

Polyhalite effectiveness as an alternative potash source in Tanzania

Robert Meakin^{1*}, Kiran Pavuluri¹ and Timothy D Lewis¹

¹ Sirius Minerals, UK

* Presenting and corresponding author: robert.meakin@siriusminerals.com

Abstract

Polyhalite, commercially known as POLY4, comprises potassium (14% K₂O), magnesium (6% MgO), calcium (17% CaO) and sulphur (19% S) with the chemical formula (K₂SO₄.MgSO₄.2CaSO₄.2H₂O). As an organic multi-nutrient fertilizer, polyhalite is a suitable alternative potash source in support of sustainable agriculture. Exploration by Sirius Minerals and characterization work by Kemp et al. (2016) identified a resource of over 2.5 billion tonnes of polyhalite in the UK with an estimated supply for over 50 years. Contemporary research, particularly in tropical environments, on polyhalite is limited; hence a requirement to conduct research trials to determine polyhalite fertilizer potential.

In the Southern Highlands of Tanzania, six trial sites growing corn (*Zea mays* L.) were established to assess potassium supply from polyhalite against potassium chloride (MOP) using micro-dosing to apply 20 kg K₂O ha⁻¹. Measured treatments were: 1) Control in which no fertilizer was applied; 2) Recommended practice of 120-60-0 (NP treatment, 120-60-0); 3) NP treatment + Muriate of Potash (MOP); 4) NP treatment + Polyhalite (POLY4); and 5) NP treatment + MOP + Kieserite (MOP + Kieserite).

Results from Tanzania indicated that all treatments outperformed control to demonstrate the need for potassium. Furthermore, the importance of sulphur was identified by yield improvements for both POLY4 and MOP+Kieserite treatments over MOP across all six sites (Pavuluri et al., 2017). POLY4 and MOP+Kieserite treatments offered similar yields indicating no response to magnesium in either treatment.

Research trials continue across Tanzania to validate polyhalite as an alternative potash source on a wider range of crops and soil environments.

References

Kemp, S. J., Smith, F. W., Wagner, D., Mounteney, I., Bell, C. P., Milne, C. J., Gowing, C. J. B. and Pottas, T. L. (2016) 'An Improved Approach to Characterize Potash-Bearing Evaporite Deposits, Evidenced in North Yorkshire, United Kingdom'; *Economic Geology*, 111(3), pp. 719–742. doi: 10.2113/econgeo.111.3.719.

Pavuluri, K., Malley, Z., Mzimhiri, M. K., Lewis, T. D. and Meakin, R. (2017) 'Evaluation of polyhalite in comparison to muriate of potash for corn grain yield in the Southern Highlands of Tanzania'; *African Journal of Agronomy*, 5(3), pp. 325–332.