

Abstract of thesis presented to the Senate of Universiti Malaysia  
Terengganu in fulfilment of the requirements for the degree of Doctor of  
Philosophy

**THE POTENTIALS OF ORGANIC FERTILIZERS ON GROWTH,  
YIELD AND QUALITY OF WATERMELON**

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Environmental risks and emerging health issues concerning the usage of inorganic fertilisers have raised considerable concerns. According to statistics, inorganic fertilisers account for more than 90% of fertiliser consumption in developing countries worldwide. Several trials were conducted with the objectives of determining the effects of different organic fertilisers on the growth, yield and quality of watermelon varieties, to determine an optimal application rate of poultry manure on watermelon varieties and to evaluate the effects of poultry manure (PM) and NPK (Nitrogen, Phosphorus and Potassium) on the growth, yield and quality of two varieties of watermelons. A study of 7x2 factorised experiment of seven organic fertilisers (poultry manure, goat dung, fish waste, dolomite, vermicompost, seaweed extract and the control) applied to two watermelon varieties (Golden delight and New dragon) was conducted, of which the poultry manure was selected for a follow up study, where different application rates of the poultry manure (0 t/ha, 10 t/ha, 20 t/ha and 30 t/ha) were applied to two the varieties of watermelon. While the third study was a 6x2

factorial design of combined PM+NPK fertilizer treatments (Control, 100% PM, 75% PM + 25% NPK, 50% PM + 50% NPK, 25% PM + 75% NPK, 100% NPK) applied on two varieties of watermelon which was a multi-location study (Bukit Kor: Malaysia and Maiduguri: Nigeria). All experiments were laid out in a completely randomized block design (CRBD) with six replicates and several growth, yield and quality parameters were determined for all the objectives. Results from the studies indicates that, poultry manure performed significantly higher than the other organic fertilisers. Subsequent data from the further study reveals that 20 t/ha and 30 t/ha of poultry manure gave the significant higher results on watermelon varieties. Furthermore, the application rates of 50% PM + 50% NPK, 25% PM + 75% NPK and 100% NPK performed statistically higher than other treatments. In conclusion, 50% PM + 50% NPK had a promising effect on watermelon varieties at both Bukit Kor and Maiduguri. It is recommended that repeated trials be carried out at different locations or climatic areas.

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**POTENSI BAJA ORGANIK TERHADAP PERTUMBUHAN, HASIL DAN  
KUALITI TEMBIKAI**

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Risiko alam sekitar dan isu kesihatan yang timbul mengenai penggunaan baja bukan organik telah menimbulkan kebimbangan yang besar. Berdasarkan statistik, baja bukan organik menyumbang lebih daripada 90% penggunaan baja di negara-negara membangun di seluruh dunia. Oleh itu, beberapa ujian telah dijalankan bertujuan untuk menentukan perbezaan kesan baja organik terhadap pertumbuhan, hasil dan kualiti pelbagai jenis tembikai, bagi memastikan kadar penggunaan optimum baja najis ayam ke atas jenis-jenis tembikai serta menilai kesan baja najis ayam (PM) dan NPK (Nitrogen, Fosforus dan Potassium) terhadap pertumbuhan, hasil dan kualiti dua jenis tembikai. Satu kajian eksperimen berfaktor 7x2 telah dijalankan terhadap tujuh baja organik (kotoran ayam, najis kambing, sisa ikan, dolomit, vermikompos, ekstrak rumpai laut dan kawalan); yang digunakan untuk dua jenis tembikai (Golden Delight dan New Dragon), yang mana baja najis ayam telah dipilih untuk kajian susulan, di mana kadar penggunaan berbeza bagi

baja najis ayam (0 t/ha, 10 t/ha, 20 t/ha dan 30 t/ha) digunakan untuk dua jenis tembikai. Manakala kajian ketiga merupakan reka bentuk faktorial 6x2 rawatan baja gabungan PM+NPK (Kawalan, 100% PM, 75% PM + 25% NPK, 50% PM + 50% NPK, 25% PM + 75% NPK, 100% NPK) yang digunakan ke atas dua jenis tembikai, di mana ia merupakan kajian pelbagai lokasi (Bukit Kor: Malaysia dan Maiduguri: Nigeria). Semua eksperimen telah dibentangkan dalam reka bentuk blok rawak sepenuhnya (CRBD) dengan enam ulangan dan beberapa parameter pertumbuhan, hasil dan kualiti ditentukan untuk semua objektif. Hasil kajian menunjukkan bahawa baja najis ayam mempunyai prestasi yang lebih tinggi berbanding baja organik yang lain. Berdasarkan kajian lanjut menunjukkan bahawa 20 t/ha dan 30 t/ha baja najis ayam memberi hasil yang lebih tinggi secara signifikan terhadap kepelbagaian tembikai. Tambahan pula, kadar penggunaan 50% PM + 50% NPK, 25% PM + 75% NPK serta 100% NPK menunjukkan prestasi statistik lebih tinggi berbanding rawatan lain. Secara kesimpulannya, 50% PM + 50% NPK memberi kesan yang memberangsangkan terhadap varieti tembikai di kedua-dua Bukit Kor dan Maiduguri. Ujian ulangan disyorkan di lokasi atau zon iklim berbeza.