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Efficiency of Polyhalite as fertilizer to banana crop in Brazil

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Banana cultivation reaches a large area in Brazil, being the most consumed fruit the country, generating 4,5 billion dollars in income for the farmers in 2016. Fertilization with KCl in high rates is common in the management of crop, leaving soils with high concentration of potassium and usually with high salinity. This can influence the development of plants and their nutrition, mainly with calcium and magnesium. The aim of the research was to evaluate the efficiency of Polyhalite as fertilizer to banana crop in a high fertility soil, common in banana areas in Brazil. Polyhalite is a natural fertilizer extracted from a single crystal complex with two molecules of water of crystallization, the chemical formula of the mineral is: $K_2Ca_2Mg(SO_4)_4 \cdot 2(H_2O)$, and it contains 19.2% of sulfur (S), 14% of potash (K_2O), 12% of calcium (Ca), 3.6% of magnesium (Mg). Important characteristics of Polyhalite are the slow release and higher availability of nutrients due to its sulphate form, and the lower salinity in function of the low contents of chloride (Cl) and sodium (Na). Trial was made at Lagoinha farm, in Juquia, Sao Paulo state, Brazil. Experimental design in randomized blocks with 7 treatments and 4 replications. Treatments were blends of KCl and Polyhalite, relative to the weight of fertilizers, to provide 360 kg ha^{-1} of K_2O , except Treatment 1, Control without nutrient application. Treatments: 1- Control; 2 - 100% KCl; 3 - 80% KCl/20% Polyhalite; 4 - 60% KCl/40% Polyhalite; 5 - 40% KCl/60% Polyhalite; 6-20% KCl / 80% Polyhalite; 7 - 100% Polyhalite. There wasn't significant effect for the KCl application in relation to the control, with reduction of 1.5% in fruit yield due to the K_2O fertilization. However, the best results were observed with the fertilization with blends Polyhalite and KCl, and the best result was obtained with the 60% Polyhalite / 40% KCl ratio, which increased yield by 13.2% compared to conventional fertilization with KCl. Plants that received Polyhalite showed the bunches with greater vigor, and the plants had larger diameter of the stem. Polyhalite is a viable alternative for use in banana fertilization because it improves the nutritional balance with supply of Ca, Mg and S, besides decreasing the salinity and increasing the yield potential.

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