

Chemical Assessment of Geophagic Botshabelo Soils and Possible Micronutrient Supplementation

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Abstract

Background: Consumption of earth and earth-like material is a widespread practice in South Africa and is termed geophagia, geo meaning earth while -phagia refers to consumption. The rationale of practitioners for the consumption of geophagic materials is not generally supported by scientific data, however, articulated on cultural, religious, socioeconomic and (moreover) to augment a scanty or mineral-deficient diet. Geophagic materials are also said to enhance gut pH which aids trace mineral absorption.

Aim: The aim of the study was to assess soil colour, chemical composition and pH of the of geophagic soils in Botshabelo.

Methodology: Samples were collected from geophagic mining sites in Botshabelo with the assistance of geophagia practitioners in Botshabelo. A total of 60 samples was collected across Botshabelo. The samples were analysed for chemical composition using X-ray fluorescence (XRF) to determine possible micronutrient supplementation. In addition, calcium chloride method was used to determine pH which enriches absorption of minerals, was determined. Furthermore, soil colour was analysed using Munsell soil colour classification, as colour is associated with mineral content.

Results: The soil colour results showed 30.4% of the soil population to be brown, which is associated with presence of iron. Furthermore, dark greyish brown (15%) and dark yellowish brown (15%) were both second. The geophagic materials were found to contain micronutrients that are essential for human health even though not all were abundant. Micronutrients that were found in high quantities were iron (>35000ppm), potassium (>10000ppm) and calcium (>5000ppm). While zinc and chromium quantities were less than 200ppm. In addition, selenium levels were below the level of detection. Most of the soils were found to be neutral and alkaline accounting for 90% of the soil population.

Conclusion: This shows that there is great potential for the geophagic materials being used as micronutrient supplements. However, these micronutrients being available does not imply that they are accessible.