samples were decomposed by dry ashing and wet acid dissolution. Ca, Mg, Na, K, Fe, Mn and Zn were analysed by FAAS, Al, Cr, Cd, Cu, Ni, Mo, V and Pb by ETAAS, total P UV-Vis spectrometry and Cl by Potentiometry. The CRM from BCR 063 skim milk powder from the European Commission and/or fortified milk samples were used on quality assurance and quality control programs. Measurement uncertainties were estimated using a relative approach comprising the overall analytical procedure and covering all the uncertainty relevant components.

Results and discussion: The relative combined uncertainty, $u_c^{rel}(Y)$, includes the precision studies (RSD), and the relative uncertainty of the recovery (trueness) [$u_{rel}(\bar{R}_m)$]:

$$u_c^{rel}(Y) = \sqrt{RSD^2 + (u_{rel}(\bar{R}_m))^2}$$

Precision under within-laboratory reproducibility was estimated from triplicate analysis (R-charts) and recoveries from CRM or spiked samples analysis. A correction for bias wasn't considered since \bar{R}_m weren't significantly different from 1.

The magnitudes of the uncertainty components depend on the concentration level of the measurand and aspects like matrix-matched and metrological characteristics of CRM are discussed.