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Estimation of nutrient values of pig slurries in Southeast Spain using easily determined properties

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Abstract -
 The contents of available nutrients in pig slurries are not easy to quantify in situ without laboratory facilities, but chemical analyses using standard laboratory methods also take time and are costly and not practical for most farms. Thus, when animal slurries are applied to land, their fertiliser potential is often unknown. In addition, in the last years, the changes in the management of industrial piggeries has changed the nature of the pig slurries vg. decrease of the dry matter content, and consequently the methods and equations used for estimating the nutrient contents in these residues must be checked. In our study, slurry samples were collected from the storage tanks of 36 commercial farms in Southeast Spain. Samples were analysed for pH, electrical conductivity (EC), redox potential (RP), specific density (D), total solids (TS), sedimentable solids (SS), biological oxygen demand (BOD5), chemical oxygen demand (COD), total nitrogen (TKN), ammonium nitrogen (AN), organic nitrogen (ON), and total contents of phosphorus, potassium, calcium and magnesium. Relationships between major nutrient levels of pig slurries and a range of physical and chemical properties were investigated. We also analysed the variability of pig slurries according to the production stage. TKN, AN and K were closely related to EC. The P content in slurries was related more closely to solids-derived parameters such as D. The use of multiple properties to estimate nutrient contents in pig slurries, especially for AN and K, seemed unnecessary due to the limited improvement achieved with an additional property. Therefore, electrical conductivity seemed to be the most appropriate single, easily determined parameter for estimation of total and ammonium nitrogen and potassium in pig slurries, with more than 83% of the variance explained. P seemed to be the worst key nutrient for estimation using any easily determined parameter.

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