Effect of weighing warm paddington cups

Pete Phillips

17th March 2016

Introduction

At the CEn TC 205 WG15 meeting in London in June 2015, the minutes stated:

`ACTION: PP to check effect of weighing hot objects at 37C on balances – does it have an effect. Add a Rationale explanation – and remove 30 minutes equilibration requirement if it looks sensible.`

Method

5 paddington cups (without lids) were weighed at room temperature (24C), incubated overnight at 37 ±2°C and weighed, and then left to cool to room temperature and weighed. This was repeated three times, giving a total of 15 sets of data. The 5 cups were chosen at random from SMTL's stock of cups. Each cup has a unique ID (22, 23, 27, 28 & 30).

The key to the data below is as follows:

icwt initial cup weight
hcwt hot cup weight
fcwt final cup weight after cooling
ih.diff difference between hot and initial weight (hcwt-icwt)
hf.diff difference between final and hot weight (fcwt-hcwt)
**if.diff** difference between final and initial weight (fcwt-icwt)

Results

Table 1: Raw Data

cup	run	icwt	hcwt	fcwt	ih.diff	hf.diff	if.diff
c22	1	63.0197	63.0118	63.0169	-0.0079	0.0051	-0.0028
c23	1	63.0574	63.0505	63.0552	-0.0069	0.0047	-0.0022
c27	1	63.125	63.1199	63.1239	-0.0051	0.004	-0.0011
c28	1	63.1879	63.1801	63.1853	-0.0078	0.0052	-0.0026
c30	1	63.0645	63.0597	63.0631	-0.0048	0.0034	-0.0014
c22	2	63.0121	63.0075	63.0103	-0.0046	0.0028	-0.0018
c23	2	63.0539	63.0484	63.0515	-0.0055	0.0031	-0.0024
c27	2	63.1214	63.1175	63.1199	-0.0039	0.0024	-0.0015
c28	2	63.1886	63.1833	63.1864	-0.0053	0.0031	-0.0022
c30	2	63.0616	63.0577	63.0603	-0.0039	0.0026	-0.0013
c22	3	63.0103	63.0035	63.0077	-0.0068	0.0042	-0.0026
c23	3	63.0515	63.045	63.0492	-0.0065	0.0042	-0.0023
c27	3	63.1199	63.1144	63.1177	-0.0055	0.0033	-0.0022
c28	3	63.1864	63.1802	63.1847	-0.0062	0.0045	-0.0017
c30	3	63.0603	63.0539	63.0578	-0.0064	0.0039	-0.0025

Plots and summary statistics

Scatterplots of weight differences between the
three phases of weighings for each cup
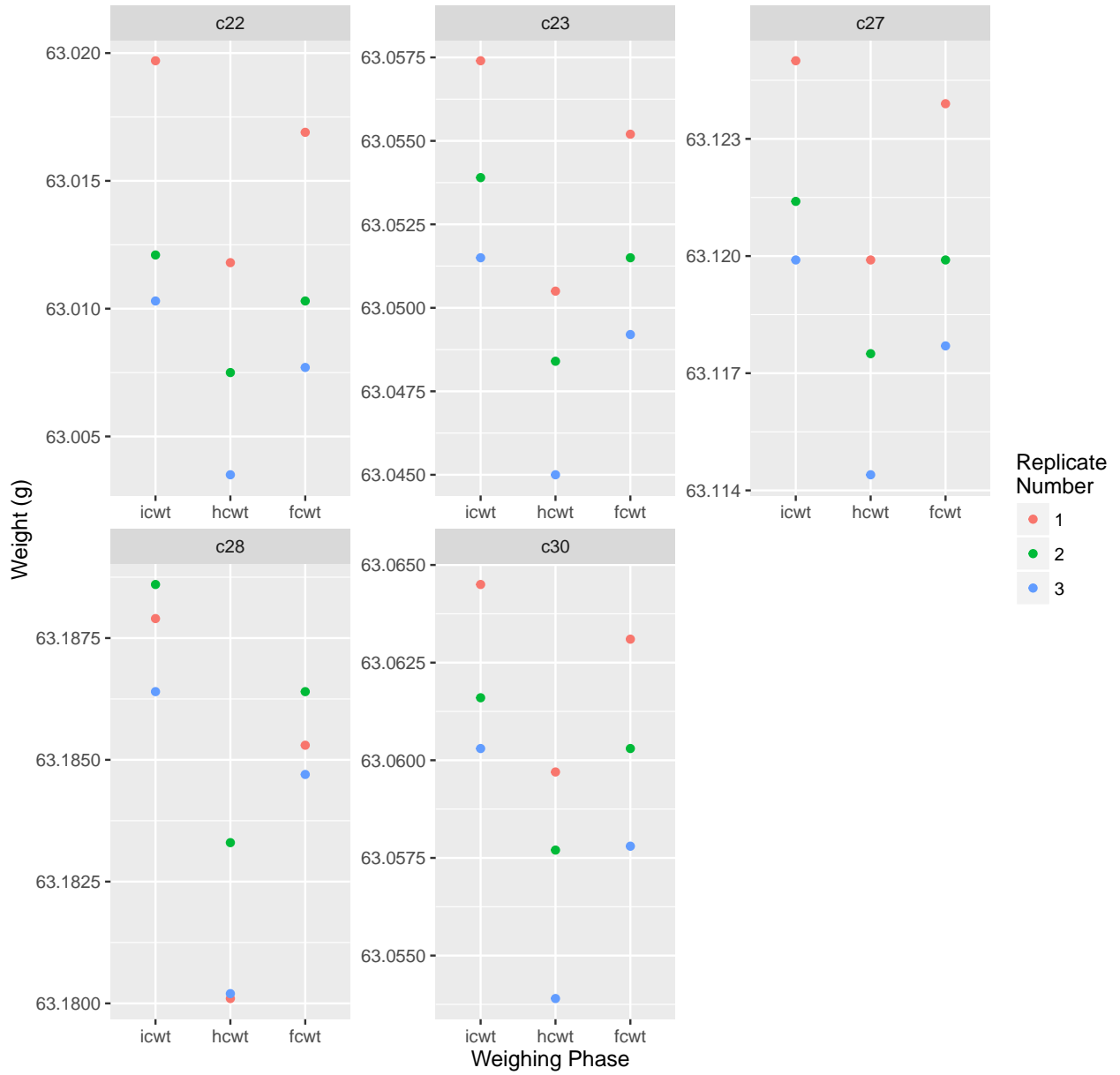
Scatterplots of weight differences between the three phases of weighings for each cup
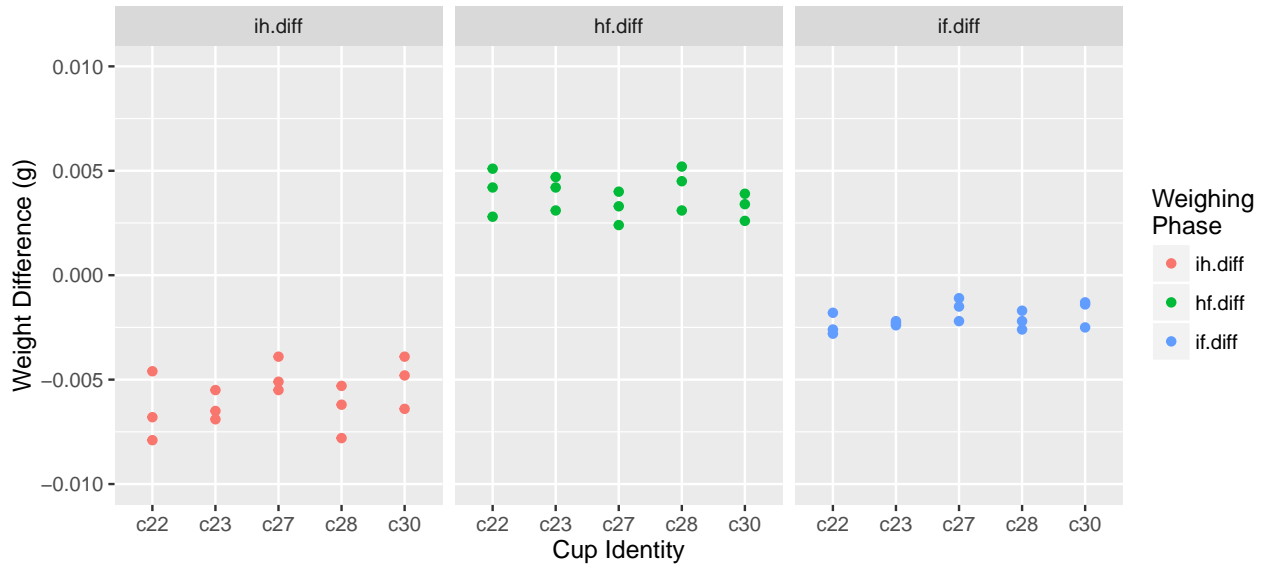
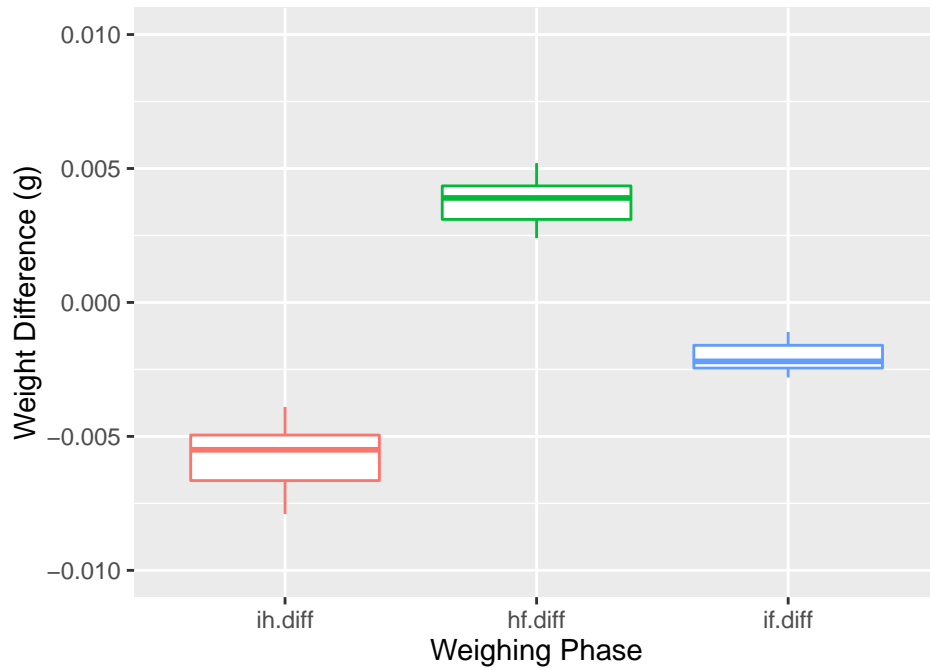Boxplot of weight differences between the three phases of weighings for each cup

Table 2: Hot Weighing Test Data - Summary Statistics.

temp	n	wt	
		mean	sd
icwt	15	63.0880333	0.0627899
hcwt	15	63.0822267	0.0628390
fcwt	15	63.0859933	0.0628958
ih.diff	15	-0.0058067	0.0012595
hf.diff	15	0.0037667	0.0008902
if.diff	15	-0.0020400	0.0005343

Conclusion

The difference between weighing the test chambers at 37 $\pm2°$C and 23 $\pm2°$C is at most 0.01g.

The SMTL have recently tested a selection of 50 foam wound dressings for fluid handling capacity in the NHS Wales Wound Management contract. The lowest weight loss recorded in the test was 5.190g (i.e. FHC of 5.190g). Therefore the 0.01g difference in weighing hot and room temperature test cups is less than 0.2% of the lowest FHC dressing, which in our view is insignificant.

Most dressings tested gave much higher Total FHC, and the effect would be even smaller on these.

We therefore believe that we can remove the 30 minute acclimatisation step from the FHC test.

Note that the MVTR method does **not** include this step anyway.