B-59: Improved anion exchange resin method for soil phosphorus estimation

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Soil phosphorus extracted by anion exchange resin method has shown good correlation with plant response for a wide range of soil types. In this method, anion exchange resin and soil are suspended in water in the ratio 4 : 5 : 100 and shaken for 16 h (overnight) and phosphorus sorbed by resin, eluted and estimated. Long extraction time (overnight shaking) is not convenient for routine laboratory work in Sri Lanka, due to frequent power failures particularly in the night, which disturb the smooth operation of shakers. The possibility of using a shorter extraction time for soil phosphorus extraction by anion exchange resin method is discussed.

Anion exchange resin (IRA 400) in Cl form (4 ml), 2 mm sieved air-dried soil (5 g) and distilled water (100 ml) in polypropylene containers (250 ml) were shaken for 4 h, 8 h and 16 h respectively, using an end-over-end shaker. The resin sorbed phosphorus was eluted with 1M NH_4Cl and the extraction was analysed for P by the molybdenum blue method. Pueraria was grown in polypropylene pots (IL) filled with 20 different soils and placed in a greenhouse. Each soil was treated with a basal dose of ammonium sulphate (0.16 g), muriate of potash (0.2 g) and magnesium sulphate (0.1 g) and there were 2 phosphorus treatments for each soil; i.e triple superphosphate application at the rate of 1 g per pot (+P) and no phosphate application (-P). The percentage response of Pueraria in each soil was worked out by the ratio of total dry matter weight of -P treatment to +P treatment.

The linear correlation coefficient among resin P extracted at different shaking times were highly significant ($p < 0.001$). The extracted P increased with increasing extraction time. Percentage response of Puereria to applied P and resin extracted P of soil was fitted to the Cate and Nelson (1971) model with r_2 of 0.676, 0.592 and 0.616 for extraction times of 4 h, 8 h and 16 h respectively. 4 h extraction time was sufficient for anion exchange resin method instead of 16 h extraction. This provides a convenient laboratory method for soil P extraction by anion exchange resin method. The suggested modification results in reducing operation cost and time.

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