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The Effect of Conventional and Organic Farming on Cabbage (*Brassica oleracea* Var. *capitata* L.) Yield - a Case Study in Lembang, Indonesia

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Abstract

Cabbage is the 3rd most important vegetable grown in Indonesia. A major production area is located in the highland near Lembang, West Java. High doses of mineral N with frequent chemical pesticide application is the most common farming practice, with high potential risk to environment and consumer safety. Farm yard manure and biopesticides are major elements of organic farming which has been suggested as viable alternative.

A field experiment (randomised complete block) was conducted in 2005 on the station of the Indonesian Vegetables Research Institute, Lembang to test if chicken manure (20 t/ha) and a biopesticide (*Bacillus thuringiensis*) can maintain yield of an early and late cabbage variety (Green Coronet and Gloria Ocena) on an Andosol as compared to standard practices (100 and 200 kg N/ha with weekly applications of Chlorfenafir) and an additional zero control.

Cabbage growth and yield was the lowest in the zero control across both cultivars (23 t/ha net weight). Moreover, 40% of the heads were damaged by cabbage moth (*Plutella xylostella*) and head caterpillar (*Crocodylomia binotalis*) to such an extent that it would not be acceptable for consumers. Biopesticide combined with manure application had a net yield of 40 t/ha, with an average damage level of 17%. In general, synthetic pesticide application combined with 200 kg N/ha had the highest net yield (57 t/ha) and lowest damage (5%) across both cultivars. However, explorative analysis for pesticide residue showed contamination levels (0.9 — 11 mg/kg) high above the critical limit (0 mg/kg). Furthermore, high nitrate-N contents in the heads (118 mg/kg) as well as very high residual nitrate-N in the topsoil (425 mg/kg) clearly show that further research and monitoring is necessary to improve consumer safety and reduce pollution risk to the groundwater. Manure application alone could not reduce nitrate levels of plants and soil to an acceptable level. Further research in crop rotation and use of catch crops are suggested to improve N efficiency of manure applications.

Keywords: consumer safety, conventional farming, organic farming, pollution