

Apichat Modtad 2012: Effect of Nitrification Inhibitors on Nitrogen Fertilizer Transformation and Nitrous Oxide Emission in Corn Field. Master of Science (Environmental Technology and Management), Major Field: Environmental Technology and Management, Department of Environmental Science. Thesis Advisor: Associate Professor Patthra Pengthamkeerati, Ph.D. 95 pages.

Enhancing efficiency of nitrogen fertilizer can be done by slowing nitrogen (N) transformation rate for maintaining N in soil. The laboratory and field trial experiments were conducted to compare the effect of nitrification inhibitors (NIs) (dicyandiamide [DCD] and neem [*Azadirachta indica*] oil) at two rates of 5 and 10% w/w or v/w fertilizer on soil N fate (NH_4^+ and NO_3^-) and nitrous oxide emission. Under controlled moisture at 60% of pore space and temperature at 25 and 35°C, DCD and neem oil can reduce N transformation rate by prolonging NH_4^+ in soil and minimizing nitrous oxide emission for both studied temperatures and rates fertilizer. The application of DCD and neem oil at a ratio of 10 % (w/w) gave a maximum efficiency for slowing soil N transformation. DCD application tended to have a better efficiency in slowing nitrification process than neem oil. Field trial was also conducted to investigate the effects of NIs applied on soil N fates and corn yields (Suwan 4452) at the Khon Hin Son Research Center, Chacheongsao province. The experimental design was RCBD with 4 replications. Result from the field study showed that NIs reduced rate of soil N transformation and decreased nitrous oxide emission from the field. The application of DCD at a ratio of 10 % also had a maximum efficiency for retarding N transformation, as was observed in the laboratory incubation. Despite NIs had a tendency to increase corn yield in comparison with the control plot (applied only fertilizer), there were not significantly different except for grain N uptake. Hence, the finding in this study supports that NIs application retards N fertilizer transformation, minimizes greenhouse gas emission and increases crop productivity.

Student's signature

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