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Effects of room temperature on the properties of some materials used in collection conservation

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Introduction:

The functional properties of conservation materials may depend on environmental temperature, a factor that is often overlooked. As part of a larger study we present the preliminary results of temperature tests performed to evaluate attributed functionalities of two materials used in collection conservation:1) polystyrene transparent boxes used for dried samples; 2) indicator pills of alcohol density for whole body samples.

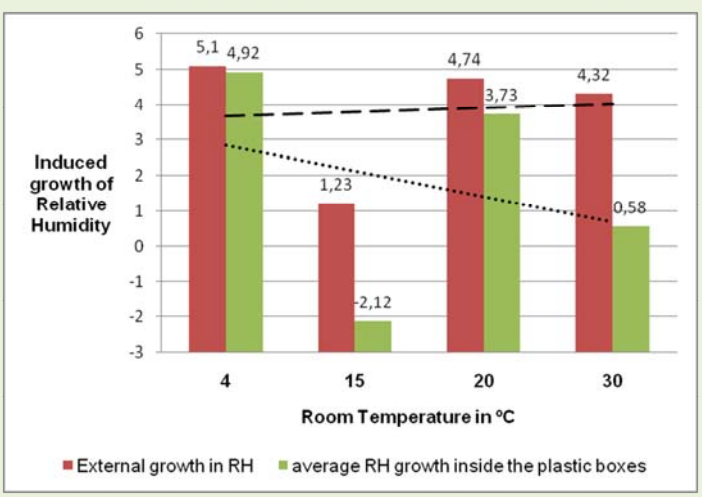
Methodology:

General method: the materials were tested at environmental room temperatures of 4, 15, 20, and 30 ºC for 4-5 days. Temperature and Relative Humidity were monitored each half hour.

Hypothesis 1) Plastic boxes may be a barrier against increases in environmental relative humidity. To test this premise at different temperatures, three cases (80x80x62 mm) containing a datalogger (Testo,175-h2) and an isolated datalogger to record environmental conditions were placed in a cardboard box (50x50x50 cm approx.). At the end of the second day a source of wetness (a plate with water) was added to the device. The measures inside the three boxes were highly correlated (r=0.99).

Hypothesis 2) The Alcomon Indicator System (http://www.alcomon.com/) *"is an instrument in the form of two small indicator pills that monitor the ethanol concentration in fluid preserved specimens"*. The orange pill should float on the fluid of conservation if its alcohol volume is below 60%; the same for the red pill at 50%. When the densities of alcohol are higher the pills would be at the bottom of the jar. Therefore, a quick look at the jars would be sufficient to detect incorrect alcohol densities. To test this property at different temperatures we placed two pills (orange & red) in 12 samples whose densities ranged from 45 to 72 % (measured by means of Densito 30PX, Mettler Toledo).

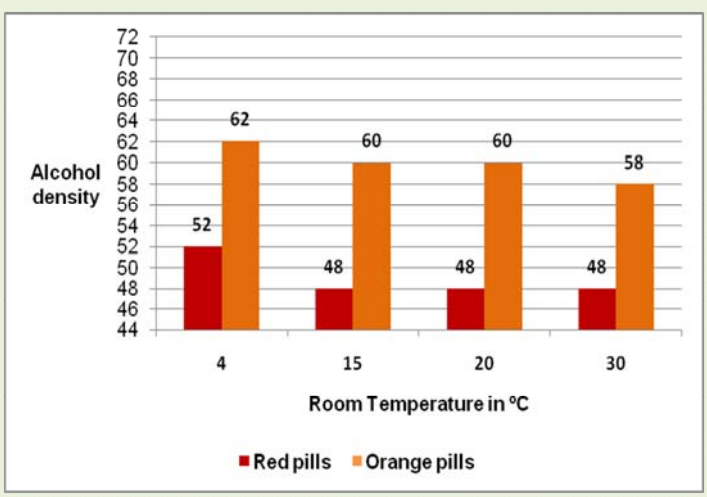
Are the plastic boxes hermetic to relative humidity at several temperatures?



The experimental increase in Relative Humidity achieved a similar value outside the boxes (4,32-5,1), with the exception of the measure at 15ºC. The negative result inside the box at this temperature is even more difficult to explain, so that we should be caution with the results at this point.

At 4ºC the increase inside and outside the plastic boxes was similar. Nevertheless, at the other extreme temperature, 30ºC, the conditions inside the boxes experienced an increase of less than 15% in RH respect to outside conditions. The induced growth of RH inside the plastic boxes was relative to the environmental temperature: the higher the room temperature, the more independent from the external conditions was the relative humidity inside the boxes

Are indicator pills at several temperatures reliable?



The pills proved to be reliable at the four tested temperatures. The figure shows the level of alcohol concentration at which the pills float, i.e. the level at which the pill indicates a threshold of lowering density. In both cases, red and orange pills, the results fall within the range of variation stated by Alcomon company, that is ±3 around values of 50 for red pills and 60 for orange pills.

Nevertheless, at low temperatures there is more risk of false alarms than at warmer conditions. On the other side, the risk of false negative signalling, however, seems to be minimal.

General conclusions:

-The short-term results of this small sample from preliminary experiments supports the development of more extensive long-term tests.

- Environmental temperature should be taken into account when testing the efficiency of materials for conservation.

Conclusions for conservation purposes:

- Plastic boxes can play a role in controlling relative humidity of dried specimens in temperate temperatures.

- Pills that indicate alcohol density are reliable at a wide range of storing temperatures.