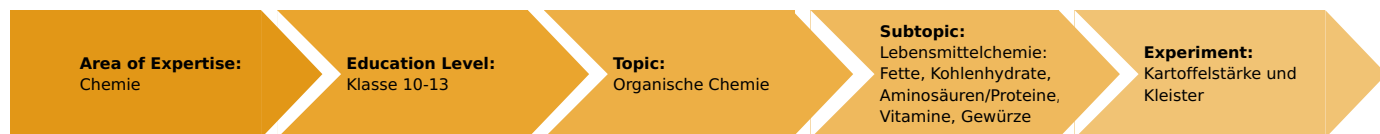


Potato starch and paste (Item No.: P7187300)

Curricular Relevance



Difficulty



Easy

Preparation Time



10 Minutes

Execution Time



20 Minutes

Recommended Group Size



2 Students

Additional Requirements:

Experiment Variations:

Keywords:

carbohydrates, potato starch

Task and equipment

Information for teachers

Additional Information

Potato starch is very popular as a thickening agent in the preparation of sauces and gateaus. Paste made from starch can stick paper and cardboard together.

Notes on content and learning objectives

- Potatoes contain starch, which can be extracted from them after comminuting them.
- On controlled heating of starch, dextrans are formed as decomposition products.

Notes on the method

The starch and dextrans which are extracted can be used in further experiments, such as fortesting their reaction with iodine potassium iodide solution or with Fehling's solution, or for microscopical examination. The significance of starch as the most important carbohydrate in our diet should be pointed out during the lesson.

Fundamentals and remarks

Starch is extracted from tubers and seeds of various plants by washing them subsequent to comminutation. Admixtures of proteins, cell components and water soluble substances are removed by washing them away. Mainly maize, potatoes, rice and wheat are used for winning starch.

Dextrans are obtained as intermediate products when starch is thermally, enzymatically or chemically decomposed. They are mixtures of oligo- and polysaccharides, which give a reddish-brown colouration, and not a blue colouration, with iodine potassium iodide solution detection of starch). Dextrans are used as thickening agents, paste adhesives and sizing agents.

Hints on going deeper

- Potato starch as starting material for a wide range of products.
- Information on the starch industry.



Hazards

- Wear protective glasses!

Notes on the set-up and procedure

Preparation:

The potato should be peeled or scrubbed.

Notes on the students experiment:

Other foods rich in starch, such as grain of flour, can also be used for the extraction of starch.

Should the potato starch still be brown after decantation, make a slurry of it in water and decant the water off after it has settled out.

Slow heating of the starch is necessary to avoid carbonizing it.

Waste disposal

Pour the solutions to drain.

Potato starch and paste (Item No.: P7187300)

Task and equipment

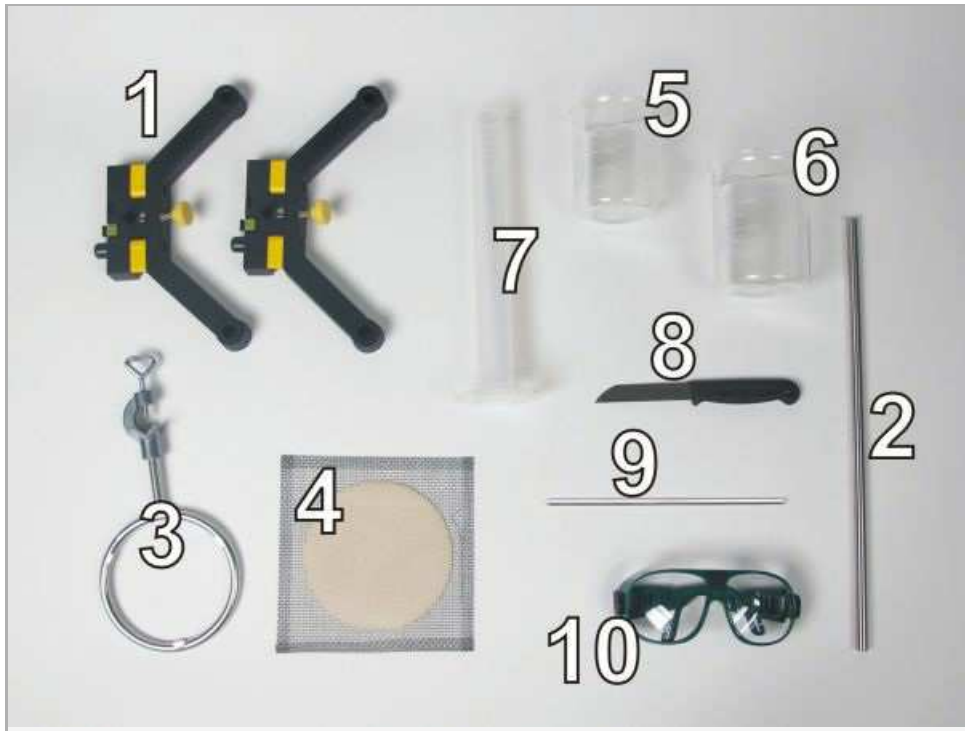
Task

How can potato starch and paste be prepared?

Extract starch from potatoes and make paste from it.



Equipment



Position No.	Material	Order No.	Quantity
1	Support base, variable	02001-00	1
2	Support rod, stainless steel, l=370 mm, d=10 mm	02059-00	1
3	Ring with boss head, i. d. = 10 cm	37701-01	1
4	Wire gauze with ceramic, 160 x 160 mm	33287-01	1
5	Glass beaker DURAN®, short, 250 ml	36013-00	1
6	Glass beaker DURAN®, short, 400 ml	36014-00	1
7	Graduated cylinder 100 ml, PP transparent	36629-01	1
8	Knife, stainless	33476-00	1
9	Glass rod, boro 3.3, l=200mm, d=6mm	40485-04	1
10	Protecting glasses, clear glass	39316-00	1
	Butane burner f.cartridge 270+470	47536-00	1
	Butane cartridge CV 300 Plus, 240 g	47538-01	1
	Water, distilled 5 l	31246-81	1
Additional material			
	Linen cloth		
	Potato		
	Strips of paper		
	Reibe		

Set-up and procedure

Set-up

Hazards

- Wear protective glasses!



Set-up

First peel the potato using a knife (Fig. 1).



Use a grater to grate the peeled potato. Put the grated potato in a 400 ml glass beaker (Fig. 2) and add 200 ml of distilled water (Fig. 3).



Assemble the stand as shown in figures 4 to 8. Fasten the support ring to the support rod and place the wire gauze on it. Adjust the height of the support ring so that the flame of the burner just reaches the wire gauze.



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8

Procedure

Stir the mixture of grated potato and water with a glass rod for about 2 minutes. Filter the solution through a linen cloth into a 250 ml glass beaker (Fig. 9). Squeeze out the cloth firmly by hand (Fig. 10).



Allow the filtrate in the beaker to stand, until a greyish white precipitate has settled out. Carefully pour off the supernatant solution.

Heat the beaker containing the precipitate carefully under stirring with a glass rod until the precipitate is yellow.

Stir the residue with a few ml of water to a viscous solution. Try to stick two paper strips together with this solution.

Waste disposal

Pour the solutions to drain.

Report: Potato starch and paste

Result - Observations

Note your observations.

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Evaluation - Question 1

Draw conclusions from your observations.

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Evaluation - Question 2

In which process for producing food is starch degraded to dextrins?

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Evaluation - Question 3

How can the starch which has been extracted be detected?

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Evaluation - Question 4

Complete the following statements.

1. On grating a potato are released from and settle to the bottom.
2. On heating starch, are formed, which give a sticky and syrupy liquid.

Evaluation - Question 5

Why must potatoes be cooked before they are eaten?

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