

# Rockmelon in soilless culture



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Rock Melon came from the melon family of Cantaloupe. It is a famous fruit in Europe especially in Mediterranean region. It is also famous in USA in different variety which is called muskmelon. C: Documents and Settings\sdburke\Desktop\rockmelon-resized. jpg

In Japan, this fruit is in demand as far back as the late century and has very high demand. From this it has a title for it as “ Royal Fruit” from Japanese. It is also suitable for souvenir and gift purposes.

Rock melon is very nutritious to eat. It is listed as one of the 150 healthy foods to eat by Jonny Bowden, PhD, author of The 150 Healthiest Foods on Earth; The Surprising, Unbiased Truth About What You Should Eat and Why. The reason is that rock melon has 90 % water content which can help to prevent dehydration. It is a good snack to eat when we feel hungry even at late hours. It is a good food to nibble with rather than taking other fat

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contains snack. But most important is rockmelon contains beta carotene about 3000 micrograms in each which can help to fight cancer.

Rock melon is almost similar to watermelon in terms of shape and flesh. It has yellow flesh with very hard rind. The rind colour depends on the variety rock melon, yellow or green. When it is on peak of ripeness, rock melon has a very strong smell. This smell is very unique because it helps farmers to know whether the fruit has ripened or not.

In Malaysia, Rock melon is fast growing popular fruit among locals and has very high demand. High value crop such as Rock Melon could open new markets for greenhouse growers in Malaysia (Cantliffe et al., 2001; Shaw et al., 2000) and give consumers in Malaysia the choice of new, high quality commodities.

Farmers in Malaysia started to plant rockmelon commercially because it will profit the farmers. Most farmers used conventional method which rockmelon are usually planted using nomadic method. When they used soil, many problems related to fungus and soil-diseases which are affecting the plant and fruit. There are also a lot of problems in setting high yield for rockmelon. Plus, many farmers want to get the best quality rockmelon so that they can fetch higher price in the market. Therefore, many farmers and researchers are finding ways and techniques to solve the solution regarding to rockmelon plantation commercially.

I decided to find a treatment that can improve the quality fruit produced. I wanted to test this commercially on rockmelon since it is my favourite fruit. With all the problems related to soil especially, fertigation is believed the <https://assignbuster.com/rockmelon-in-soilless-culture/>

best solution to overcome this. In my extended essay, instead of using soil, I will be using fertigation technique which rockmelon will be grown in six different types of soilless medium.

Therefore, the research question is “ Which of 6 different soilless media is a better treatment on the quality of rock melon Cucumis melo var. Golden Queen and total soluble solid(brix) under a specific system, by using soilless system which is fertigation (under protected structure within 81-90 days harvesting period)?”

Using soilless system such as fertigation technique can hopefully reduce any disease related to rock melon. The structure of the rockmelon farming area is covered with netting at both sides. The function of using protected structure are for rain shelter cover netting and prevent from diseases that comes from rainfall such as powdered mildew and downy mildew. It is also prevents insects from coming. When using protected structure there is no natural pollinator because there is no presence of wind, animals and etc. Therefore, the method used is by assisted pollination manually which is by hand, where male flowers are pollinated with female flowers from 7th branch and above. The reason behind this is that the fruit produced will be bigger because of the sugar produced by the leaves of the plant which are mostly located at the top of the plant.

This paper will discuss the yield, fruit weight and total soluble solid related to fruit quality for 46 plants of Rock Melon carried at MARDI, Serdang. These characters of Rock Melon will help local farmers increase their profits.

## **HYPOTHESIS**

Different types of medium used in the fertigation technique will provide fruits of different are said to provide the structure for the plant and the minerals that comes straight ality. It is hypothesised that medium consisting of 75% cocopeat and 25% burnt rice husk will produce rock melon of the desired qualities. The different types of mediums are;

T1 - 100% cocopeat

T2 - 100% burnt rice husk

T3 - 75% cocopeat + 25% burnt rice husk

T4 - 50% cocopeat + 50% burnt rice husk

T5 - 75% cocopeat + 25% perlite

T6 - 50% cocopeat + 50% perlite

(% depends on ratio of mass)

## **Literature Review**

Coco peat

It is made up of coconut husk. This type of peat is suitable for growing medium and also normal plant. The special characteristics about coco peat are the resistant towards fungal and its natural rooting hormone. It also can absorb a lot of water and hold it for a long time. This media can last long until 4 years of harvesting. It has natural rooting hormones that help roots of plants to absorb water and nutrients from the medium easily and effectively.

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It is usually used in fertigation technique because in Malaysia coconut husk is easy to get from coconut plantation farmers with cheap price.

#### Burnt Rice Husk

It is made up from the by-product of threshing paddy milling. One of its characteristics is black-greyish in color.. Husk from the paddy milling is burn into ash. The content of burnt rice husk is 90% amorphous silica. It can be used as a fertilizer because it has a high lignin content that can be composed. Other used of burnt rice husk are as pillow stuffing, pet food fibre, cement, etc. Burnt rice husk is also a coarse material that can give aeration to soil for plantation.

#### Perlite

Perlite is a siliceous rock and is made up from volcanic substance. It is a rock that can expand in a very high temperature. It is also white in color. The pH is around 7 and it is chemically inert. It is also a natural glass. Perlite is also used to give aeration and good moisture retention to plant as it can help to support the plant growth.

#### Fertigation technique

It is come from the word fertilizer and irrigation. Fertigation is becoming popular as it can increase the production of crops. It is function to prevent plant from harmful soilless diseases. This technique can be done at any places and specially done under the protected structure house. This technique is done in this experiment as to control the amount of water and

fertilizer supply to all plants so that every plant will have the same amount of nutrients and water.

## **METHODOLOGY AND MATERIALS**

30 Rock melons from variety of (*Cucumis melo* L. var. Golden Queen) which are available at Protected Structure Area at the Horticulture Research Centre MARDI in Serdang, Selangor were used.

A fertigation in soilless media system under rain shelter with side netting are constructed.

30 white polythene bags were filled with different types of medium and are labelled T1, T2, T3, T4, T5 and T6. Note 1. 0 Six soilless treatments on rock melons

(T1) 100% cocopeat

(T2) 100% burnt rice husk

(T3) 75% cocopeat + 25% burnt rice husk

(T4) 50% cocopeat + 50% burnt rice husk

(T5) 75% cocopeat + 25% perlite

(T6) 50% cocopeat + 50% perlite

\*Physical properties of perlite used was medium perlite ranged from less than 0. 25 to 2. 4 mm (Cantliffe et al., 2003).

The experiments were a randomised complete block design with four blocks. The spacing was 1.2 m between rows and 0.30 m between plants.

\*Figure above shows the arrangement of plants with different treatments according to randomised block design method

Plants were direct seeds on (23 April 2010) and started to germinate on 2nd day after seeding.

The main stems were allowed to grow and 1st branch was trained vertically by means of nylon string acting as trellis. All other lateral shoots were pruned.

Pollination was done manually using technique called assisted pollination, every week from the moment male flower and female flower blossomed, as many as possible on each plant.[8]

For maintenance, the plants need to be checked weekly. Firstly, check on the drippers to make sure that the liquid fertilizer can flow smoothly. Observe the signs for diseases. Conditions that usually can be noticed that the leaves of the plant will turn yellowish and dry if the plant receives too much fertilizer. If it is too little, the plant will wilt.

For disease control, the treatment to prevent phytophthora (root diseases) was done on day 7 and day 17 Foli-R-Ros is diluted inside 10L of liquid. The diluted solution was sprayed on medium. But the fertilizer flow must be turned off first. Then if any plant is infected, the right treatment should be applied.



After 90 days, harvesting was done on 20 – 29 July 2010, 10 days observation and evaluation on the rock melons, to make sure that rock melons on the peak of its ripeness.

The quality of rock melons; fruit weight, yield and total soluble solid content were measured directly after harvest each fruit. A few instruments used to collect data which are brix meter, a digital hand-held “ Pocket” refractometer PAL-1(ATAGO U. S. A., Inc.) to determine soluble solids (a measure of sweetness) and weight balance. The data was analyzed using analysis of variance(ANOVA test) and Duncan’s Multiple Range Test(DMRT) using SAS software(Statistical Analysis System, version 9. 1 SAS Institute Inc) [10]

## **Data Collection**

Fruit yield was not significantly different between all treatments. The yield range is between 3477. 5 g and 4902. 5 g. The treatment that has the highest yield is treatment 3 (75% coco peat + 25% burnt rice husk) has 4902. 5 g for 5 fruits masses. While the lowest fruit yield is 3477. 5 g at treatment 2 (100% burnt rice husk).

## **Discussion**

Different soilless media treatments can affect the quality of rockmelon in terms of fruit weight, yield and total soluble solid. The media provide the nutrients from the fertilizer irrigation supplied and growing medium for the plant.

From the data obtained from the experiment, it can be concluded that treatment 3(75% cocopeat + 25% burnt rice husk) is the best treatment

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medium for rockmelon as it produces the best quality fruit in terms of yield and brix. Treatment 3 shows the highest yield mass with 4902.5 g from sum of five fruits produced. Average of five mass fruits from treatment 3 is the highest with 1085.88 g. It also has high soluble solid percentage with 13.32%.

Mixture of 75% cocopeat and 25% burnt rice husk give the best condition for the plant root. Root needs oxygen, nutrients and also water so that the plant can produce a quality fruit. Cocopeat has a special characteristic that can store a large amount of water[11]. Water for the plant is supplied from the irrigation system which the amount of water is controlled for every plant. When the plant gets enough water, it will cause low aeration that cause root to have insufficient amount of air. Water can only absorbed a small amount of oxygen. When the medium has too much water, it cannot allow oxygen to be supplied to the root. Oxygen is needed in root for respiration so that more minerals can be absorbed into the plant. It also helps the photosynthesis process in leaf which removes the carbon dioxide from the medium to the leaves. Oxygen in medium is also important to kill anaerobic bacteria that can damage the root cells.

So, the problem of aeration is solved by the adding coarse material into the medium. The burnt rice husk is a coarse particle that allows space inside the cocopeat substance. This makes the third treatment a good environment for the root. Not only that, burnt rice husk contains nutrients which are good for the roots. It contains phosphorous, calcium, magnesium, calcium and silica. Both substances make a good mixture of medium for plant which enhances the quality of rock melon fruit produce.

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14Based on my secondary research, the pH value of 70% cocopeat and 30% burnt rice husk is around 4.8. This pH level is suitable for the medium because the nature of most plants that require slightly acidic medium[15]when fertilizers enter the medium from the irrigation system, it does not change the medium by too much and nutrients are not disturbed to be supplied to the plant.

Based on the bar graph on brix level, the sweetness level of fruit is not very significantly different except for treatment 2. The rockmelon tastes sweet when it is ranged 10% and above. All the fruits produced are in the category very sweet. Treatment 5 has the highest average soluble solid which is 13.74% which has the sweetest taste from other fruits. The presence of perlite in the medium has effects on the fruit soluble solids. The content of soluble solids in fruit is actually determined by the leaves that are exposed to the sunlight. There is actually a relationship of perlite to the number and area of leaves that effect on the maximising soluble solid of fruit.

## **Significance**

The result of this experiment can help in the field of horticulture. Farmers can know the best treatment commercially to improve yield and to have quality rockmelon using a good medium. This research can also help farmers to choose which medium to use, either the cheaper ones or the expensive ones depending on the quality of rockmelon that the farmers need (yield or sweetness).

## **Conclusion**

Based on research question of “ Which of 6 different soilless media is a better treatment on the quality of rock melon Cucumis melo var. Golden Queen and total soluble solid(brix) under a specific system, by using soilless system which is fertigation (under protected structure within 81-90 days harvesting period)?” it can be concluded that treatment medium 3 which is 75% cocopeat with 25% burnt rice husk is the best medium to get the optimum quality of rockmelon in terms of yield, fruit weight and sweetness level. However, this result is limited only to production of rockmelon under the specific system done under protective structure.

A good medium can help to increase the quality of rockmelon production in Malaysia. Since, farmers are trying to find ways to increase the profits, this research also helps farmers to choose the best media for economic wise and profit wise.

For a better result, a further result, this research should be extended to 3 times of harvesting period to identify the precision of data obtained. From this, more weaknesses can be detected and more problems can be found to improve the quality of rockmelon fruits. Also, this research should be done at another place which has different environment with different climate.

In the future, a research also can be done to use the treatments on different types of plants and its effect on them. I strongly believe that it research on different media has different impact on different types of plant. This also can help other farmers that have other plants.