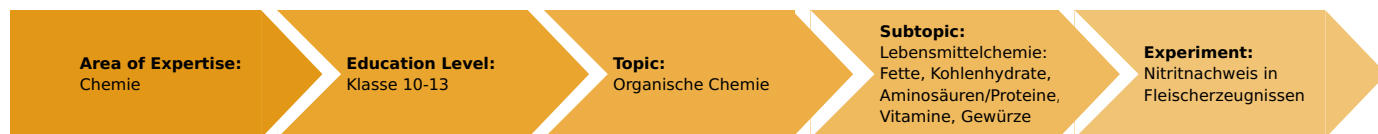


Detection of nitrite in meat products (Item No.: P7188400)

Curricular Relevance



Difficulty



Intermediate

Preparation Time



10 Minutes

Execution Time



20 Minutes

Recommended Group Size



2 Students

Additional Requirements:

Experiment Variations:

Keywords:

food chemistry, tests for nitrite

Task and equipment

Information for teachers

Additional Information

Why does minced meat change colour, while the other meat products stay red?

Notes on content and learning objectives

- Meat products which are treated with nitrite pickling salt keep a fresh red colour, which is resistant to heat.
- Meat products are treated with salt, nitrite and nitrate to keep them longer.



Hazards

- Water can splash when being heated!
- Wear protective glasses!

Notes on the method

The effect of nitrite pickling salt can be demonstrated by immersing pieces of meat in a pickling bath. The experiment can then be carried out as described with the self-treated meat.

It should be pointed out to the students, that it is not advisable to grill and roast pickled meats, as poisonous nitrosamine vapours can then be evolved.

Fundamentals and remarks

Nitrite pickling salt is a mixture of common salt with approx. 0.5 % nitrite. Nitrite changes the muscle substance myoglobin in meat and meat products to a heat-stable dye, nitroso-myoglobin, by addition of NO. In addition, nitrite inhibits the propagation of spoilage microorganisms, generates a typical pickling aroma and delays fat from going rancid.

A differentiation is made between dry, wet and rapid pickling.

Notes on set-up and procedure

Preparation:

Other lean meat products can be used for this experiment.

The meat or meat products should be chopped up as finely as possible with a food processor or with a knife.

Notes on the students experiment:

The colour change which the test strip gives can be demonstrated with a solution containing nitrite or nitrate.

Meat residues on the test strips should be carefully removed with a spatula prior to evaluation.

Waste disposal

Pour the solutions to drain. Put the meat products into the normal waste.

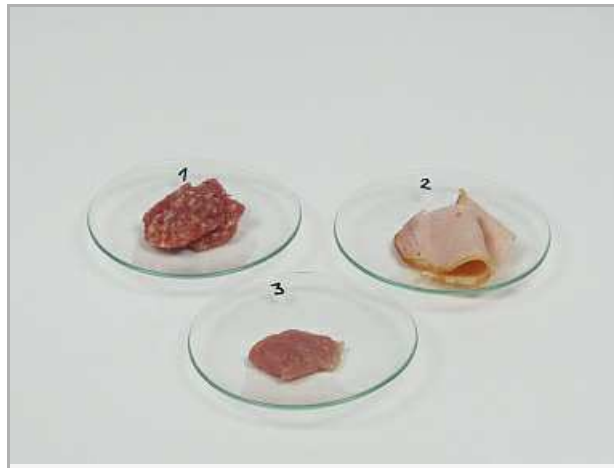
Detection of nitrite in meat products (Item No.: P7188400)

Task and equipment

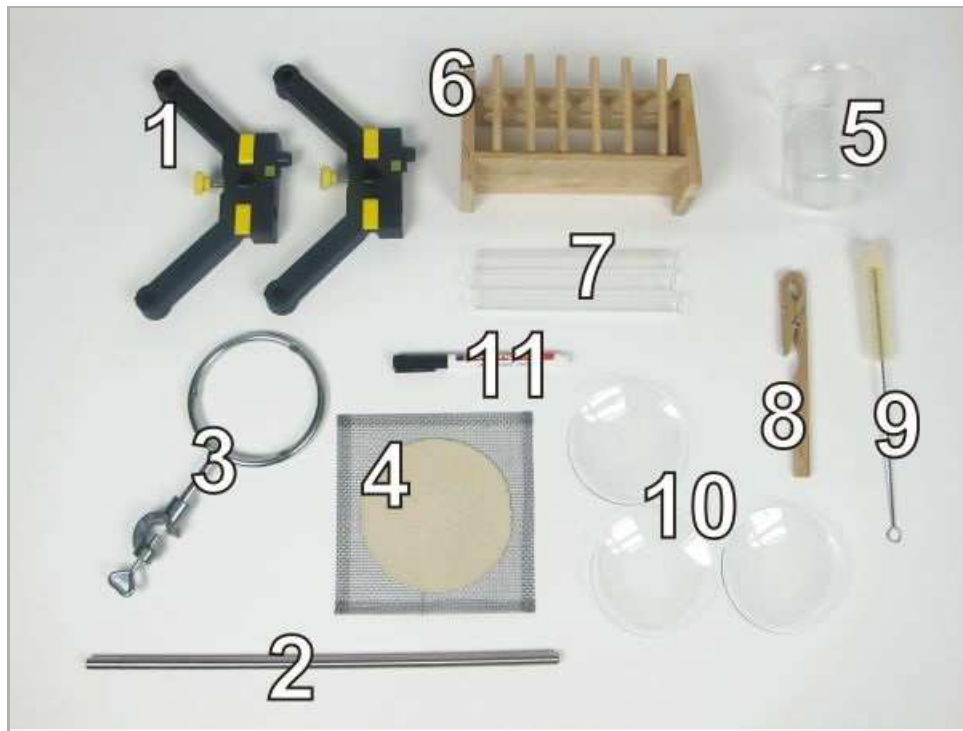
Task

Why does smoked loin of pork stay pink when it is cooked?

Detect nitrite "picking salt" in meat products.



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, 400 ml	36014-00	1
6	Test tube rack for 12 tubes, holes d= 22 mm, wood	37686-10	1
7	Test tube, 180x18 mm,100pcs	37658-10	(3)
8	Test tube holder, up to d 22mm	38823-00	1
9	Test tube brush w. wool tip,d25mm	38762-00	1
10	Watch glass, dia.100 mm	34574-00	3
11	Labor pencil, waterproof	38711-00	1
	Butane burner f.cartridge 270+470	47536-00	1
	Butane cartridge CV 300 Plus, 240 g	47538-01	1
	Nitrate, nitrite, tester, 100pcs	30346-07	1
	Water, distilled 5 l	31246-81	1
	Boiling beads, 200 g	36937-20	1
Additional material			
	Smoked loin of pork, finely chopped-up		
	Minced pork, uncooked		
	Onion flavoured soft smoked sausage (in sausage skin)		

Set-up and procedure

Set-up

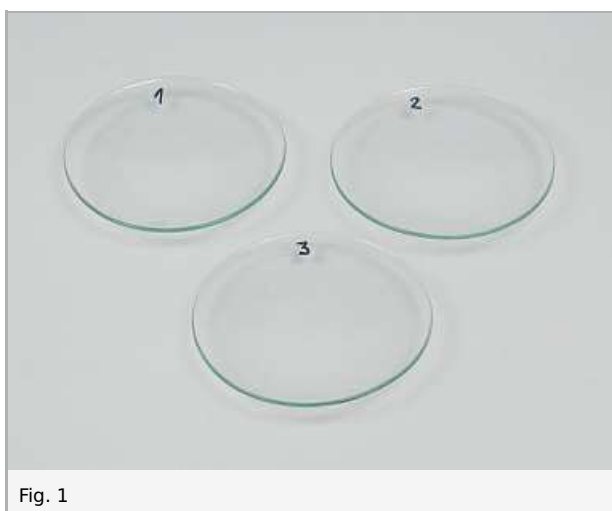
Hazards

- Water can splash when being heated!
- Wear protective glasses!



Set-up

Number three watch glasses from 1 to 3 (Fig. 1).



Also number three test tubes from 1 to 3 and stand them next to each other in the test tube rack (Fig. 2).



Assemble the stand as shown in figures 3 to 7. 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. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7

Half-fill a 400 ml beaker with water and add a few boiling stones (Fig. 8). Heat it to boiling, then put it aside. Extinguish the bunsen burner flame!

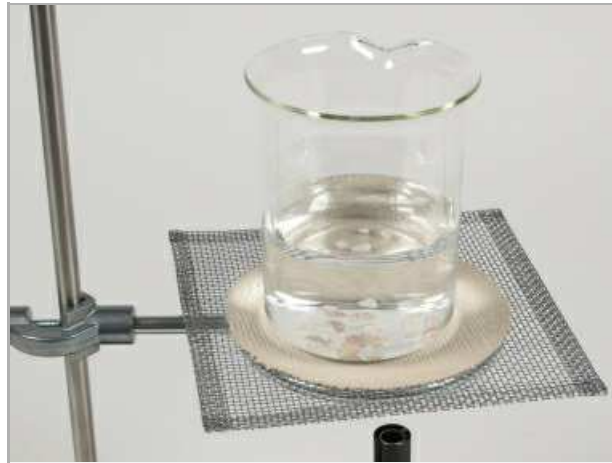


Fig. 8

Procedure

Transfer three heaped spatula tips of meat products into the appropriately numbered test tube (Fig. 9).

1. Onion flavoured sausage
2. Loin of pork
3. Minced pork



Fig. 9

Fill distilled water into each test tube to a height of 4 cm (Fig. 10). Place the test tubes in the prepared hot water bath for about 10 minutes (Fig. 11).

Examine the colour of the heated meat products.



Fig. 10



Fig. 11

Put nut-sized pieces of the meat products onto the numbered watch glasses, in the same succession as above (Fig. 12).



Fig. 12

Lay a nitrate, nitrite test strip on the onion flavoured sausage (watch glass 1). Press the strip onto the sausage for about 10 seconds with your fingers.
Remove the test strip and evaluate it.

Examine the other two meat products in the same way.

Waste disposal

Pour the filtrates in the test tubes into the container for heavy metal salt solutions.

Report: Detection of nitrite in meat products

Result - Observation 1

Note your observations in the following table.

Test tube	Meat product	Colour after heating	Nitrite test
1	Onion flavoured sausage	1	1
2	Loin of pork	1	1
3	Minced pork	1	1

Evaluation - Question 1

Draw conclusions from your observations.

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Evaluation - Question 2

What is to be understood by "pickling"?

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Evaluation - Question 3

Why must uncooked minced meat not be kept for more than a day?

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Evaluation - Question 4

Complete the following statements.

1. Meat products which are treated with keep a fresh colour, which is resistant to
2. Treatment with salt and nitrite (.....) is called
3. Pickling makes meat products