Water content of natural substances

In this student experiment, the water content of natural substances is examined. For this purpose, different types of fruit and vegetables are examined, the natural substance is crushed and heated in a test tube. Before and after heating, the mass of the natural substance is determined and the water content can be determined by the difference.

Chemistry > Inorganic chemistry > Water

Nature & technology > Substances in everyday use

Difficulty level	Group size	Preparation time	Execution time
easy	2	10 minutes	10 minutes

This content can also be found online at:

http://localhost:1337/c/633b2ee3bdf6080003a9420f

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Teacher information

Application

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Vegetables are rich in water

Many foods are water-rich foods with a water content of 50 percent.

Fruits and vegetables have the highest water content, up to 97 percent. Nuts, seeds and dried fruits do not contain much water.

People need about three litres of water a day. Some of this can be covered by food.

A high water content is defined as a proportion of more than 90 percent.

Foods that have such a large water content are, watermelon, cucumber, iceberg lettuce, radishes, asparagus, grapefruit and strawberries.

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Other teacher information (1/2)

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Prior knowledge

Water is vital for humans and animals.

Water can be ingested in liquid form or through "solid" food that is also ingested.

Principle

In this student experiment, the water content of natural substances is investigated.

For this purpose, fruit and vegetables are heated and their mass is determined before and after heating.

The water content of the food is determined by calculating the difference between the two masses.

Other teacher information (2/2)

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Learning objective

Water is contained in fruit and vegetables in sometimes very high proportions.

Water is also present to a greater or lesser extent in most other foods.

Tasks

- The students examine different types of fruit and vegetables for their water content.
- They chop the food and heat it.
- The respective mass is determined before and after heating.
- The water content is now determined from the difference between the two masses.

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Safety instructions

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- Use protective goggles!
- The general instructions for safe experimentation in science lessons apply to this experiment.

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Student information

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Motivation

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Water is essential for life

Water is not only used in the household for hygienic purposes. Every person needs at least 1.5 litres of drinking water every day.

During physical activity, heat or illness, the intake must be higher. A water loss of more than one fifth of the body weight is fatal.

Water is used in many industrial processes, such as cooling towers that dissipate heat.

In a water wheel with a downstream electric machine, water can be used to generate energy.

Other applications of water are in agriculture, hotels, hospitals and swimming pools.

Tasks

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- Examine different fruits and vegetables for their water content.
- Chop the fruit and vegetables and heat the respective food.
- Before and after heating, the respective mass of the food must be determined.
- The water content in the food can be determined from the difference between the two masses.
- Note down your observations and answer the questions in the report.

Do natural substances contain water?

Which foods contain a lot of water?

Watermelon, Cucumber

Nuts

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Equipment

Position	Material	Item No.	Quantity
1	Knife, stainless	33476-00	1
2	Watch glass, dia.60 mm	34570-00	1
3	Test tube, 180x18 mm,100pcs	37658-10	1
4	Test tube rack f. 6 tubes, wood	37685-10	1
5	Laboratory pen, waterproof, black	38711-00	1
6	Test tube brush w. wool tip,d20mm	38762-00	1
7	Test tube holder, up to d 22mm	38823-00	1
8	Protecting glasses, clear glass	39316-00	1
9	Butane burner with cartridge, 220 g	32180-00	1
10	Spatula, powder, steel, l=150mm	47560-00	1

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Set-up (1/2)

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Number 6 test tubes from 1 to 6. Place them in a test tube rack (see picture on the right).

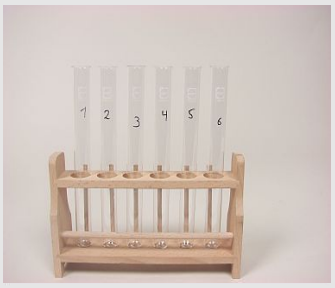
Take a knife and a bowl (or a watch glass)

Cut the fruit and vegetables into small pieces with the knife.

Now take the scale, open the scale and switch it on.

Now place an empty watch glass on the scale.

See the illustrations on the right.



Set-up (2/2)

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Tare the scale to zero by pressing the button "Tare".

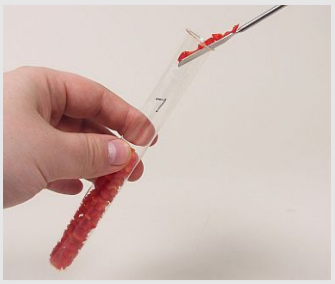
Put as much of one type of fruit or vegetable on the watch glass until the scale reads about 10 g.

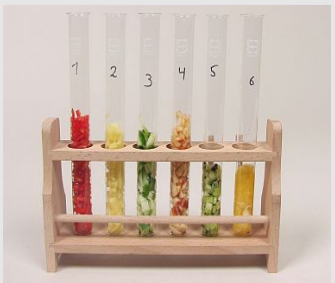
Make a note of the type of fruit you used and the exact weight.

Put the pieces from the watch glass into test tube 1 and place it in the test tube rack.

Then clean the watch glass and dry it.

Do the same with the other fruits and vegetables.





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Procedure

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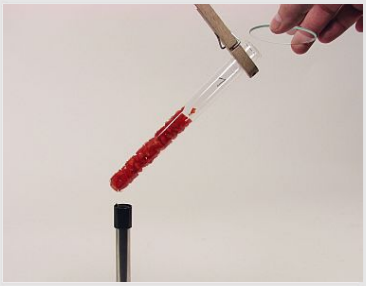

Remove test tube 1 with the clamp and heat the contents evenly over the pilot flame of the burner.

Make sure that the samples do not completely decompose and char.

Hold a cleaned and dry watch glass over the test tube opening during heating.

After cooling, weigh the contents of the test tube (on an empty, tared watch glass dish).

See the illustrations on the left.

Do the same with the other samples.

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Report

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Task 1

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Write down your observations.

Evaluation - Task 1

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Water content of food

Which type of fruit or vegetable has the highest water content?

- Melon
- Peanut
- Tomato
- Cucumber

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Evaluation - Task 2

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Summarise the results of the experiment

Water is _____ for humans and animals. Almost all foods contain water, the water content in natural substances is particularly _____, for example, fruit and vegetables sometimes contain a very _____ proportion of water. In this experiment, the water content of natural substances was investigated. To do this, various types of fruit and vegetables were _____ and _____ in a test tube. Before and after heating, the mass of the natural substance is determined and the water content is determined by the _____.

difference
heated
high
high
essential
chopped up

Check

Slide	Score / Total
Slide 8: Water content in natural substances	0/1
Slide 15: Water content of food	0/1
Slide 16: Summary	0/6

Total 0 / 8

Solutions Repeat Export text

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