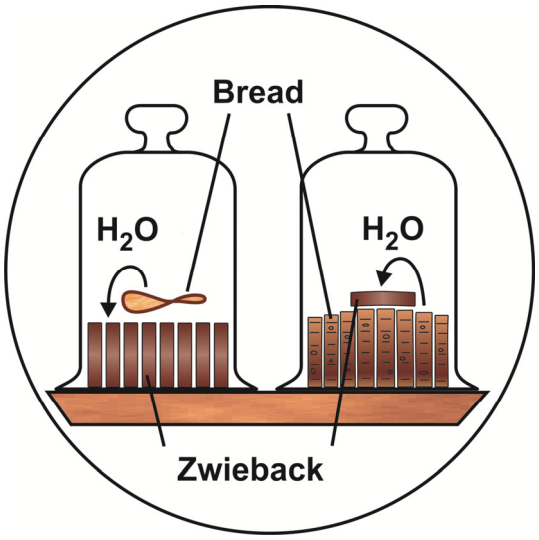
Redistribution of Water between Zwieback and Bread



Equipment:

2 glass bell jars (with ground flange bottom)
wooden board as base for both bell jars
(alternatively: 2 airtight food storage bags with sealing clips)

“Chemicals”:

half loaf of fresh bread in slices
package of zwieback (literally translated “twice-baked”) (a form of rusk)

Safety:

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Procedure:

One slice of bread or one piece of zwieback is placed with the remaining zwieback or bread under a glass bell jar and left to stand for two days. Bread and zwieback should be arranged in such a way that the surfaces of the slices or pieces are not covered as far as possible.

Observation:

The slice of bread stored together with the pieces of zwieback becomes hard and brittle; the piece of zwieback stored together with the fresh bread, on the contrary, becomes quite soft and bendable.

Explanation:

In the initial state, the zwieback is much drier than the fresh bread; its water content is therefore significantly lower and thus also the chemical potential of the water compared with that in the bread. Therefore, a redistribution of the water takes place according to

$$H_2O|_{\text{bread}} \rightarrow H_2O|_{\text{zwieback}}.$$

The slice of bread correspondingly loses its moisture to zwieback, while the piece of zwieback, on the other hand, absorbs water from the bread.

Disposal:

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