

**Client:** Don Whitley Scientific  
**Project:** RABIT case study  
**Status:** FSA approved  
**Date:** 17.1.08

1 **MINIMISING MICROBIAL RISKS IN INFANT MILK FORMULA**

2 Equipment manufactured by Don Whitley Scientific Ltd (ShIPLEY, UK) is being used in  
3 a new study looking at bacteria in infant formula powders. Dr Steven Forsythe's  
4 research group at Nottingham Trent University is investigating how quickly  
5 Enterobacteriaceae such as *Salmonella*, *Enterobacter sakazakii*, *Escherichia coli*,  
6 *Klebsiella pneumonia* and *Citrobacter freundii* can grow in reconstituted powdered  
7 infant formula. In order to study the growth rates of these organisms over a range of  
8 temperatures, they are using the Rapid Automated Bacterial Impedance Technique  
9 (RABIT) from Don Whitley Scientific.

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11 The bacteria *Salmonella* and *Enterobacter sakazakii* have been associated with  
12 illness attributed to powdered infant formula. *Enterobacter sakazakii* is associated with  
13 infection of immuno-compromised individuals, especially newborn babies. As cases  
14 have been associated with contaminated powdered infant formula, the European Food  
15 Safety Authority's (EFSA) Scientific Panel on Biological Hazards cites *Enterobacter*  
16 *sakazakii* and *Salmonella* as the pathogens of greatest concern. Although infections  
17 with these bacteria from formula milk are relatively rare, powdered infant formula is  
18 not sterile and microbial contamination can cause serious illness. In December 2006,  
19 the Department of Health (DH) and the Food Standards Agency (FSA) issued revised

20 guidance for health professionals on the safe preparation, storage and handling of  
21 powdered infant formula milk to reduce these risks.

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23 Good hygiene practices are essential in preparing and storing feeds made from  
24 powdered formula. EFSA, DH and the FSA recommend allowing boiled water to cool  
25 to no less than 70°C, which in practice means using water that has been covered for  
26 less than 30 minutes after boiling. After reconstitution, the powdered infant formula  
27 should be cooled to an appropriate feeding temperature. It is recommended that feeds  
28 are used within two hours of preparation, as the length of time for which reconstituted  
29 formula is stored increases the risk of bacterial growth and therefore infection. In order  
30 to further refine advice regarding the microbiological safety of powdered infant  
31 formula, the FSA is supporting studies examining optimal storage times and  
32 conditions in further detail.

33  
34 A versatile and cost effective rapid bacterial detection method, the RABIT is used to  
35 measure changes in the culture medium's electrical conductance that occur when  
36 charged metabolites are produced by the bacteria of interest. Dr Forsythe's group is  
37 using six separate modules at different temperatures to measure samples at set time  
38 intervals over a range of dilutions. A calibration curve is produced for each organism,  
39 where the time to detection is directly proportional to the growth rate and indicative of  
40 real-time microbial activity.

41  
42 Allowing data export to all standard spreadsheet and database programs, the  
43 automated system's intuitive software simplifies sample entry and results analysis.

44 Quality-assured results are available more quickly than with traditional microbiological  
45 methods, improving both sample throughput and laboratory efficiency.

46  
47 This approach is used in Dr Forsythe's laboratory instead of inoculating large numbers  
48 of culture plates with different incubation times and temperatures, and is much less  
49 labour intensive and less time consuming. Using the manual plate method, samples at  
50 each time point would need to be collected, diluted, plated, incubated overnight and  
51 counted the following day.

52  
53 Dr Forsythe's research is due to be completed in September 2008 and the final report  
54 will be available via the Agency's website (<http://www.food.gov.uk>).

55 **ENDS**

56 **Editor's note:**

57 Don Whitley Scientific Limited is an independent family owned business founded by  
58 Don Whitley in 1976. It has rapidly grown to be a leading supplier of innovative  
59 equipment to the microbiology industry and a leading microbiology contract laboratory.  
60 The company sells to both public and private sectors throughout the world from its  
61 base in Shipley, West Yorkshire.

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