Prakasit Intarasamarng 2006: Transformation and Quality of Composts from Rice Straw, Bagasse, Sawdust, Eucalyptus Bark and Sewage Sludge from Pulp Industry. Master of Science (Agriculture), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Mr.Chawalit Hongprayoon, Ph.D. 203 pages.
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Five analytical methods for determining the cation exchange capacity (CEC) of composts, AOAC (2000), Faithfull (2002), Black (1965), Hendershot *et al.* (1993) and Lax *et al.* (1986), were compared. The results considered that both AOAC and Faithfull methods were the most effective methods. The AOAC method was the most appropriate and more reliable than Faithfull method.

The composting process and compost quality of 5 raw materials, rice straw, bagasse, sawdust, eucalyptus bark and sewage sludge were studied for 210 days. It was found that temperature within rice straw, bagasse and sewage sludge compost piles decreased faster than the sawdust and eucalyptus bark compost piles. Decreasing in mass and organic matter due to decomposition of rice straw and bagasse composting were faster than other materials. Sewage sludge had the shortest decomposting period until mass stabilization. The percentages of total N, P, K, S, Ca, Mg, Fe, Zn, Cu and Mn in all composts increased in the early stage of decomposition and stabilized in the curing period. Rice straw compost contained the highest total N and K whereas sewage sludge compost had the highest total P. Availability of N was highest under composting process of bagasse and sewage sludge but the available P was highest in eucalyptus bark composting. Electrical conductivity (EC) and CEC in all composts increased in the early stage of decomposition and to a stable values in the curing period. Compost formed from eucalyptus bark showed the highest quality in cation exchange capacity.

The quality for soil improvement and the decomposition rate of the composts in soil were compared for 56 days, with and without plant. The experiment without plant showed that composts significantly increased soil organic matter, EC, CEC and decreased bulk density. Decomposition of soil organic matter was slow during 0-56 day. Soil organic matter decreased from 1.83-2.44% at 0 day to 1.73-1.91% after 56 days. Available N increased from 17.35-91.09 mg kg^{-1} at 0 day to 49.83-94.91 mg kg^{-1} after 56 days. Available P and exchangeable K relatively constant during the incubation period. Decomposition of soil organic matter in soil with growing plant was similar to without plant experiment. The available nutrient in soil and EC were found lower in planted experiments.

Student's signature Thesis Advisor's signature 25 / 10 / 2006