

# Dose Effects of Barnyard Manure as Organic Fertilization in the Reduction of The Exclusive Mineral Fertilization of N, P, K and S in The Coffee Culture: An Additional Inorganic Chemistry for B. Pharm First Year Students in India



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## Abstract

The technical feasibility of reducing the levels of nitrogen (N), phosphorus (P), potassium (K) and sulfur (S) recommended in the mineral nutrition of arabica coffee through the use of manure as organic fertilization, in increasing doses of 5.0; 10.0; 20.0; 40.0 and 80.0 t.ha<sup>-1</sup>, added to the mineral fertilization reducing proportionally to the amounts of nutrients contained without manure. After three harvests all treatments were higher than the control, from 75 to 133% in productivity, indicating the importance of nutrients N, P, K and S without coffee cultivation without soil under study. The treatment that used 20.0 t.ha<sup>-1</sup> was significantly superior to the others with a 23% increase in production in relation to the exclusively mineral treatment. The other treatments with manure were similar to each other and mineral mineral, except for 80.0 t.ha<sup>-1</sup>, which was lower, due to physical objects of foot falls. Ca<sub>2</sub><sup>+</sup>, Mg<sub>2</sub><sup>+</sup>, K<sup>+</sup>, P, Zn, Mn and B, without pH and V% were observed in the treatments with 20.0 t.ha<sup>-1</sup> or higher, reduction of alcohol in CTC alone. In the higher doses of mineral fertilization found reduction of pH and V%, by the probable acidic effect of Urea, Ammonium Sulphate and MAP. The leaf contents of N, P, K and S are only deficient in the control. Of the doses of N, P, K and S, without experience, they can reduce to 6 to 88% of N, 16 to 93% of P, 7 to 86% of K and 9 to 87% of S.

**Keywords:** Coffea Arabica; Organic Fertilization; Corral Manure

**Abbreviations:** CTC: Cation Exchange Capacity

## Introduction

Barnyard manure, historically, was the first input used in the fertilization of coffee, due to its great availability in the old coffee farms. Currently in the high-scale cattle confinements, with more than 10 thousand confined animals, their availability is increasing, especially in the enclosed and adjacent triangle of Minas Gerais, as well as dairy basins such as Araxá in properties called "coffee with milk." Manure has also been used in several compounds, such as, for example, coffee straw. Organic matter improves physical, physicochemical, chemical and biological properties of soil, which will directly or indirectly influence soil fertility [1]. In addition, it assists in aeration, permeability and greater retention of moisture in the soil. It provides nutrients, slowly available to plants and increases cation exchange capacity (CTC). However, the exclusive use of organic fertilizers in the coffee crop implies negative results of production in

relation to the conventional system and productivity losses, being recommended the association between fertilizers organic and mineral soils to obtain the balance between nutrients and consequently the better vegetative-productive behavior of the coffee tree [2].

From this association, good results can be seen in some studies that, when testing doses of different types of organic fertilizers, obtained positive results when using manure of corral and chicken in association with mineral fertilizer, increasing the productivity of 9 to 20% in relation to the exclusive mineral fertilization. Also that obtained productivity increase with the association of coffee straw with mineral fertilizer. In order to obtain good results in the use of organic fertilizers it must be considered that each type of organic compound used in fertilization reacts with the soil and provides nutrients to the

plants in different speeds and forms due to their nutritional composition and the relation between the carbon and nitrogen. When testing different organic nutritional sources in the production of coffee tree seedlings in tubes, state that when using the coffee straw the leaf contents of K were higher than the other organic sources used, while the leaf contents of Ca and Mg were below the critical range.

In order to evaluate the effect of N, K, and Mg on the nutrient content of N, K, and Mg, with the addition of 40% turkey litter in artificial substratum favored the development of coffee tree seedlings, already [3,4] obtained results of production without significant difference for coffee fertilizer fertilized organominerals and exclusive mineral fertilization. The present work was carried out with the objective of studying the technical viability of reducing N, P, K and S levels of the coffee's exclusive mineral fertilizer, with the annual use of manure as a form of organic fertilization in increasing doses (5, 0, 10.0, 20.0, 40.0 and 80.0t.ha<sup>-1</sup>) plus mineral fertilization reduced proportionally to the amount of these nutrients contained in manure from the planting to the third crop, period considered such as the formation of coffee crop [5].

### Executive Summary

There were no significant differences between the exclusive and mineral mineral fertilizations proportionally reduced the different doses and of the manure of corral evidencing the technical viability of the use of the manure of corral as source of N, P, K and S in the reduction of these nutrients in the mineral fertilization of the coffee, the dose of 20.0t. ha<sup>-1</sup> being higher than the others, with a 23% increase in productivity. All the exclusive and reduced mineral fertilizations with corral manure were significantly higher in productivity (75to133%) to the control, demonstrating the nutrient needs of the coffee in the soil under study; Exclusive and low dose fertilization with up to

10.0t. ha<sup>-1</sup> of manure was depressant for pH, V%, Ca<sub>2</sub><sup>+</sup> and Mg<sup>2+</sup> due to the probable acidification promoted by Urea, ammonium sulphate and MAP used in the experiment; The higher doses of corral manure above 20.0t. ha<sup>-1</sup> did not alter the pH and V%, and increased Ca<sup>2+</sup>, Mg<sup>2+</sup>, K<sup>+</sup>, P, Zn, B, Mn and CTC contents, besides reducing Cu; The leaf contents of N, P, K and S were higher than the control, which was deficient and did not differ from each other, with levels close to the levels considered appropriate for the collection period, showing that N, P, K and S of manure of corral were efficient and similar the mineral sources; The levels of N, P, K and S of exclusively mineral fertilization can be reduced, from 6 to 98% for N, 16 to 93% for P, 7 to 86% for K and 9 to 87% for the S with the use of 5.0 to 80.0 t. ha<sup>-1</sup> of corral manure as organic fertilizer for coffee.

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