Effect of Type and Maturity on Water Content of Three Varieties of Hot Chilli (Capsicum Frustencents L, Catas, Segana End Domba Variety)

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Abstract. Variety and ripeness are two factors that will influence water content and vitamin C of hot chilli (Capsicum frustencents L). This research was carried out to observe the influence of varieties and ripeness of hot chilli toward water content and vitamin C. The results showed that varieties and ripeness give a significant different influence towards water content and vitamin C of hot chilli. The amount of water content decreases and the amount of vitamin C increase when hot chilli becomes red. From the three varieties, the green ripeness level of catas, segana and domba showed that the highest water content of each variety is not so different. Meanwhile in orange variety ripeness level, catas and domba have much amount of water content. Each has 67.88% and 72.99% respectively. Domba has the highest amount of vitamin C when it is at green ripeness at 52.864mg/100g and Catas has 47.859mg/100g in stage. Segana possess the highest amount of vitamin C at orange ripeness level at 71.990mg/100gr. The highest vitamin C is found on Catas variety at red ripeness level at 68.558mg/100gr.

Keyword : hot chilli, water content, vitamin C, rippeness

1. Introduction
Hot chilli is horticultural commodity that is consumed by many people in Indonesia, especially by spiced food lover. Some varieties of hot chilli are consumed in fresh condition by Indonesian. Hot chilli is used as cooking spice to add flavor. Hot chilli has been used by many food and farmacy industries. As any other horticulture commodities, the length of its storage is short. After the chilli has been harvested, metabolism activities are still occurring and later the process will affect the decrease quality of chili.

The freshness of agricultural product is determined by the amount of water content. Metabolism like respiration and transpiration will cause the reduction of water content that will cause the lower of chili quality. It can be shown by withered, wizened, and hard chili.

Variety and the phase of harvest will influence the water content of commodity. This information will be valuable in order to how to treat and store it after being harvested. The research on how to store hot chilli has been done to keep it fresh until it reach the end user hand. Water content of hot chilli varies from one to another. It depends on kinds and ripeness levels. Information of ripeness level is important to know...
the proper time to harvest so that water content and the freshness are getting optimal. The longer water content lasts in the chili, the longer freshness and quality can be maintained too. Chili has different amount of water content and vitamin C on each different level of their maturity. Most Indonesians consume catas and sagana in green ripeness level, while domba is mostly consumed red ripeness level. This study has observed on three variety of hot chilli. The are catas, segana, domba. This research intent to find out water content, vitamin C on three of red hot chili varieties, catas, segana, domba, based on theirs level of ripeness.

2. Material and method

2.1 Water content
Hot chilli was supplied from farmer’s field of Lembang, West Java, Indonesia. It was picked on various kinds of ripeness or maturity. The samples were catas variety (small hot chilli), segana (green hot chilli) and domba (white hot chilli). Green ripeness level is harvested after getting 50 days of its plantation, orange ripeness is in 60 days and red ripeness is in 70 days. Measurement procedure of water content sample can done in several steps. First, empty clean bowl is dried at the temperature of 105°C for one hour. Then, it is cooled in desicator for 30 minutes (w1). The bowl is weighed afterward. Next, 2 grams of sample are needed. The sample is put into the bowl (w2). The bowl contained sample of 2 grams is put into furnace at the temperature of 105°C until the weight is constant. The bowl containing sample is then cooled desicator. Finally, the bowl is weighed again (W3) to get its water content calculation.

2.2 Vitamin C content
The vitamin c is measured by using iodometri method. 50 ml of sample solution of chilli is taken by using pipette and it is put into erlenmeyer. The solution of 10% H2SO4 is added and 1% amilum solution is added into Erlenmeyer. They are given a titration process with 12 standard solution.

3. Result and Discussion

3.1 Water content
Withered of hot chilli is caused by transpiration activities that later result a wrinklet and lower fresh of the chili. Water content affects the freshness of hot chilli. Water content in hot chilli is different from each variety and its ripeness. Green rippenes, orange rippeness, and red rippeness have different water content. In order to keep good quality of hot chili from the harvest time to it is on the customers’ hand, it is important to maintain the water content.

The result of research of three varieties of hot chilli catas (small hot chilli), sagana (green hot chilli), and domba (white hot chilli) shows that water content of each different variety and level of ripeness gives different result. The result reveals that from the three varieties of hot chilli, domba, sagana and catas contains the highest water content when they are on green ripeness phase. Each has 79.82%, 78.30%, 79.63% of water content respectively. Orange rippeness stage of catas and domba were significantly different from segana. Domba has the highest degree of water at 77.99%, catas has 67.90%. However, Segana has the lowest value at 61.62%. The result also shows that at red ripeness level, Segana was significantly different from the two others. Segana has the highest of 73.32% water content. While catas and domba has lower rate of 57.35% dan 61.69% each. Data of the three varieties were shown on the following figure.
Figure 1. Water Content of Sample in Catas

Figure 1 tells us the different percentage of water content of Catas on each level of ripeness. Green ripeness percentage differs significantly from those of orange and red do. Green has 74.63%, orange has 67.88%, and red has 57.35%. We can conclude that the largest amount of water content was in the green ripeness phase. On the other hand, the lowest one is red ripeness phase.

Both green and red ripeness phase of Segana has the highest water content and they differ significantly compared to orange ripeness phase. Green has 78.31%, red has 73.32% and orange has 61.61%. Data of this variety were shown in Figure 2.

Figure 2. Water Content of Sample in Segana

The green ripeness level of domba’s water content is different from orange and red one. The highest water content was found in green ripeness phase which is 79.82%. The second higher rate was in orange ripeness
phase. While the least percentage of water content in the Domba belongs to red ripeness phase. Data of the variety were shown on Figure 3.

![Figure 3. Water content of sample in Domba.](image)

The previous elaboration on ripeness level affecting the water content of green, orange and red phase is related to the research that has been done by Adhytya et al. in their work that revealed the water content decreased as the fruit is ripe. The maturity showed the significant difference on the water content. The water content in hot chilli is about 49.55% - 61.46% [1]. The reduction of water content is not so different between orange fruit and dark red fruit. However, the reduction and the increase of water content in hot chilli is caused by the humidity of environment on harvest time [4]. Water content of hot chili seed that is harvested on various ripeness phase have a significant drop from green phase to its maturity phase showed by dark red color [5]. Water content in hot chilli is about 49.55 % - 61.46%.

### 3.2 Vitamin C content

The content of vitamin C of three varieties of hot chilli of various maturity levels shows significant difference. Therefore 5 % of duncan test is continued. The result showed that the content of vitamin C is different on each maturity level. The more ripe the higher vitamin C maturity level is. How ever Segana variety has the highest of vitamin C when orange maturity and decreases its vitamin C when it is at red maturity. At green level Catas, Segana, and Domba have no significant difference of vitamin C content. While at orange level, the content of vitamin C of the three varieties of hot chilli shows different content.

The highest content was found in Segana at orange maturity level 71.99mg/100g. However, Catas and Domba reveal no significant difference at red maturity level. The highest content of vitamin C was found in Catas with 68.56mg/100g while Catas and Segana shows no significant different. The content were about 61.22mg/100g in Catas. The content of vitamin C at red maturity was different with green and orange one. Orange and green levels indicate the significant difference. The highest vitamin C content of Catas was found at red maturity level with 68.56mg/100g, orange with 53.06mg/100g, and green with 47.86mg/100g. The data were shown in Figure 4.
Meanwhile, orange ripeness of Segana show significant difference from green ripeness and red rippeness. The highest vitamin C content was found in orange ripeness which is about 71.99mg/100g whereas the lowest vitamin C was found in green ripeness which is about 63.82mg/100g. The detail about the vitamin C content of each group level of maturity were revealed in the following Figure 5 below.

Vitamin C content in the domba at red and green maturity level indicates the significant difference. However, the difference between the red and orange maturity level were not significant. The highest content was found in red maturity level with 61.22mg/100g, orange with 57.70mg/100g, and green with 52.86mg/100g. The data were shown in Figure 6.
The result obtained based on analyzing vitamin C content in the three varieties of hot chilli is nearly the same as the study that has been conducted before. Temperature and storage process gives influence on vitamin C. The content of vitamin C in fresh green hot chilli before the chili is kept is 59.9mg/100ml [2]. In addition, the other study reveals that the content of vitamin C in fresh hot chilli before the chili was kept is 68 mg [3].

4.0 Conclusion
Varieties and maturity level of hot chilli give influence toward the water content and their vitamin C. The water content in hot chilli will decrease when the fruit is ripe. Moreover, the vitamin C content in the fruit will increase when it is ripe.

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