

Biology ... What a Pizza!!!

Student Activities

Problematization

Have you ever eaten a pizza that was not really perfect? Maybe it was overcooked or with large bubbles, or it was not crisp or too thin and not well leavened or had a crust with a light colour? Have you ever wondered what causes these defects?

Do you know the basic ingredients of pizza? Have you ever prepared a pizza? Have you ever seen someone at home who prepares it? Do you know the "tricks" to make a good pizza?

STEP 1: the dough

Analysis of the product. Let's know the pizza more closely:

- When was it born? What are the basic ingredients (we omit the topping to simplify the study)? In which ratios should be mixed? It is important the sequence?
- Try to draw a flowchart (dough, first rising, second rising, cooking).

Problematization

Analyze the ingredients:

- All flours are the same? How are they different? What is the best?
- It is important the water temperature? Why? What is water hardness? How does hardness may affect the leavening?
- What are the functions of the salt? The salt is only used to give flavor? Search how it can affect the stability of the dough.
- In how many ways can the dough leaven? Do you know what is the sourdough? Do you know the brewer's yeast ? Do you know why it is called so? Do you know other leavening agents (chemical yeast ...)? Do you know what are they formed?
- Why the salt should not be added in direct contact with the yeast previously dissolved in warm water?
- Why do you add a little **olive oil** or another fat? What is its function?
- Some people add a little **milk or sugar**: why?

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Research

At the end of a research group, where you can use the media that you think most appropriate (web search, consultation of books, interviews with experts or simply an interview with your mother or your grandmother ...) write, with your teammates, the possible answers to the questions that are listed above.

Experimentation

Describe some experimental activities that can demonstrate your hypothesis.

In the laboratory:

1. Identification of the gluten in the flour;
2. Reading of the labels of the leavening agents;
3. Observation of *Saccharomyces* with optical microscope.

STEP 2: the rising

Problematization

Let the dough rise. Why should it be covered with a damp cloth? If the mixture is crushed and not with a spherical shape, we would get the same result? The volume changes? Is it important the temperature of the room? And the humidity? Which is the odor of the dough during fermentation? Why?

Observation

We observe what happens after a long time. Mark the changes with your teammates. What is causing the increase in the volume? What is the role of sugar or milk?

Research

Make a research on the fermentation, at the end you will be able to answer questions Show with a drawing what happens during fermentation.

Experimentation

Describe some experimental activities that can demonstrate your hypothesis.

In the laboratory:

1. The fermentation develops a gas (flasks, mixing, balloon);
2. Measurement of CO_2 ;
3. Identification of durum wheat and soft wheat;
4. The fermentation proceeds at different rates by changing the% of sugar.

Guided tour

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Objectives: to know a product, to be able to read the label of flour (type 0, 00, whole meal wheat flour, durum wheat ...), to recognize the role of biodiversity in providing the flour different characteristics.

Since a visit to a mill near the school is scheduled, students are asked to prepare a short questionnaire-interview (type of grain used for bread and pasta production, commercial categories of flour). On this occasion the students can also observe the laboratory technicians while they work in the analysis of the flour resistance to the rise and in the determination of the chemical composition of the flour to a proper mix, according to the different purposes for which they are intended .

STEP 3: the coking

Problematization

Which is the most suitable oven temperature? What happens to the yeasts when cooking? Why the dough continues to rise?

Observation

Describe what happens during cooking: changes in volume, color, consistency, development of flavors

Research

With your teammates make a quick research on the main reactions that occur during cooking: the caramelization of sugars, the Maillard reaction.

Experimentation

1. Preparation of caramel

STEP 4: the sensorial analysis

Problematization

The pizzas are all the same? What causes some defects, often common, such as the formation of bubbles or the low rising? Now you are able to answer

Research

PROFILES



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With your teammates, prepare a table of sensory analysis, assigning a score to each item. Communicate to the other groups your choices. After a brief comparison identify a table of common assessment.

Distribute pizza and, individually, without any conditions by classmates, fill the table. The results of the tasters are the same?

Assessment

Write some notes on the experience in your notebook: What have you learned? Do you have any suggestions? What would you change? Which activity did you like a lot?

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