Composition of human excreta - a case study from Souther Thailand

In Thailand, human excreta might be recycled into agricultural soils as a supplement to commercial fertiliser and thereby enrich the general fertility of the soils. However, for Thailand an adequate knowledge of the quality of human excreta, in order to assess its fertiliser potential, is not available. A literature survey revealed only very limited information of the chemical composition and generation rate of human excreta in South East Asia. Data from other parts of the world also lacked specific information on collection and analytical methods, or the studies were typically 20-30 years old. In the present study the composition of human excreta has been studied in three case study areas in Southern Thailand: Kuan Lang, Phattalung and Prik. The inhabitants of the three areas represent people of Southern Thailand by age, sex, occupation, religion and type of residence. Human excreta was collected and stored for 1 week from five persons in each area, who each had their own toilet and collection bucket. In parallel, a septic tank at the Observation and Protection (O&P) Centre of Songkhla (a boys prison institution) adjacent to the three study areas was used as a daily sampling point, to obtain data on average amounts of human excreta and chemical composition. Information on average values of generation rate and chemical composition was obtained as well as inter-human variation. However, no significant variation was found between the results for human excreta at the O&P Centre or from the 15 individuals. Furthermore, there was no significant influence of age, sex, occupation or religion on the chemical composition. The only significant variation was that the older people excreted larger amounts of total wet matter than the younger, which could be due to a higher water intake, in order to reduce the risk of constipation. The generation rate found was 0.6-1.2 L urine/cap/day and 120-400 g wet faeces/cap/day. The generation rate of the elements in the excreta was 7.6-7.9 g N/cap/day, 1.6-1.7 g P/cap/day, 1.8-2.7 g K/cap/day, 1.0-1.1 g S/cap/day, 0.75-1.5 g Ca/cap/day, 0.25-0.4 g Mg/cap/day, 9-16 mg Zn/cap/day, 1.4-1.5 mg Cu/cap/day, 0.3 mg Ni/cap/day, 0.02-0.03 mg Cd/cap/day, 0.07-0.14 mg Pb/cap/day, 0.01 mg Hg/cap/day and 0.8-1.1 mg B/cap/day. The metals (Ca, Mg, Zn, Cu, Ni, Cd, Pb, Hg) are mainly excreted via the faeces and the remaining elements (N, P, K, S, B) are mainly excreted via the urine. It can be concluded that human excreta constitutes a large fertiliser resource, which presently is not utilised in Thailand. (C) 2002 Elsevier Science B.V. All rights reserved.