

What's "Relative" about Relative Humidity?

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As Canadians, one of our national pastimes seems to be complaining about the weather. We often hear the phrase, "It's not the heat, it's the humidity" repeated during the summer months.

Weather forecasters may tell us that the temperature is twenty-eight degrees Celsius and the relative humidity is eighty-five percent. In response to this, we probably roll our eyes, resigning ourselves to the fact that working outdoors will be extremely uncomfortable. Just to confirm our suspicions, the meteorologists then go on to say that these conditions will make it feel closer to forty degrees Celsius.

Many of us have digital thermometers with an attached electronic hygrometer that tells us the relative humidity of the air. In the accompanying photograph, the thermometer-hygrometer combination on the left shows the conditions mentioned previously and indicates the situation would feel "wet".

When I prepared this article, the temperature was twenty-four degrees Celsius and the relative humidity was 39%, as shown by the unit on the right-hand side of the photograph. This created a "dry" situation which was rather pleasant, as far as I was concerned.

Now to the point of all this. Even though we use relative humidity values in our everyday conversations, do we really understand what the term means? To what is the humidity actually relative?

To answer these questions, we need to consider a mixture of air and water vapour. The definition of relative humidity is the amount of water contained in the air divided by the amount of water that the air is capable of holding at that temperature, times 100%.

As air is heated, its ability to hold moisture increases. At twenty-four degrees Celsius, one kilogram of dry air can hold about 19 grams of water before it becomes saturated and can hold no more water vapour. If the air in our room has a relative humidity of 39%, it contains less than half of the moisture that it could possibly hold at that temperature. This works out just over 7 grams of water per kilogram of dry air. Don't worry about the kilograms of dry air part, that's just a way of keeping all the values on a consistent basis so that they can be compared to one another.

At twenty-eight degrees Celsius, one kilogram of dry air can hold almost 25 grams of water. 85% relative humidity means that the water content of one kilogram of dry air will

be about 21 grams. This is three times the amount of water that was present in the other air example.

In winter, the cold outside air can hold hardly any moisture at all. When we bring this cold air into our homes and heat it, the relative humidity is so low that many people use humidifiers to add moisture to it. This helps reduce static shocks and generally make things more comfortable.

So how does all this impact food?

Let's suppose that it's a hot, humid summer day. If you leave a package of cookies or soda biscuits open to this air, you will find that after a short time, their crispness is lost. That's because of the moisture uptake from the surrounding air.

If you leave fresh cookies or soda biscuits exposed to the dry air in the winter months, they will not experience the same deterioration in quality that they did in the more humid air. This is because there is not enough water present in the air for the food to draw into itself. In contrast, moist foods will dry out faster in the winter months than they will in the more humid summer months.

While all of this may appear somewhat complicated, the take-away message is quite simple. For all food products, you should be aware of the conditions in which you are storing them. For some foods, it is necessary to do so in a cool, dark, dry area using an airtight container to prevent the penetration of moisture. In this way, you will minimize degradation due to heat, moisture, and light.

If you are trying to store fruits and vegetables, you need to do so in a cool, moist environment to prevent them from losing moisture. However, you also need to have sufficient air circulation to prevent mold growth.

As you can see, storage of food products is not a simpler matter. You may find a number of on-line information sources helpful in this regard.



These electronic thermometer / hygrometer devices show the temperature and relative humidity of air under two different sets of conditions.