J. Trop. Agric. and Fd. Sc. 39(2)(2011): 229–237

Composts as additives in coconut coir dust culture for growing rockmelon (*Cucumis melo* l.)

[Kompos sebagai bahan tambahan dalam habuk sabut kelapa untuk tanaman tembikai wangi (*Cucumis melo* l.)]

A.B. Wira*, I. Mohd Razi** and Z. Abd Jamil*

Keywords: rockmelon, composts, coconut coir dust

Abstract

Coconut coir dust (CD) is a good growth medium in soilless culture for many selected vegetables and fruit. It has a high water holding capacity, excellent drainage, free of weeds and pathogens, high cation exchange capacity (CEC) and electrical conductivity (EC), easier wetting ability and also gives good aeration to root zone. However, there are some problems in using CD such as low pH, high potassium content and salinity. Addition of peat moss to CD in a ratio of 7:3 has proven to be effective in improving crop growth. Instead of peat moss, compost can be used as an additive to CD. An experiment was conducted with the main objective to determine the best medium to be used as an additive in coconut coir dust culture for growing rockmelon var. Waka Natsu 1. Five types of composts were used as treatments which consisted of M 1 (70% CD: 30% rice straw compost), M 2 [70% CD: 30% empty fruit bunches (EFB) compost], M 3 (70% CD: 30% peat moss), M 4 (70% CD: 30% burnt rice husk) and M 5 (100% CD as control). M 2, which consisted of a mixture of CD and EFB compost in a ratio of 7:3, was found to be the best medium for growing rockmelon var. Waka Natsu 1 using fertigation system. Overall, plant grown in this medium produced the best growth performance compared to the control (100% CD). Plants grown in M 2 produced the largest fruit diameter (14.15 cm) with highest fruit fresh weight (1482.9 g) and total soluble solids (15.33%).

Introduction

Growth media are inorganic or organic materials other than soil in which plants are grown. They are porous and well drained, yet retentive of sufficient moisture to meet the water requirements of the growing plants. The media contains relatively low soluble salts, but have adequate exchange capacity to retain and supply the elements necessary for plant growth (Calile 1997).

Coconut coir dust (CD) is a suitable growth medium for many crops (Prasad 1997) and proven to have ion exchange and gas absorptive properties that can be utilized to absorb N in its NH^+ and NO_{3-} forms, protecting it from loss into the environment (Evans et al. 1996). When used as a growth medium, it may be used alone or in combination with other materials. Awang and Ismail (1997) reported that utilization

*Strategic Resources Research Centre, MARDI Headquarters, Serdang, P.O. Box 12301, 50774 Kuala Lumpur, Malaysia.
**Faculty of Agriculture, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia
Authors' full names: Wira Abu Bakar, Mohd Razi Ismail and Abdul Jamil Zakaria
E-mail: wira@mardi.gov.my

of 100% CD caused initial wetting ability problem. Therefore, addition of other materials into CD is needed to stabilize water content and possibly enhance its quality as a growth media.

Addition of compost into CD can enhance plant growth and increase fruit quality. It generally improves the chemical properties of the substrates by increasing pH, cation exchange capacity (CEC), and concentrations of plant-available nutrients (Kraus et al. 2000). The use of agricultural by-products such as rice straw, empty fruit bunches and burnt rice husk as growth media is becoming popular nowadays.

Rice straw has the ability to stimulate phosphorus availability in the media which resulted in higher yield (Verma and Bhagat 1992). The production of rice straw compost reduced burning activity and removed rice straw waste from paddy fields after harvest.

In Malaysia, about 8 million tonnes of empty oil palm fruit bunches (EFB) are produced after the oil is extracted and they are commonly utilized as mulch for field crop production (Oviasogie et al. 2010).

Peat moss is a growth media that has high salt buffering capacity and good aeration quality, suitable for more acidic conditions and not suitable for growing without mixing with other media (Molitor and Bruckner 1997). Peat is a basic component for potting media in horticulture (Molitor and Bruckner 1997). Rice husk charcoal is another by-product used to improve properties of growth media.

The aim of this study was to determine the best organic material to be used as an additive in coconut coir dust culture for rockmelon production in fertigation system.

Materials and methods

This study was carried out at Agrotech Unit, Taman Pertanian Universiti, Universiti Putra Malaysia, Serdang, Selangor. Experiments were conducted under a simple rain shelter sized 27.5 m x 3.3 m x 3.5 m which can accommodate 180 white polybags. The distant between polybags was 45 cm x 45 cm.

Growth media

Rockmelon seeds variety Waka Natsu 1 were germinated in peat moss inside the tray and were put under protected area to avoid rat attack. After 10 days, the seedlings were transferred into polybags 25 cm x 30 cm containing five different media treatments (*Table 1*). Using a fertigation system, fertilizer solution was dripped directly to the root zones. Fertilizer used was based on Cooper Formulation solution (*Table 2*) (Cooper 1979) and was applied to the plants four times a day at 3-hour intervals during day time (Ismail et al. 1997).

Analysis of growth media

Parameters such as electrical conductivity (EC), pH, macro and micronutrients were measured from the culture media. The EC, pH, macro and micronutrients of each medium (before and after planting) were determined using air-dried samples which were mixed with water at a ratio of 1:2 (v/v) (Warncke 1986). The mixtures were stirred with a glass rod and allowed to equilibrate for 4 h.

For EC measurement, the solution was filtered through a Whatman No. 41 filter paper and the extract was collected in a small beaker. The EC of the extract was measured using the EC probe with calibrated conductivity meter (Horiba B-173 Twin Cond.). For pH measurement, the samples were stirred again before measuring the pH using a calibrated pH meter (HACH IQ150). For macro and micronutrients analysis, the solution was filtered and the extract was collected and taken to the lab for analysis using the Atomic Absorption Spectrometer (Perkin-Elmer Model 3100).

Plant growth analysis

Parameters that were observed include total leaf area, fresh and dry weight of leaf, stem and root, fruit diameter, fruit fresh and dry weight and total soluble solid. Total leaf area

Table 1. Five different media treatments used in the experiment

Treatment	Composition	Ratio % (v/v basis)
M 1	Coconut coir dust : Rice straw compost	70:30
M 2	Coconut coir dust : Empty fruit bunches compost	70:30
M 3	Coconut coir dust : Peat moss	70:30
M 4	Coconut coir dust : Burnt rice husk	70:30
M 5	Coconut coir dust (Control)	100

Table 2. Cooper formulation solution

Fertilizer/Salt	Formula	Weight of salt (g)/ 20 litres
Stock A		
Calcium nitrate	$Ca(NO_3)_{2.}4H_2O$	10,030.0
EDTA iron	$CH_2N(CH_2.COO_2)_2$ Fe Na	790.0
Stock B		
Potassium dihydrogen orthophosphate	KH_2PO_4	2,630.0
Potassium nitrate	KNO_3	5,830.0
Magnesium sulphate	$MgSO_{4.}7H_20$	513.0
Manganous sulphate	$MnSO_{4.}H_2O$	61.0
Boric acid	H_3BO_3	17.0
Copper sulphate	$CuSO_{4.}5H_2O$	3.9
Zinc sulphate	$ZnSO_{4.}7H_2O$	4.4
Ammonium molibdate	$(NH_4)_6MO_70_{24.}4H_2O$	3.7

was determined using Automatic Leaf Area Meter (MODEL LI-300, LI-COR). For dry weight data, leaf, stem and root were dried in the oven at 70 °C for 48 h before the readings were taken (Iverson et al. 2001). Root to shoot ratio was calculated using the formula shown below (Harris 1992):

$$R{:}S = \frac{\text{Total root dry weight}}{\text{Total stem and leaf dry weight}}$$

Analysis of fruit

After both male and female flowers were developed, assisted pollination was done at 28–38 days after transplanting for fruit production. It took about 10 days from flowering stage to fruit set, after which the fruits were thinned to a maximum of two fruits per plant. Fruits were harvested at 65–80 days after transplanting. The fruit diameter was measured using Vernier calipers. Data on fruit dry weight were measured by determining the dry percentage ratio using the formula shown below (Weston 1994).

$$\text{Dry percentage ratio: } \frac{\text{Wt of pieces of cut fruit (fresh)} - \text{Wt of pieces of cut fruit (dry)}}{\text{Wt of pieces of cut fruit (fresh)}} \times 100$$

Fruit dry weight = Dry percentage ratio x Fruit fresh weight

The total soluble solid (TSS) was measured using a digital hand-held pocket refractometer (PAL-1-Atago). A few drops of the melon juice were placed on the glass surface of the refractometer and the refractive index (°Brix) of the juice was automatically measured.

Statistical analysis

The experiment was arranged in Completely Randomized Design (CRD) with five treatments and six replications. The treatments were indicated in *Table 1*. For data collection, six plants were taken from each plot (n = 6). Data collected were subjected to one-way analysis of variance

(ANOVA) using Statistical Analysis System (SAS Inst. 2002) software to evaluate the best medium to be used as an additive in coconut coir dust culture. Differences among means were separated using Least Significant Difference (LSD) at *p* <0.05 level.

Results and discussion

Nutrient composition

Table 3 shows the macronutrient composition in the growth media before and after planting. The macronutrient contents in all media increased after planting. Before planting, N content in all media did not differ significantly from the control (M 5). But after planting, the highest N was found in M 4 (2.81 ppm) and it was significantly different compared to the control (0.51 ppm). The highest P was found in the control (M 5) before (17.43 ppm) and after (23.93 ppm) planting.

K content was highest before planting in M 1 (13.70 ppm) and the amount differed significantly from the control (9.63 ppm). After planting, there was no significant difference in K content in M 1 (17.27 ppm), M 2 (14.19 ppm) and M 4 (15.16 ppm). Only K content in M 1 showed significant difference from control (11.46 ppm).

Ca content before planting in M 1, M 2, M 3, M 4 and M 5 were 5.0, 1.60, 3.40, 1.73 and 4.77 ppm respectively. Ca content in M 1 and M 3 did not show any significant difference compared to the control. After planting, Ca content in M 1 (7.90 ppm), M 2 (7.77 ppm) and M 3 (5.57 ppm) did not show any significant difference with the control (5.67 ppm). However, Ca content in M 4 (2.30 ppm) was significantly lower compared to the control.

Mg content in M 1 and M 2 were significantly different compared to the control before and after planting. Mg content in M 1 and M 2 were 1.66 ppm and 1.64 ppm before planting, and 2.22 ppm and 1.99 ppm after planting.

Results from micronutrient analysis (*Table 4*) showed that Fe content was found highest in M 2 before (0.65 ppm) and after (1.45 ppm) planting and were significantly different compared to the control. Before planting, M 1 contained the highest Mn (0.09 ppm) and it was significantly differed

Table 3. Macronutrient composition of growth media before and after planting

Treatment	N (ppm)		P (ppm)		K (ppm)		Ca (ppm)		Mg (ppm)	
	Before	After	Before	After	Before	After	Before	After	Before	After
M 1	0.42a	0.51b	7.10d	10.82d	13.70a	17.27a	5.00a	7.90a	1.66a	2.22a
M 2	0.61a	0.85b	11.13bc	16.00bc	6.42c	14.19ab	1.60b	7.77a	1.64a	1.99a
M 3	0.74a	1.04b	8.32cd	13.37cd	6.43c	12.32b	3.40a	5.57a	0.36b	0.52b
M 4	1.17a	2.81a	13.43b	18.30b	11.48ab	15.16ab	1.73b	2.30b	0.34b	0.54b
M 5	0.53a	0.51b	17.43a	23.93a	9.63bc	11.64b	4.77a	5.67a	0.19b	0.23b

Means with the same letter within column were not significantly different based on LSD (*p* <0.05)

Table 4. Micronutrient composition of growth media before and after planting

Treatment	Fe (ppm)		Mn (ppm)		Zn (ppm)		Cu (ppm)	
	Before	After	Before	After	Before	After	Before	After
M 1	0.34b	0.45b	0.09a	0.39a	0.03a	0.15a	0.03b	0.07b
M 2	0.65a	1.45a	0.06b	0.28ab	0.04a	0.19a	0.06a	0.09a
M 3	0.30b	0.39b	0.05bc	0.06b	0.04a	0.20a	0.03b	0.05c
M 4	0.15b	0.22c	0.04bc	0.06b	0.06a	0.17a	0.03b	0.04d
M 5	0.15b	0.22c	0.02c	0.06b	0.05a	0.15a	0.03b	0.04d

Means with the same letter within column were not significantly different based on LSD (*p* <0.05) from the control. After planting, Mn content was highest in M 1 (0.39 ppm) and it was significantly different from the control (0.06 ppm). Zn content in all media treatment before and after planting did not show any significant differences compared to the control. Cu was highest in M 2 before (0.06 ppm) and after (0.09 ppm) planting and they were significantly different from the control.

From the macronutrients composition analysis (*Table 3*), it was found that no specific growth media had the highest values in all nutrients (N, P, K, Ca and Mg). However, Singh et al. (1989) reported that nutrient availability in the media increased when EFB was incorporated as additives in coconut coir dust. Ismail et al. (2004) also reported that increase in K concentration is expected when EFB is incorporated into coconut coir dust compared to coconut dust with no additives. In this study, K content was higher in M1 (17.27 ppm) followed by M 4 (15.16 ppm) and M 2 (14.19 ppm) with no significant difference.

Handreck (1993) and Evans et al. (1996) reported that coir tend to have higher P than peat. This is similar with results obtained from this study where M 5 (100% coconut coir dust) gave the highest P content compared to other treatments.

Most nutrients are actively taken up by the plant from the soil. With active uptake, the plant roots use energy to scavenge the root environment for soluble nutrients. For nutrients that are taken up actively (like nitrogen or phosphorus), their concentration in the root zone (as measured with soil tests) tends to correlate well with uptake by the plant (Santos et al. 2008).

Media pH and salinity

Table 5 shows the pH and EC values of all growth media before and after planting. There was reduction in both pH and EC readings for all treatments after planting. The highest pH reading before planting was found in M 4 (7.56) and it was significantly different from the control. The pH of M 2 (6.73) and M 1 (6.42) were at the optimum level before planting as indicated by Burt (2007) that soil pH was at its optimum when it was between 6–7. After planting, the lowest pH was found in M 5 (5.11) and this value was significantly different from M 1 (5.93) and M 2 (5.97).

EC of the growth medium ranged between 1.21 to 4.67 dSm^{-1} before planting, but after planting the EC declined between 0.66 to 1.76 dSm^{-1}. Before planting, EC readings in M 1 (4.67 dSm^{-1}) and M 2 (3.40 dSm^{-1}) were significantly different compared to the control. There was no significant difference in EC readings for all media treatment after planting. The EC levels affected plant growth differently on different crops. Scoggins et al. (2002) reported that EC lower than 0.85 or higher than 2.6 dSm^{-1} is beyond the acceptable limit. Our studies showed that EC for M 1, M 2 and M 5 were 1.76, 1.53 and 1.49 dSm^{-1} respectively.

Table 5. pH and EC of growth media before and after planting

Treatment	pH		EC (dSm^{-1})	
	Before	After	Before	After
M 1	6.42c	5.93a	4.67a	1.76a
M 2	6.73b	5.97a	3.40a	1.53a
M 3	5.88cd	5.51ab	1.21b	0.66a
M 4	7.56a	5.68ab	2.90ab	0.74a
M 5	5.61d	5.11b	1.54b	1.49a

Means with the same letter within column were not significantly different based on LSD ($p < 0.05$)

Vegetative growth

Figure 1a shows the effect of different media on total leaf area after 12 weeks of cultivation. The highest total leaf area was obtained from plants grown in M 2 (9185.8 cm^2) and it was significantly different from M 5 (5285.4 cm^2), M 1 (7136.8 cm^2), M 3 (6407.4 cm^2) and M 4 (5411.2 cm^2).

The effects of growth media on leaf, stem and root dry weight after 12 weeks of cultivation are shown in *Figure 1b*. Analysis of variance showed that plants grown in M 2 gave the highest mean leaf dry weight (56.61 g) and it was significantly different compared to all the other treatments. Stem dry weight of plants grown in M 2 was higher but it was not significant compared to plants grown in M 1 (27.70 g) and M 3 (24.68 g). However, the stem dry weight of plants grown in M 2 was significantly different compared to the control (18.27 g).

Root dry weight of plants (*Figure 1b*) grown in M 2 (2.20 g), M 1 (1.89 g) and M 3 (1.79 g) were not significantly different with each other but significantly different with the control (1.18 g). Root dry weight of plants grown in M 4 (1.78 g) did not show any significant difference with those obtained from plants grown in M 1, M 3 and the control (M 5).

Root to shoot ratio (*Figure 1c*) of plants grown in M 4 (0.031) was not significant compared to plants grown in M 1 (0.027), M 3 (0.029) and M 5 (control). The lowest root to shoot ratio was observed in plant grown in M 2 (0.025) which reflects that the roots were well able to supply the top of the plant with water, nutrient, stored carbohydrates and certain growth regulators (Harris 1992).

Incorporation of EFB compost (M 2) into coconut coir dust culture increased total leaf area, leaf dry weight, stem dry weight and root dry weight of plant. The presence of beneficial microbes in EFB compost such as *Bacillus* sp., *Actinomycetes* sp., *Trichoderma* sp., *Aspergillus* sp. and *Azetobacter* phosphate solubilizing bacteria improves the uptake of nutrients, replenishes soil nutrients, prolongs its usable period and promotes healthy plant growth (Van Der Heijden et al. 2008). Plants grown in M 2 had better growth performance probably due to the increase in soil organic content, soil structure, aeration capacity and microfauna activities as reported by Hartley (1980).

M 1 also contained compost but there was no supplemental microbes present as in M 2. Even though the N, P, K values were higher in M 4, but based on the growth performance, the nutrients were not efficiently absorbed by the plants. This was probably due to the antagonist effects of other nutrients that were available in the media.

In addition to this, toxicity to plant will also occur whenever N, P, K supplied is too high. Therefore, in order to achieve the best growth rate, the plants should be supplied with optimum N, P, K levels. Ismail et al. (2004) suggested that EFB compost can be used to substitute peat in the production of vegetables using coconut dust soilless culture system.

Yield

As shown in *Figure 1d*, the highest average fruit diameter was found in plants grown in M 2 (14.15 cm) and it was significantly different compared to the control (12.14 cm), M 1 (11.91 cm), M 3 (12.74) and M 4 (12.18 cm).

Effect of medium treatment on average fresh fruit weight is shown in *Figure 1e*. The average fruit weight of plants grown in M 2 (1482.9 g) was the highest and it was significantly different from the control (1177.4 g). Results obtained in this study were similar to those obtained by Ismail et al. (2004) who reported that cauliflower and Pak Choy grown in coconut coir dust supplemented with EFB compost resulted in better growth and higher yield compared to plants grown in either coconut coir dust or coconut coir dust mixed with peat.

As shown in *Figure 1f*, TSS for fruit derived from plants grown in M 2

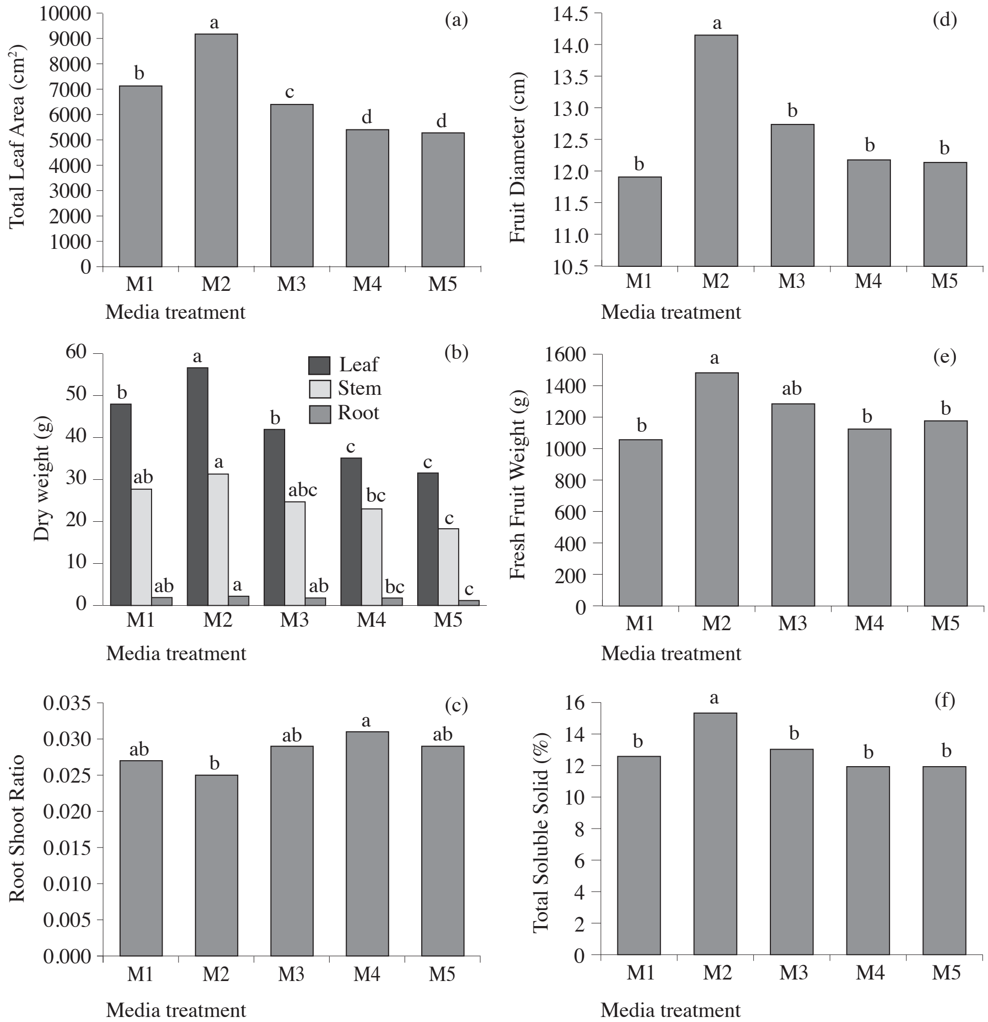

Figure 1. Effect of growth media on (a) total leaf area; (b) leaf, stem and root dry weight; (c) root to shoot ratio; (d) fruit diameter; (e) fresh fruit weight and (f) total soluble solids of rockmelon var. Waka Natsu 1 after 12 weeks of cultivation. Means with the same letter were not significantly different based on LSD ($p < 0.05$)

showed the highest percentage (15.33%) and significantly different from the other treatments. The TSS of fruit grown in M 1, M 3, M 4 and the control were not significantly different from each other.

The results showed that plants with higher total leaf area produced bigger fruits and higher TSS content as indicated by plants grown in M 2. Heavier leaf dry weight is associated with bigger leaf area and it might suggest that a higher whole plant assimilation rate occurred and thus increased the TSS content (Awang and Ismail 1997).

Conclusion

The growth of rockmelon var. Waka Natsu 1 was enhanced when grown in media containing 70% coconut coir dust incorporated with 30% EFB compost (M 2). High initial EC in these media apparently did not pose any problem in the plant growth as it might have been leached by frequent irrigation. Rockmelon grown in coconut coir dust supplemented with EFB compost resulted in better growth and higher yield compared to plants grown in either coconut coir dust or coconut coir dust mixed with peat. Fruits formed from plants grown in M 2 also showed better quality. The fruits were bigger and have higher TSS compared to fruits produced from other growing media.

Acknowledgement

The authors are grateful to Faculty of Agriculture, Universiti Putra Malaysia Serdang, Selangor for financial support of this work.

References

Awang, Y. and Ismail, M.R. (1997). The growth and flowering of some annual ornamentals on coconut dust. *Proceedings of international symposium on growing media and plant nutrition in horticulture,* (Roeber, R.U., ed.). Acta Horticulturae 450: 31–38

Burt, J. (2007). Growing eggplant. Farmnote. Department of Agriculture and Food. No.9/2000. Retrieved from http://www.agric.wa.gov.au/objtwr/imported_assets/ content/hort/veg/cp/capsicums/fn009_2000.pdf

Calile, W.R. (1997). The requirement of growing media. In: *Peat in horticulture*, p. 17–23

Cooper, A.J. (1979). *The ABC of NFT*. London: Grower Book

Evans, M.R., Konduru, S. and Stamps, R.H. (1996). Source variation in physical and chemical properties of coconut coir dust. *Hortscience* 31: 965–967

Handreck, K.A. (1993). Properties of coir dust, and its use in the formulation of soilless potting media. *Communications in Soil Science and Plant Analysis* 24: 349–363

Harris, R.W. (1992). Root-shoot ratios. Journal of Arboriculture 18(1): 39–42

Hartley, C.D.H. (1980). The disposal of oil palm empty bunches from oil mills. An environmental and logistic problem. Paper presented at PORIM workshop on farm mechanisation in the oil palm industry, Kuala Lumpur, Malaysia

Ismail, M.R., Sze L.Y., Poulus, P. and Ibrahim, H. (2004). The use of empty oil palm bunch (EFB) compost as additive in coconut dust soilless system for vegetable crop production. *Proceedings of the international symposium on growing media and hydroponics,* Alnarp, Sweden, (Alsanius, B., Jensen, P. and Asp, H., eds.). Acta Hort 644: 193–198

Ismail, M.R., Yusneldi, R. and Awang, Y. (1997). The use of rubberwood sawdust (RS): peat mix in the soilless cultivation of melon (*Cucumis melo* L.). *Proceedings of the international symposium on growing media and plant nutrition in horticulture*, Freising-Weihenstephan, Germany, (Roeber, R.U., ed.). *Acta Hort* 450: 149–154

Iverson, A.L., Iverson, L.R and Eshita, S. (2001). The effects of surface-applied jasmonic and salicylic acids on caterpillar growth and damage to tomato plants. *Ohio Journal of Science*, The. FindArticles.com.

Kraus, H.T., Mikkelsen, R.L. and Warren, S.L. (2000). Container substrate temperature affect mineralization of composts. *Hortscience* 35(1): 16–18

Molitor, H.D. and Bruckner, U. (1997). Waste paper – a substitute for peat in horticulturae. *Acta Horticulturae* 450: 47–55

Oviasogie, P.O., Aisueni, N.O. and Brown, G.E. (2010). Oil palm composted biomass: A review of the preparation, utilization, handling and storage. *African Journal of Agricultural Research* 5(13): 1553–1571

Prasad, M. (1997). Physical, chemical and microbiological properties of coir (cocopeat). *Acta Horticulturae* 40: 21–27

Santos, K.M., Fisher, P.R. and Argo, W.R. (2008). A survey of water and fertilizer management during cutting propagation. *HortTechnology* 18(4): 597–604

SAS Inst. (2002). *SAS user's guide version 9*. Cary, NC: SAS Institute Inc.

Scoggins, H.L., Bailey, D.A. and Nelson, P.V. (2002). Efficacy of the press extraction method for bedding plant plug nutrient monitoring. *HortScience* 37: 108–112

Singh, G., Manoharan, S. and San, T.T. (1989). United Plantation approach to palm oil mill by product management and utilization. Paper presented at PORIM international palm oil development conference, Kuala Lumpur

Van Der Heijden, M.G.A., Bardgett, R.D. and Van Straalen, N.M. (2008). The unseen majority: soil microbes as drivers of plant diversity and productivity in terrestrial ecosystems. *Ecology Letters* 11: 296–310

Verma, T.S. and Bhagat, R.M. (1992). Impact of rice straw management practices on yield, nitrogen uptake and soil properties in a wheat-rice rotation in northern India. *Fertilizer Research* 33: 97–106

Warncke, D.D. (1986). Analyzing greenhouse growth media by the saturation extraction method. *HortScience* 21: 223–225

Weston, G.D. (1994). *Biotechnology by open learning: Crop physiology*. Butterworth-Heinemann

Abstrak

Habuk sabut kelapa (CD) ialah medium pertumbuhan yang baik bagi penanaman sayur-sayuran dan buah-buahan terpilih dalam kultur tanpa tanah. Ia mempunyai keupayaan menakung air yang tinggi, saliran yang bagus, bebas rumpai dan patogen, tinggi keupayaan pertukaran kation (CEC) dan kekonduksian elektrik (EC), kebolehan pembasah yang mudah dan dapat memberi pengudaraan yang bagus kepada zon akar. Bagaimanapun, terdapat beberapa masalah dalam penggunaan CD seperti pH yang rendah, kandungan kalium dan kemasinan yang tinggi. Penambahan mos gambut kepada CD dalam nisbah 7:3 telah terbukti berkesan dalam meningkatkan pertumbuhan pokok. Selain mos gambut, kompos juga boleh dijadikan sebagai bahan penambah kepada CD. Satu kajian telah dijalankan dengan objektif untuk menentukan medium terbaik sebagai bahan penambah dalam habuk sabut kelapa untuk tanaman tembikai wangi var Waka Natsu 1. Lima jenis kompos digunakan sebagai rawatan terdiri daripada M 1 (70% CD: 30% kompos jerami padi), M 2 (70% CD: 30% kompos tangkai kelapa sawit (EFB)), M 3 (70% CD: 30% mos gambut), M 4 (70% CD: 30% arang sekam padi) and M 5 (100% CD sebagai kawalan). M 2 yang mengandungi campuran CD dan kompos EFB pada nisbah 7:3 didapati sangat sesuai bagi pertumbuhan tembikai wangi var Waka Natsu 1 menggunakan sistem fertigasi. Pada keseluruhannya, pokok yang tumbuh di dalam medium ini menghasilkan prestasi pertumbuhan paling baik berbanding kawalan (100% CD). Pokok yang tumbuh di dalam M 2 menghasilkan diameter buah paling besar (14.15 cm) dengan berat basah buah (1482.9g) dan jumlah pepejal larut paling tinggi (15.33%).

Accepted for publication on 21 July 2011