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Cool box validation protocol

**Version 1
September 2007**

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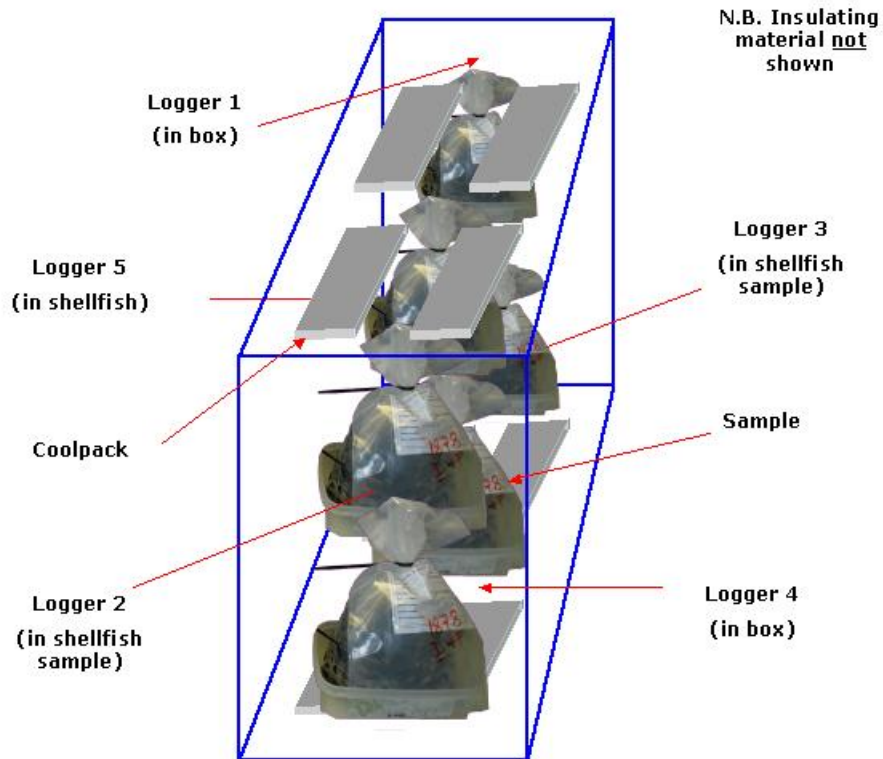
INTRODUCTION

Specific models of cool box and numbers/sizes of cool packs may be critical and so each combination that may be used should be validated under expected extremes-of-use conditions. The relevant variables/factors then need to be specified for use – see section on “Specification of a use protocol”.

METHOD

- Replicate experiments should be carried out i.e. run each trial at least in duplicate
- There can be temperature variations within a box, including through a sample or samples, and so more than one logger should be used to check for this
- Loggers need to be positioned inside samples (i.e. in amongst shellfish) to measure in-sample temperature and inside box to measure air temperature
- Record logger locations and shellfish packing arrangements ideally with suitable 3D diagram/photos e.g.

Example 3D representation of positions of shellfish samples and loggers within the cool box



- Real shellfish samples should be used (species used should be specified – species differences may be a source of variation)
- Information is needed on the way that the cool packs are prepared prior to use. The time/temperature of freezing, and subsequent treatment after removal from the freezer may all be significant. Ice packs should generally be frozen to -18°C for 24 hrs and then placed in the appropriate positions within the box. Direct contact with shellfish should be avoided by appropriate use of insulatory material
- Carry out experiments at three temperatures:
 - coldest ambient expected during transit
 - mid-range ambient expected during transit
 - hottest ambient expected during transit

VALIDATION

- Data loggers used for the validation work need to be first calibrated by an accredited organisation or against certified thermometers. The latter is relatively easy to do in-house.
- The calibration might consist of comparing a calibrated thermometer against the printed/stored readings from data logger probes held in ambient air, hot water, and chilled water.

Table 1: Logger results compared with the certified thermometer readings.

Thermometer	Air temperature	Temp in Hot Water	Temp in Cold Water
Certified			
Probe 1			
Probe 2			
Probe 3			
Probe 4			
Probe 5			

Table 1 should demonstrate that all readouts from all five probes were within a specified limit of $\pm 0.5^{\circ}\text{C}$, throughout the temperature range of the test.

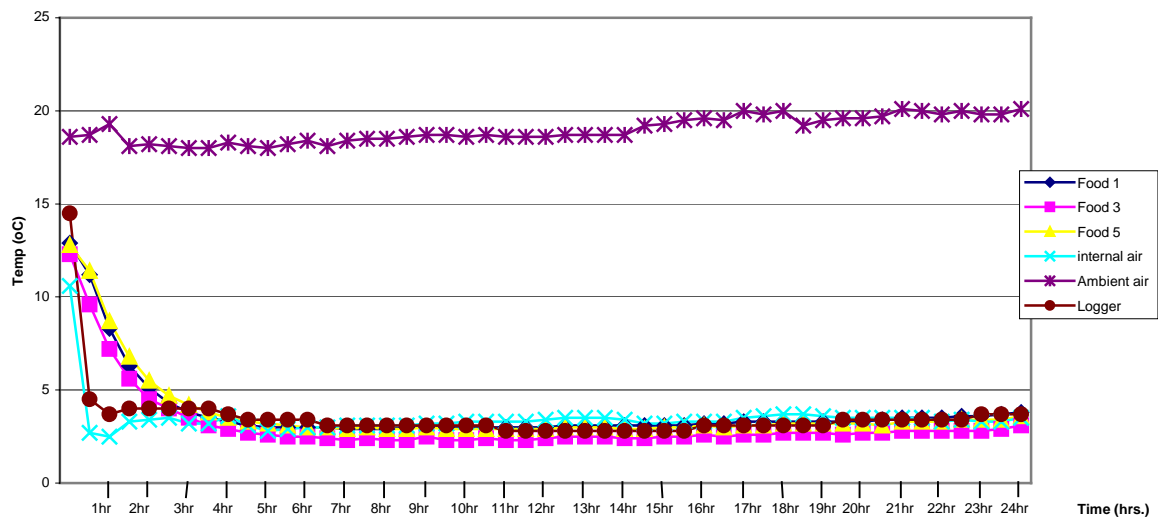
- Thermometers/loggers should start recording simultaneously and be set to record temperatures at 30 minute intervals.
- After 48 hrs the equipment should be stopped and the recordings downloaded.

RESULTS

- State ambient temperatures at which the trial was carried out
- Insert temperature profile graphs for all loggers covering experiments over 0-48 hours (see example as per Figure 2 below)

Example temperature profile of ambient shellfish samples using specified cool box

Figure 2



- For microbiology testing purposes, samples should be shown to be cooled to below 8°C within 4 hrs. The air temperature within the box should fall to below 8°C within 30 minutes and all samples should be maintained below 8°C for 48 hrs.

COMMENTS

Record any observations as appropriate

CONCLUSIONS

- Successful performance of cool box should be assessed against ability to cool ambient food samples to below 8 °C for microbiology (10 °C for biotoxins) within 4 hrs and to maintain a temperature of below the relevant temperature for 48 hrs.
- Successful performance should also include a requirement that sample temperatures should not fall below 0 °C at any time.
- Prices of cool boxes, cool packs and postage for typical sampling weights could be considered for practical purposes

REFERENCES

Record any references as appropriate.

SPECIFICATION OF A USE PROTOCOL

A 'Use Protocol' should be given for each make and model of cool box. This should specify:

- Use to which cool box will be put (i.e. sampling shellfish/water etc) and for which determinand(s) e.g. *E. coli*
- Ambient temperature range for use
- Cool box (ideally with photo): make, model, dimensions and material of construction
- Cool packs: make, model, dimensions and material of construction
- Insulating material used e.g. newspaper, foam (with appropriate level of detail to allow exact replication e.g. source, material code, description, density, thickness etc) and how used (number, where in cool box, layers etc) – ideally with photo
- Sample packing: type of sample (shellfish/water), number and size of samples (for each species if this varies), sample location in cool box

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All conditions given in the Use Protocol should have been included in successful validation trials.