



NITRATE AND NITRITE DETERMINATION BY CAPILLARY ELECTROPHORESIS IN LETTUCE CULTIVATED WITH DIFFERENT BIOFERTILIZERS

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INTRODUCTION

One of the main sources of nitrate ingestion is the consumption of leafy vegetables, especially lettuce. Nitrate ingestion may present health risks, as consumption of foods containing excess of nitrate can lead to methemoglobinemia and cancer development. The objective of this work was to determinate nitrate and nitrite levels in lettuce leaves cultivated with different biofertilizers in organic production system.

MATERIAL AND METHODS

This study evaluated four treatments, three biofertilizers (fish wastes, shrimp shell powder and palm heart industry wastes) and a control treatment (without biofertilizer). Lettuce leaf samples were analyzed by capillary electrophoresis. A fused silica capillary with an external polyimide coating and 50 μm of internal diameter was used. Electrophoretic conditions were carried out with 30 kV negative voltage, 8 seconds injection at 50 mbar through the farthest vial of the detector, temperature of 25°C and 200 nm detection. The electrolyte was composed of 25 mmol.L^{-1} Tris-(hydroxymethyl) aminomethane (TRIS) and 5 mmol.L^{-1} H_2SO_4 , with pH 8.1.

RESULTS

The nitrate average value found in lettuce cultivated with biofertilizer made up from palm heart wastes was the one that presented the highest nitrate content with 630.15 mg.kg^{-1} , followed by the fish wastes one, with 588.19 mg.kg^{-1} . The average values of nitrate in lettuce produced with shrimp shell powder and without the addition of biofertilizer presented the lowest values, with 44.55 and 51.49 mg.kg^{-1} , respectively. Overall, all samples analyzed presented values below the limit established by the European regulation, that allows the maximum limit of nitrate in lettuce of 4,500 mg.kg^{-1} in fresh mass, when cultivation occurs in winter, and 2,500 mg.kg^{-1} in fresh mass, when cultivation is carried out during summer. No nitrite content was detected in the analyzed samples.

CONCLUSIONS

Despite the higher values obtained in lettuce cultivated with palm heart wastes and fish wastes biofertilizers, they were not higher than the established by European regulation. This allows the researchers to say that it is possible to produce quality lettuce with the biofertilizers evaluated in this study.