

عنوان مقاله:

Cow urine as a potential source for struvite production

محل انتشار:

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خلاصه مقاله:

Background Rock phosphate deposits are non-renewable and are facing a decline. Due to this, phosphate fertilizers are going to be limited in future. Struvite is a crystalline mineral substance containing equimolar amount (1:1:1) of magnesium ammonium and phosphate ions ($MgNH_4PO_4 \cdot 6H_2O$), a good source of phosphorus and a slow release fertilizer. In the present study it was crystallized from cow urine using brine as cheap source of magnesium. Cow urine and brine was mixed at different proportion to find out the optimum concentration for struvite crystallization. Crystallized struvite was characterized by X-ray diffraction, thermogravimetric and differential thermal analysis, Fourier transform infrared spectroscopy and scanning electron microscopy and energy dispersive spectroscopy. Results The ratio of 1:0.5 cow urine and brine mixing gave the best quality struvite at pH 9. The analysis of struvite for phosphate, magnesium and ammonium ions showed 5.85, 3.16, and 0.56 % respectively. The fertilizer potential of struvite was evaluated on the growth of *Vignaradiata*. The best growth was observed in the pots where struvite was added at a concentration of 2 g/kg of soil. Conclusion Struvite is a good source of phosphate and it can be recovered from livestock waste such as cow urine. Struvite can be made from a renewable source for a sustainable agricultural development. Theoretically at the yield of 40 g/L a total of 12,176 tons struvite could be made per day all over India for fertilizer use.

کلمات کلیدی:

Brine Cow urine Crystallization Fertilizer Phosphate Struvite

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