

Orange (*Citrus X sinensis*)

Water Extraction

By Sythong Run

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Lab partner:

Sopor Thanann

Contributer:

Davith Chan

Mengthong Long

Panharith Yav

Rika Chan

Samady Sek

Seyha Khom

Somphors Yun

Thiny Tha Tep

Vatthey Chan Leang

Abstract

All organism need water for their body function. Based this study, the amount of water at which an orange (*Citrus X sinensis*) holds was calculated to be 16.16% which failed to support the hypothesis stating that 94% of the orange is water. Consequently, the hypothesis was rejected and in addition, the result from the lab was far off the number (water content) agreed upon in the science community.

Introduction

Life on earth are known use water as part of their survival mechanism. That is because water has many special properties to offer for instance acting as a dissolvant. With the properties provided, water is vital in many body process such as metabolism, homeostasis, and food production. The amount of water of which an organism hold varies between species, for an example, cucumbers holds more water than human. Given the background, this study focuses on finding out the water content in an orange (*Citrus X sinensis*) in percent and discuss how this finding is different compared to the findings from studies on different fruit and vegetable conducted by peers. Before the study was conducted, the water content in the orange is estimated to be 94%. This estimation was based on past experience eating oranges; they are a juicy fruit. Moreover, the rind of orange is known to squirt out liquid when squeezed.

Methodology/Lab procedure/Material

In this study, the orange was washed and dried thoroughly to remove excess dirt. Then it was weighed three times and calculated for the average; the weight before the extraction of water. Then, the orange was grated for its rind into a bowl where it is wrapped by two piece of paper towel and squeezed. Once the paper towel was soaked, the squeezed rind was wrapped by two new pieces of paper towel and the process described earlier was repeated for two more times. Then the water-extracted rind was placed into a weigh-boat and set aside. Next, the leftover part of orange (the carpel wrappe by the endocarp) is cut in half and the endocarp was removed from the capel. The carpel was then place into a sieve and grinded with a petle into the bowl. Once finished, the left over was wrapped in a towel and pounded with the pestle then put away into the weigh-boat. This same procedure was also applied to the endocarp. One the process of extraction was done, each of the three weigh-boat was weighed three times and averaged for their weight. The total weight of the remaining of the orange was used to help calculate for the water content (in percent). Note that the water extracted from the orange was discarded.

Result

Portrayed below (Table.1) the initial weight of the orange was 200g, but after water have been extracted its weight lowered to $77.6\bar{g}$, which is found by adding the average weight of the water-extracted rind, carpel and endocarp. Provided this data, the percent of water in this orange was calculated to be 61.16%. Compared to other organism studied, orange had the second highest water level (61.16%) with watermelon being the highest (18.87%). Logan appeared to have the lowest water content (in percent) with the percentage being 31.23%, followed by dragon fruit (38.27%), bell pepper (40.5%) and carrot (44.83%) as shown in table 2. All data listed above were from the labs, the approximate value agreed by the science community however communicate a different result to that of the study. Shown in table 3, bell pepper surprisingly had the highest water content (94%) followed by watermelon (92%), carrot (88%), orange and dragon fruit (87%) and longan (83%).

	Weight #1	Weight #2	Weight #3	Average weight
Initial weight of the orange	200g	200g	200g	200g
Water-extracted orange rind	36g	36g	36g	36g
Water-extracted orange carpel	24g	24g	25g	$24.3\bar{g}$
Water-extracted orange endocarp	17g	18g	17g	$17.3\bar{g}$
Total weight of the water-extracted orange: $77.6\bar{g}$				
Calculated percent of water in the orange: 61.16%				

Table 1. Weight of the orange before and after water extraction

Organism	Initial weight	Weight after water extraction	Percent water
Logan	16g	3g	31.23%
Dragon fruit	324g	200g	38.27%
Bell pepper	163g	97g	40.5%
Carrot	154.67g	57g	44.83%
Orange	200g	77.6~g	61.16%
Watermelon	2059g	450g	73.13%

Table 2. Percent of water in organism studied arranged from lowest to highest.

Organism	Percent of water from the study	Percent of water from scholarly studies	Percent missed
Logan	31.23%	83%	51.77%
Dragon fruit	38.27%	87%	48.73%
Orange	61.16%	87%	25.84%
Carrot	44.83%	88%	43.17%
Watermelon	73.13%	92%	18.87%
Bell pepper	40.5%	94%	53.5%

Table 3. True approximate percent of water in organism (in the study) arranged from lowest to highest.

Discussion and conclusion

The result from the study did not provide enough convincing evidence for the hypothesis to be accepted, thus it should be rejected. Moreover the result of the water content in orange (61.16%) was not close the consensus of the scientific community (87%). However the result of the study is reasonable since no advanced tools were used to extract water from the orange. To improve the result, an extra procedure could be added to the one described earlier in this report; that is using heat to extract excess water.

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