Mould fungi growing on food (Item No.: P1444301)

Curricular Relevance

Area of Expertise: Biologie
Education Level: Klasse 7-10
Topic: Biologie der Zelle, Mikroskopie
Subtopic: Samenpflanzen, Farne, Pilze
Experiment: Schimmelpilze auf Lebensmitteln

Difficulty	Preparation Time	Execution Time	Recommended Group Size
Easy	10 Minutes	30 Minutes	1 Student

Additional Requirements:

- Drinking glass or small bell jar
- Bread
- Water

Experiment Variations:

Keywords:

Task and equipment

Information for teachers

Information

Surely you have seen on several occasions that molds have grown on food. Molds live on organic matter composed of carbohydrates, fat, and protein. As foodstuffs contain these substances and the required moisture, they make an ideal substrate. The macroscopically visible mold constitutes but one part of the fungus. It only emerges when the food is fully interspersed with mycelial threads (hyphae). As many molds produce toxic substances, moldy foodstuffs should not be consumed.

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Information on obtaining materials

You can easily cultivate the study material on your own. Various foodstuffs can be worked with. Bread and cucumber are particularly suited, since beautifully long sporophores develop on these substrates. **The safety instructions (see student worksheet) must be observed by all means.**

Information on molds
Most molds emerging as decomposers of foodstuffs belong to the ascomycetes. As such they are saprophytes. Fungi present problems especially when they spoil foods with their toxins (e.g. aflatoxin and patulin or when allergic responses to the spores are triggered).
However, there are desirable molds that also grow on foodstuffs and do not present a health hazard according to the current state of knowledge (edible mold growing on cheese and some types of salami).


Safety measures

- Raw alcohol (methylated spirit) is highly flammable. Extinguish all open flames!
- Wear protective glasses!

Hazard and Precautionary statements

Ethanol:	
H225:	Highly flammable liquid and vapour.
P210:	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

Information on how to proceed
ad 1: Foodstuffs can mold
Crucial for this experiment are uniform moist warm climate conditions. Direct exposure to sunlight should be avoided. Culturing can be done in a Petri dish. A taller glass cover is more effective. The students should have access to their cultures regularly. Microscopy ensues when the morphologies of filaments and sporangia are well developed (10 – 14 days).
ad 2: Microscopy
Observe the safety instructions!
The students shall prepare their slides under the laboratory exhaust hood. The specimen mounted in liquid and covered with a

cover slip may then be carried out in the room.
Microscopy medium: A mixture of ethanol and water prevents the occurrence of air bubbles and thus affords a better view.
Lugol’s solution stains the hyphae to some extent.

Molds growing on bread, 400x

Molds growing on bread, 400x in Lugol’s solution

Molds growing on cucumber, 100x in Lugol’s solution

Mold spores (bread), 100x in Lugol’s solution

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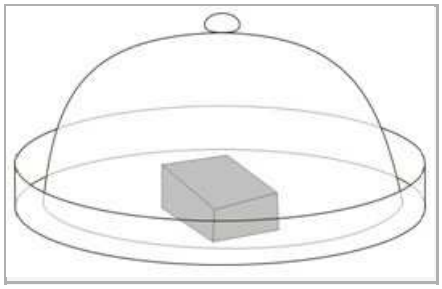
Task and equipment

Task

Observe the growth of molds and view their sporophores under the microscope!



Equipment

Position No.	Material	Order No.	Quantity
1	Euromex BioBlue BB.4250 microscope	EUR-BB-4250	1
2	Microscopic slides, 50 pcs	64691-00	1
3	Cover glasses 18x18 mm, 50 pcs.	64685-00	1
4	Petri dishes, plastic, d=94mm, 20/pkg	64709-03	1
5	Beaker, low form, plastic, 100 ml	36011-01	1
6	Tweezers,straight,pointed,120mm	64607-00	1
7	Dropping pipette with bulb, 10pcs	47131-01	1
8	Chemicals set for TESS advanced Microscopy	13290-10	1

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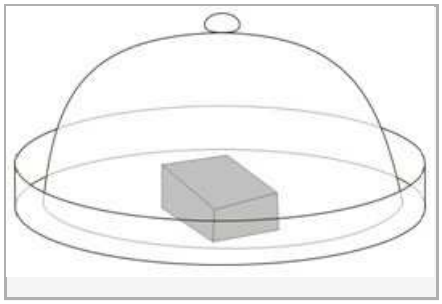
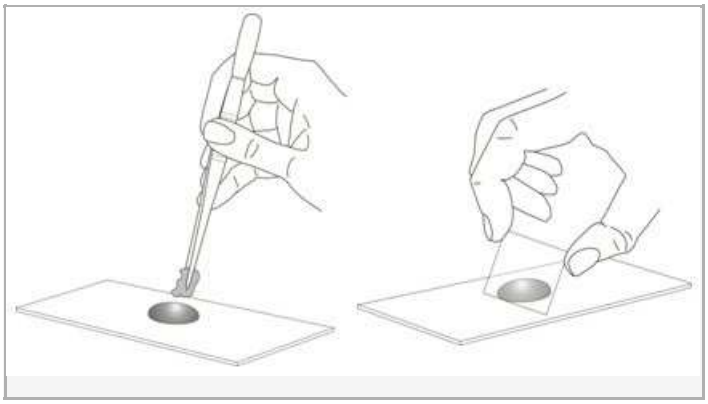
Set-up and procedure

1. Foodstuffs can mold
Moisten the bread a little bit and place it on a Petri dish. Put a drinking glass or glass (cheese) cover over it, so that a damp chamber is created. Keep it at a warm place (room temperature). Observe the development of the mold over a period of two weeks. Never lift the cover, otherwise you might inhale the spores.
Keep records of your observations in the report!



2. Microscopy
Be careful! Try to avoid inhaling and dispersing the spores in the room.
Work under a laboratory exhaust hood!
Lifting the cover and preparation of the slide is to take place under a laboratory exhaust hood. You may return to your microscopy workbench with the finished (mounted) slide!

- Microscopy medium: Use a mixture of ethanol and water for microscopy (1 to 2 pipettes of 70% ethanol dissolved in 20ml water) or diluted Lugol's solution.
- Remove a part of the visible sporophores using forceps and dissecting needles and place it directly into the microscopy medium!
- Examine the specimen under the microscope up to the highest power!
- Make a drawing of one sporophore in the report!



Information: Some molds are named after the shape of their sporophores. If it looks like a brush, we speak of penicillium ("brush" mold). If it reminds of a watering can from which water is just being sprinkled we speak of aspergillus (aspergillum: holy water sprinkler).

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Report: Mould fungi growing on food

Result - Observations

Note down your observations.

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Evaluation - Question 1

Make a drawing of one sporophore.