



Composition of Brazilian Phosphate Rocks Used for Cattle Feed Supplement

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Phosphate rocks constitute the bulk of the raw materials for the manufacture of phosphate fertilizers and some phosphorus based chemicals. It is well known that natural phosphate contains a great variation of heavy metals, and some of them, depending of their concentration, could present nutritional and environmental problems [1]. Normally, di-calcium phosphate is used for animal feed supplement. Otherwise, due to the high prices, other kinds of phosphate have also been investigated for cattle feeding. The Brazilian Official Publication SDR 06 04/02/2000 changed the legislation about phosphate solubility and fluorine concentration, allowing the use of non-traditional phosphate sources, such as superphosphate, in the feeding of bovine. This product is used as fertilizer and presents elevated solubility. Therefore, the analysis of this material is important. There are few and discrepant information in the literature about heavy metals concentration in phosphate fertilizers. In the present study element concentrations in fifteen samples including traditional and alternative phosphate sources were determined. The contents of Pb, Cd, Cr, Ni, V, and Zn were determined by ICP OES and GF AAS methods. The total concentrations were measured in samples digested with aqua-regia plus hydrogen peroxide in a microwave system with high pressure vessels and the contents of the investigated elements were compared to the animal nutritional requirements and daily permissible dose. A great variation of the results was observed. As an example, Pb amount varied from 0.15 ± 0.1 to 5.93 ± 0.1 mg kg⁻¹ and Cd from 0.28 ± 0.02 to 79.5 ± 3.4 mg kg⁻¹. The results are discussed taking into account if application of alternative phosphate sources may contribute to the increase of toxic metals in the food chain. Detection limits and precision were established. The accuracy was checked using a standard reference material (NIST 694).

[1]. P.O. Ogunleye, M.C. Mayaki, I.Y. Amapu, J. Environ. Radioactivity, 62:39-48, 2002.

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