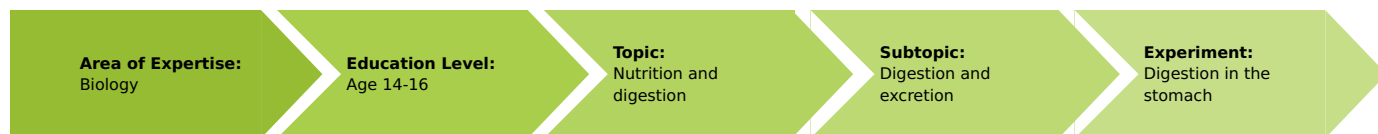


# Digestion in the stomach (Item No.: P8012800)

## Curricular Relevance



### Difficulty



Difficult

### Preparation Time



10 Minutes

### Execution Time



30 Minutes

### Recommended Group Size



2 Students

### Additional Requirements:

- Boiled fish

### Experiment Variations:

### Keywords:

Enzyme, Pepsin

## Task and equipment

## Information for teachers

## Additional Information

After the food has been chewed in the mouth, it goes through the gullet into the stomach. There the digestion of the proteins begins. The gastric juice contains the enzyme pepsin and diluted hydrochloric acid, which activates pepsinogen, the precursor of the enzyme pepsin. The proteins are cleaved by the enzyme pepsin into peptides, which are later further digested in the intestinal.

## Hints on Set-up and Action

- Because of the waiting time, 2 days are required to carry out the experiment.

## Hint

The result of the experiment depends highly on the size of the sample and the reaction time, i.e. the duration of heating to 40 °C and the subsequent waiting time.

# Digestion in the stomach (Item No.: P8012800)

## Task and equipment

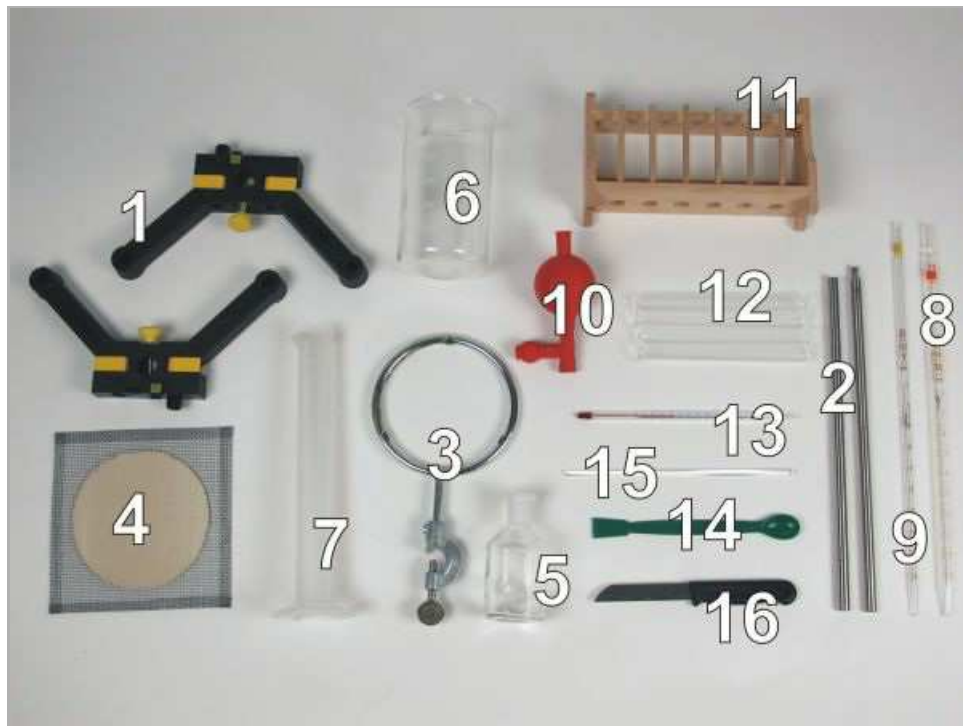
### Task

### How are proteins digested in the stomach

Find out the conditions under which protein is digested in the stomach.



Equipment



Position No.	Material	Order No.	Quantity
1	Support base, variable	02001-00	1
2	Support rod, l = 600 mm, d = 10 mm, split in 2 rods with	02035-00	1
3	Support ring, i.d. 130mm,w.boss	37722-03	1
4	Wire gauze with ceramic, 160 x 160 mm	33287-01	1
5	Bottle,nar.mouth,100ml,clear,p.st	41101-01	1
6	Glass beaker DURAN®, tall, 600 ml	36006-00	1
7	Graduated cylinder 100 ml, PP transparent	36629-01	1
8	Graduated pipette, 1 ml	36595-00	1
9	Graduated pipette 10 ml	36600-00	1
10	Pipettor,bulb,3 valves, 10ml max.	47127-01	1
11	Test tube rack f. 6 tubes, wood	37685-10	1
12	Test tube 160x16 mm, 10 pcs	37656-03	(4)
13	Students thermometer,-10...+110°C, l = 180 mm	38005-02	1
14	Spoon,w.spatula end,18 cm,plastic	38833-00	1
15	Glass rod,boro 3.3,l=200mm, d=5mm	40485-03	1
16	Knife, stainless	33476-00	1
	Protecting glasses, clear glass	39316-00	1
	Butane burner, Labogaz 206 type	32178-00	1
	Butane cartridge C206, without valve	47535-01	1
	Portable Balance, OHAUS JE120	48895-00	1
	Water, distilled 5 l	31246-81	1
	Hydrochloric acid,approx.5% 250ml	30315-25	1
	Pepsin powder,soluble 100 g	30181-10	1
Additional material			
	Boiled fish		

## Set-up and procedure

First prepare a 1 % pepsin solution by giving 1 g pepsin in a bottle and adding 99 ml (99 g) of distilled water. Shake the bottle thoroughly until the pepsin has dissolved completely.

Fill four test tubes as follows:

Test tube 1: 10 ml water

Test tube 2: 9 ml 1% pepsin solution and 1 ml water

Test tube 3: 9 ml water and 1 ml 5% hydrochloric acid

Test tube 4: 9 ml 1% pepsin solution and 1 ml 5% hydrochloric acid

Then put in each test tube a piece of boiled fish about the size of a cherry (Fig. 1).



Set up a support stand with the support base and the support rod (Fig. 2 and Fig. 3), fix the support ring to the support rod and lay the wire gauze on it (Fig. 4).

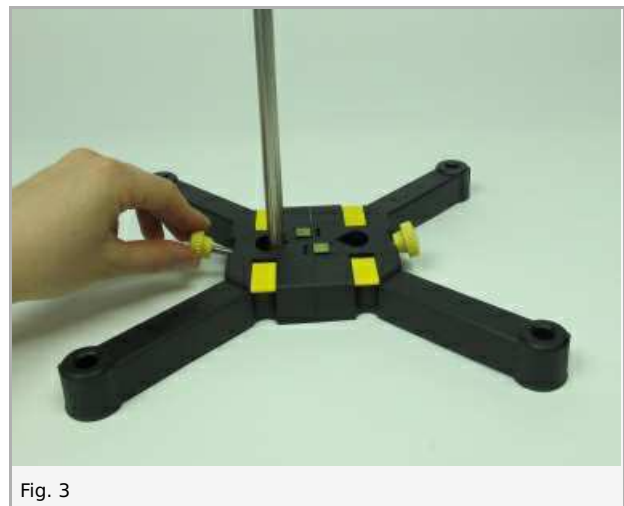
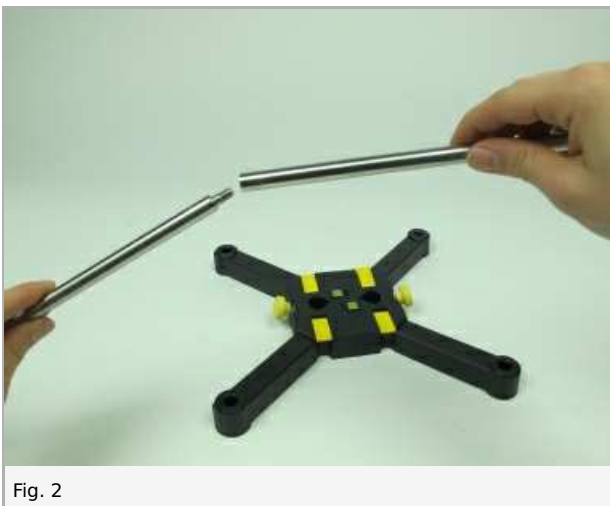




Fig. 4

Attach the butane burner to the butane cartridge (Fig. 5-6).



Fig. 5



Fig. 6

Fill a 600 ml beaker up to the half with water and place it on the wire gauze. Using matches light up the butane burner place it underneath the wire gauze and warm it to reproduce body temperature to 35-40 °C. Put in the four test tubes and keep on checking the temperature with a thermometer maintaining it at approximate body temperature.



Put out the burner at the end of the lesson and leave the test tubes at room temperature.

Examine the different samples after 24 hours and write down your observations in the report. Use a glass rod to check the texture of the samples.

## Report: Digestion in the stomach

### Result - Observations

Note down your observations. How has the flesh of the fish in the various test tubes changed by the next day?

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### Evaluation - Question 1

In which of the test tubes has the flesh of the fish been digested? „Digested“ means that the flesh of the fish has disintegrated without putrefying, so pay attention to smell

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### Evaluation - Question 2

What is necessary for the digestion of protein?

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### Evaluation - Question 3

What is the effect of hydrochloric acid on its own? In answering this question compare the contents of test tubes 1 and 3.

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