Results matter!

Dried Tomatoes

Keywords: functions, percentages, inverse proportion, rational function

Drying is one of the oldest and healthiest methods of long-term food preservation, extending the shelf life of food for up to a year. It is a way to preserve the taste, smell and color of food. Another advantage is that dried foods take up much less space.

It is one of the most commonly used preservation methods both in households and in the processing industry. In households, fruits, vegetables or mushrooms are dried freely in the sun, in an oven, or in a dehydrator. Commercial drying of fruit then takes place in specialized dehydrators.

When drying, it is important that each piece is exposed to a constant flow of warm air, which evaporates the water and lowers the humidity. The humidity should drop to a maximum of 30%. At this humidity, the growth of microorganisms and mold is prevented, regardless of the packaging material and the storage temperature.

Assignment

Tomatoes are one of the typical vegetables that are dried. Some lovers of Italian cuisine consider them a little red miracle. In terms of drying, tomatoes are among the most demanding because they consist of 94% water.

All percentages in the following exercises are expressing mass fractions, i.e. they numerically represent the number of grams of the component in $100\,\text{g}$ of mass.

Exercise 1. If a kilogram of fresh tomatoes loses one percentage point of water after drying, how many grams will the tomatoes weigh? Just for fun, try guessing the answer first.

Exercise 2. Determine the formula and the domain of a function that describes the relationship between the actual weight of the tomatoes and the percentage of water contained in them during the drying of one kilogram of fresh tomatoes. Sketch the graph of this function.

Exercise 3. In general, how does the formula of the function from the previous exercise change if we dry m grams of fresh tomatoes?

Exercise 4. How many kilograms of fresh tomatoes are needed to make

    a. one kilogram of dried tomatoes with a water content of 10%;

    b. $500\,\text{g}$ of dried tomatoes with 20% water content;

    c. $250\,\text{g}$ of dried tomatoes with 40% water content?

Literature

- Richtrmocová, Barbora. *Zdravotní a nutriční aspekty sušeného ovoce.* Bakalářská práce. Masarykova univerzita, 2018.