LABORATORY PREPARATION AND ANALYSIS OF A PHOSPHATIC FERTILIZERS

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Thesis is submitted in partial fulfillment of the requirements for the Degree of Science (Hons)

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ABSTRAK

Monokalsium fosfat, trikalsium fosfat, nitric fosfat dan diammonium fosfat merupakan baja yang biasa digunakan dalam pertanian sebagai baja fosfat. Oleh kerana, baja-baja ini berbeza dari segi kimia, maka adalah penting dibuat perbandingan dari segi keupayaan baja-baja tersebut membekalkan kandungan fosforus, P dalam bentuk fosforus pentaoksida (P_2O_5). Jadi, tujuan kajian ini dijalankan adalah untuk menghasilkan baja-baja fosfat dalam makmal dengan kaedah yang mudah. Proses untuk menghasilkan baja monokalsium fosfat adalah dengan mencampurkan serbuk fosfat batu dengan asid sulfurik dan untuk trikalsium fosfat pula, proses adalah dengan mancampurkan serbuk fosfat batu dengan asid fosforik. Baja yang dihasilkan dengan cara ini adalah murah dari segi nilai pertanian. Diammonium fosfat boleh dihasilkan dengan mencampurkan ammonia asid fosforik. Bagi fosfat nitrik, ia boleh dihasilkan dengan mencampurkan serbuk fosfat batu dengan asid nitrik. Keputusan dianalisa dengan menggunakan biasan X-ray. Ia untuk mengesahkan bahawa sampel-sampel mengandungi P_2O_5 dalam setiap baja yang dihasilkan. Monokalsium fosfat, trikalsium fosfat dan diammonium fosfat boleh dihasilkan dalam makmal kecuali fosfat nitrik. Nilai kualiti pertanian bagi baja-baja fosfat banyak bergantung kepada kuantiti, P, dalam bentuk P_2O_5.

ABSTRACT

Single superphosphate (SSP), triple superphosphate (TSP), nitric phosphate and diammonium phosphate (DAP) are the most commonly used phosphate fertilizers. Since they differ in some chemical aspects it is important to compare their ability to supply phosphorus, P, in the form of phosphorous pentaoxide (P_2O_5). The objective of this research was to manufacture phosphate fertilizer in simple laboratory method or at laboratory scale. The process to manufacture SSP consist of mixing powdered phosphate rock with sulphuric acid and for TSP, the process consist of mixing powered phosphate rock with phosphoric acid. This form of low cost fertilizer manufactured is suitable for improving the agronomic value. Diammonium phosphate is manufactured using ammonia and phosphoric acid. As for nitric acid, powdered phosphate rock is reacted with nitric acid. The result was analyzed using X-ray diffraction analysis. This is to confirmed that the samples governs the available P_2O_5 content in each phosphatic fertilizer. SSP, TSP and DAP can be manufactured using simple laboratory method except for nitric phosphate. The agronomic value of phosphate fertilizer highly depends upon the amount of P in P_2O_5 available in the fertilizer.