

Mineral Nitrogen availability after nitrogen fertilizer, vinasse application and different contents of straws during initial developing of sugarcane in São Paulo state, Brazil.

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The aim of this study was to determine the concentrations of mineral nitrogen concentrations (N-NO<sub>3</sub><sup>-</sup> and NH<sub>4</sub><sup>+</sup>) in soil during first month sugarcane crop cycle with different amounts of straw (0, 7, 14 or 21 t ha<sup>-1</sup> straw) and vinasse application (0 or 53 m<sup>-3</sup> ha<sup>-1</sup> applied to the soil surface). The experiment was installed in November 2010. Nitrogen fertilizer was applied at line as ammonium nitrate (120 kg N ha<sup>-1</sup>) in all plots. The soil samples was taken at 4, 6, 8, 11, 14, 18, 22, 26 and 29 days after fertilizer and vinasse application from the fertilized line and as well as from the midrow, at 0,0-0,2 m depth. Nitrate and ammonium was extracted in KCl 2 mol L<sup>-1</sup> and the concentrations was determined by colorimetry using flow inject analysis technique (FIALab 2500). We measured N-NO<sub>3</sub><sup>-</sup> and N-NH<sub>4</sub><sup>+</sup> concentration in filtered soluble extracts. The large mean concentration of N-NO<sub>3</sub><sup>-</sup> in treatments without vinasse application was at third sampling, when the treatments with 0, 7, 14 and 21 of straw rate present 169; 94; 78 and 53 mg N-NO<sub>3</sub><sup>-</sup> kg<sup>-1</sup> soil, respectively. This behavior remained in the other times with marked reduction of NO<sub>3</sub><sup>-</sup> concentrations. 29 days after experiment installation, nitrate concentrations were already similar between-row position and declined from 0 to 5 mg N-NO<sub>3</sub><sup>-</sup> kg<sup>-1</sup> soil in all treatments. The same tendency was showed after vinasse application, however the vinasse increased the mean contents of NO<sub>3</sub><sup>-</sup>, as well as NH<sub>4</sub><sup>+</sup>, both at fertilizer line (90 to 426 mg N kg<sup>-1</sup> soil at third sampling, where the mean NO<sub>3</sub><sup>-</sup> /NH<sub>4</sub><sup>+</sup> was 0,86) and between row positions. The concentrations of NH<sub>4</sub><sup>+</sup> in soil at line after 29 days was reduced from 25 to 55 mg N- NH<sub>4</sub><sup>+</sup> kg soil<sup>-1</sup> in all plots. Thus, after 29 days NH<sub>4</sub><sup>+</sup> was the major nitrogen form that remains as substrate for biological activity.

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