

No. 06/06 March 2006

SURVEY OF BENZENE IN SOFT DRINKS

Summary

- Benzene has been detected sporadically at low levels in some soft drinks containing sodium benzoate and ascorbic acid (vitamin C). Sodium benzoate is added as a preservative to prevent mould growing in the drinks and vitamin C may be used as an antioxidant or be present naturally.
- In this survey 150 drinks were collected from four regions in the UK from both supermarkets and independent shops. The samples consisted of concentrates (squashes), carbonated drinks and ready-to-drink still drinks.
- The majority of the drinks contained benzoates and ascorbic acid, which are thought to react to form benzene. A limited number of mango juices and cranberry drinks were chosen as these fruits have been found to naturally contain benzene. In addition, a small number of drinks containing ascorbic acid and alternative preservatives such as sorbates or sulphur dioxide were chosen to help establish whether benzene was occurring from sources other than sodium benzoate.
- Out of 150 soft drinks sampled, 107 (ca. 70%) did not contain detectable levels of benzene.
- The levels of benzene reported in this survey will only make a negligible impact on peoples overall exposure to benzene and so any additional risk to health is therefore likely to be negligible.
- There are no statutory limits for benzene in soft drinks. The Food Standards Agency has drawn on the WHO guidelines for safe levels in drinking water as an appropriate comparator.

- Four products contained average levels of benzene above 10 µg/kg: Co-op low calorie bitter lemon (2 products, 28 and 11 µg/kg), Popstar lemon and lime flavour still (17 µg/kg), Hyberry high juice blackcurrant squash (no added sugar) (12 µg/kg as purchased) and Morrison pineapple and grapefruit crush (no added sugar) (11 µg/kg). The Agency has asked the relevant companies to remove these products from sale.
- The Food Standards Agency has asked the soft drinks industry to ensure that levels of benzene are kept as low as practicable.

Background

Benzene has been detected sporadically at low levels in some soft drinks, it is thought that this occurs as a result of an interaction between the preservative sodium benzoate and ascorbic acid (vitamin C). Sodium benzoate is added as a preservative to prevent mould growing in the drinks and vitamin C may be used as an antioxidant or which may be naturally present.

People who have inhaled very high levels of benzene in the work place have been found to have an increased risk of cancer. Benzene is present in the atmosphere from exhaust emissions. On average people breathe in 220 micrograms of benzene every day. For smokers cigarette smoking is the main source of exposure at 7900 micrograms per day.¹

There is no legal limit for benzene in soft drinks in the UK. The World Health Organisation (WHO) has set a guideline level for benzene in water of 10 µg/kg.

Following reports of benzene in some soft drinks in the US, the Food Standards Agency asked the UK soft drinks industry to provide information on levels in soft drinks sold in the UK. The Agency received aggregate summary data from tests carried out on 230 drinks on sale in the UK. The information provided contained limited details. The highest level of benzene found in the industry data was 8 micrograms per litre of soft drink. Most levels reported were much lower than this.

The survey reported here was conducted to provide the Agency with details on the possible presence of benzene in soft drinks in the UK.

Methodology

Sampling

In total 150 samples of soft drinks were purchased by Ventress Technical Ltd. (Ventress), in March 2006 from four regions in the UK. The majority of samples were purchased in triplicate with samples bearing the same batch codes and best before dates.

The samples consisted of concentrates (squashes), carbonated drinks and ready-to-drink still drinks. These also included mixers and sports/health/energy drinks. The majority of the drinks contained benzoates and ascorbic acid. A limited number of mango juices and cranberry drinks were chosen as these fruits have been found to naturally contain benzene. In addition, a small number of drinks, containing ascorbic acid and alternative preservatives such as sorbates or sulphur dioxide, were included to help identify whether benzene was occurring from sources other than sodium benzoates.

A breakdown of the products tested is given below.

- 56 carbonated drinks
- 55 ready-to-drink still drinks
- 39 concentrates (squashes)

The four areas sampled in the UK are given below:

- Belfast and district (4 samples),
- London (6 samples)
- Manchester (4 samples)
- Cambridge and district (136 samples)

When a sample was found to contain a level of benzene above 2 µg/kg, another sample of this product was purchased with a different batch code and best before date to be analysed by RSSL. However, some of these products are still being collected by Ventress, as products with a different batch code are not yet available from shops.

Samples were purchased from different types of shops: 97 from large supermarkets; 36 from smaller retailers (including independent grocers); and 17 from 'impulse purchases' i.e. newsagents and service stations.

Following purchase of triplicate samples, digital images were taken and labelling and packaging details recorded. One of the three samples was despatched to RSSL under appropriate conditions (i.e. chilled if necessary) for analysis in batches. The remaining samples were retained by Ventress under dark and cool conditions (below 15°C).

Fifteen samples were also sent to CSL for confirmatory analysis. Nine samples were chosen as RSSL original analysis reported benzene levels at 5 µg/kg or above and the six remaining samples were selected at random.

Table 1 lists product details for the samples collected for this survey.

Analytical Methodology

RSSL method

The method of analysis was the RSSL in-house method number TM276 which utilises SPME (solid phase microextraction) and GC-MS (gas chromatography-mass spectrometry).

A quantity of sample (10 g) was transferred to a headspace vial and deuterated benzene was added as an internal standard. The headspace was sampled by absorption onto a SPME fibre (75µm carboxen/polydimethylsiloxane). This was followed with analysis by GC-MS in the full scan mode.

Quantification was achieved using the internal standard of deuterated benzene and an external calibration curve of benzene normalised against the internal standard.

Samples were analysed in batches of up to 10 samples. The limit of quantification (LOQ) for the method was 1 µg/kg (although traces of benzene could be confirmed at levels below this).

The results for this survey are given in Tables 2-4.

CSL method

The method of analysis was the CSL in-house method which utilises headspace and GC-MS (gas chromatography-mass spectrometry).

A quantity of sample (5 g) was transferred to a headspace vial and deuterated benzene and fluorobenzene were added as internal standards.

An aliquot of the headspace was analysed by GC-MS.

Quantification was achieved using the internal standard of deuterated benzene (or fluorobenzene) and an external calibration curve of benzene normalised against the internal standard.

The limit of quantification (LOQ) for the method was 1 µg/kg (although traces of benzene could be confirmed at levels below this).

Standard Solutions

RSSL method

An external calibration of benzene containing five standards ranging between 0 to 30 µg/kg was prepared fresh on the day of analysis.

CSL method

An external calibration of benzene containing six standards ranging between 0 to 25 µg/kg was prepared fresh on the day of analysis.

Quality Control (QC) Samples

RSSL method

A check standard of 10 µg/kg benzene was analysed after every 10th sample.

CSL method

Representative carbonated drinks over-spiked with benzene at 5 µg/kg, together with a proficiency test sample (LEAP scheme) shown to contain a mean residue level of 8.02 µg/kg, were analysed with each batch.

RSSL SPME/GC Analysis

The SPME autosampler was a CTC Combi Pal. The GC-MS system comprised of a Thermo Trace Ultra gas chromatogram coupled directly to a Thermo DSQ mass spectrometer.

CSL Headspace/GC Analysis

Analysis was carried out using either a Perkin Elmer HS40 autosampler coupled to an Agilent 5890 gas chromatograph and 5972 mass selective detector or an Agilent G1888 autosampler coupled to an Agilent 6890N gas chromatograph and a 5973 mass selective detector.

Quality Assurance

RSSL method

A deuterated benzene internal standard was used during the survey. The following quality assurance protocols also included:

- Any sample found to have benzene present at or above 2 ppb was re-analysed by RSSL.

The RSSL coefficient of variation (CV) for benzene is 3 percent for concentrations of 5 µg/kg.

CSL method

A deuterated benzene (and fluorobenzene) internal standard was used during the survey.

Each sample was also analysed in duplicate using independently prepared calibration solutions and different GC-MS systems by two analysts.

It is estimated that the measurement of uncertainty is approximately 20%.

Reporting

Brand names have been reported as outlined in the Guidelines for Food Standards Agency Technical Surveys² in October 2003. The absence of a particular brand from Table 1 means only that the brand was not sampled in the survey. No further meaning should be read into its absence from this report.

Results, Interpretation and Action

Results are given in Tables 2-5. RSSL results are given in Table 2 and 3, where Table 3 shows the duplicate analysis results for samples with 2 µg/kg or above and also the results for samples with a different batch code to those already obtained are included in this Table.

From the results obtained by RSSL, forty-one samples contained benzene at or above the Limit of Quantification, LOQ (1 µg/kg). One sample contained levels of benzene at 23 micrograms per kilogram.

Table 3 shows that for the 10 drinks for which another sample from a different batch was analysed (as the first product had a result of 2 µg/kg or above), 6 drinks contained undetectable levels of benzene.

The results of the 15 samples analysed by CSL are given in Table 4, and Table 5 shows a comparison of the results obtained by RSSL and CSL for these samples, and an average of the results.

For products where the average of the results was above 10 µg/kg (the World Health Organisation guideline level for benzene in water), action was taken to remove these from sale. These products are Co-op low calorie bitter lemon (2 products 28 and 11 µg/kg) Popstar lemon and lime flavour still (17 µg/kg), Hyberry high juice blackcurrant squash (no added sugar) (12 µg/kg as purchased) and Morrison pineapple and grapefruit crush (no added sugar) (11 µg/kg).

Benzene was not detected in products that did not contain sodium benzoate and ascorbic acid. Based on the results obtained there were indications that dilutable drinks are less likely to contain benzene than carbonates or ready to drink still drinks

The brand owners of samples with detectable levels of benzene were invited to provide comments on their results, which can be found in Annex 1.

References

1. European Commission Joint Research Centre, HEXPOC Human Exposure Characterization of chemical substances; quantification of exposure routes, p 36-59, 2005, EU 21501 EN
2. Food Standards Agency Guidelines for Food Standards Agency Technical Surveys, October 2003.

Further Information

Units

µg/kg = micrograms per kilogram

Further copies of this Information Sheet can be obtained from:

Library

Food Standards Agency

Ground Floor

Aviation House

125 Kingsway

London WC2B 6NH

Tel: +44 (0) 20 7276 8281/8182

Fax: +44 (0) 20 7276 8193

E-mail: library&info@foodstandards.gsi.gov.uk.

Table 1: Details of samples obtained

Sample code	Product as described	Brand	Manufacturer	Pack size	Country of origin	Best before/use by date	Batch code	Time code	Date purchased/sampled	Declared preservative	Place of purchase
06-207-001	Original Ribena blackcurrant drink	Ribena	GlaxoSmithKline	1 litre		FEB 2007	086F	05:14 (x3)	06.03.06	E211, E222	Tesco
06-207-002	Apple - no added sugar	Robinsons Fruit Shoot	Robinsons Soft Drinks Ltd	300ml		APR 06	N852110050		08.03.06	E211, E202, E242	Bottisham Costcutter
06-207-003	Original Lucozade energy drink	Lucozade	GlaxoSmithKline	1 litre		JAN 2007	046F D	16:47 (x3)	06.03.06	E211, E222	Tesco
06-207-004	Orange squash	Kia-ora	Coca-Cola Enterprises Ltd	1 litre		SEP 06	AS250SC7	12:04 (x2) 12:03 (x1)	08.03.06	E211, E223	Bottisham Costcutter
06-207-005	Vimto - no added sugar	Vimto	Vimto Soft Drinks	725ml		JUL 06	L35152	08:43 (x3)	08.03.06	E211, E202	Bottisham Costcutter
06-207-006	Strawberry	Robinsons Fruit Shoot	Robinsons Soft Drinks Ltd	300ml		JUN 06	N852651937		08.03.06	E211, E202, E242	Bottisham Costcutter
06-207-007	Peach high juice	Robinsons	Robinsons Soft Drinks Ltd	1 litre		JUL 06	N115203	22:38 (x3)	08.03.06	E211, E202, E223	Bottisham Costcutter
06-207-008	High juice apple squash	Tesco	Tesco Stores Ltd	1 litre	UK	JAN 07	076021	03:53 (x1) 03:54 (x2)	06.03.06	E211, E223	Tesco
06-207-009	Cox apple and elderflower crush drink	Sainsbury's	Sainsbury's Supermarkets Ltd	1.5 litre	UK	OCT 06	26025	16:12 (x1) 16:13 (x1) 16:09 (x1)	08.03.06	E211, E202	Sainsbury's
06-207-010	Apple and melon fizzy fruit - no added sugar	Sainsbury's	Sainsbury's Supermarkets Ltd	2 litre	UK	JUL 06	36039	14:51 (x1) 13:14 (x1) 14:30 (x1)	08.03.06	E202, E211	Sainsbury's
06-207-011	Fruit crush pineapple & grapefruit	Lilt	Coca-Cola Enterprises Ltd	330ml		MAY 06	B319MK2	15:42 (x3)	08.03.06	E211	Mace
06-207-012	Aqua Blackberry Boost drink - sugar free	Tesco	Tesco Stores Ltd	1.5 litre	Ireland	JAN 07	6018	11:53 (x3)	06.03.06	E211	Tesco
06-207-013	Sparkling diet orange	Tesco	Tesco Stores Ltd	2 litre	UK	JUL 06	C1 6022	20:38 (x3)	06.03.06	E211, E202, E223	Tesco
06-207-014	Mixed fruit squash	Kia-ora	Coca-Cola Enterprises Ltd	1 litre		DEC 06	AS338SC8	18:56 (x3)	07.03.06	E211, E223	Thing Me Bobs
06-207-015	Orange, lemon and pineapple squash	Spar	Spar (UK) Ltd	1 litre		DEC 06	D4 5338	11:52 (x3)	08.03.06	E211, E233	Spar
06-207-016	Citrus clear	Lucozade Energy	GlaxoSmithKline	380ml		APR 2006	425AA	22:16 (x3)	06.03.06	E211, E222	Tesco
06-207-017	Icy Lemon	Fanta	Coca-Cola Enterprises Ltd	500ml		JUL 06	A041WA9	14:37 (x3)	06.03.06	E211	Tesco
06-207-018	Lemon and lime	Oasis Light	Coca-Cola Enterprises Ltd	500ml		MAR 06	A272WAA	16:17 (x3)	08.03.06	E211, E202, E452	Lusher News
06-207-019	Isotonic orange flavour sports drink	Asda	Asda Stores Limited	500ml	UK	JUL 06	PAH 6(5?)033	19:24 (x2) 19:23 (x1)	07.03.06	E202, E211	Asda
06-207-020	Orange glucose energy drink	Asda	Asda Stores Limited	1 litre	UK	OCT 2006	6032 K3A	19:57 (x2) 19:58 (x1)	07.03.06	E211, E223	Asda
06-207-021	Blackcurrant flavour still drink - sugar free	Popstar	The Silver Spring Mineral Water Company Ltd	330ml		02 OCT 06	55A L6005	00:44 (x3)	08.03.06	E211	Lusher News

Sample code	Product as described	Brand	Manufacturer	Pack size	Country of origin	Best before/use by date	Batch code	Time code	Date purchased/sampled	Declared preservative	Place of purchase
06-207-022	Mixed berry	Lucozade Sport	GlaxoSmithKline	500ml		SEP 2006	495CC	01:35 (x3)	08.03.06	E211, E202	Spar
06-207-023	Low calorie bitter lemon	Asda	Asda Stores Limited	1 litre	UK	JUL 2006	6035 K3B	07:13 (x3)	07.03.06	E211, E220	Asda
06-207-024	Orange breaker frantic fruit frenzee	Spar	Spar (UK) Ltd	500ml		OCT 2006	6027K3A	20:36 (x3)	08.03.06	E211	Spar
06-207-025	Blackcurrant & apple - no added sugar	Robinsons Fruit Shoot	Robinsons Soft Drinks Ltd	300ml		OCT 06	N860191534		07.03.06	E211, E202, E242	Asda
06-207-026	Original florida style drink	Sunny Delight	Gerber Foods Soft Drinks Ltd	500ml		08-05-06	6009109920 2057		08.03.06	E202, E452	Spar
06-207-027	Fruit juice fizzy drink	Vimto	Vimto Soft Drinks	2 litre		OCT 06	K4B5365	02:41 (x3)	08.03.06	E202, E211	Spar
06-207-028	Cranberry classic juice drink	Ocean Spray	Gerber Foods Soft Drinks Ltd	1 litre		AUG 06	H35336	11:11 (x3)	08.03.06	None declared	Spar
06-207-029	Blackcurrant squash - no added sugar	Spar	Spar (UK) Ltd	1 litre		Aug 06	5317 D4	08:27 (x3)	08.03.06	E211, E223	Spar
06-207-030	Lemon and lime flavour still drink - sugar free	Popstar	The Silver Spring Mineral Water Company Ltd	330ml		22 APR 06	SSL5207	19:46 (x3)	08.03.06	E211	Lusher News
06-207-031	Lemon	Lucozade Energy	GlaxoSmithKline	380ml		APR 2006	415EB	17:12 (x3)	08.03.06	E211, E222	Lusher News
06-207-032	Tropical	Lucozade Energy	GlaxoSmithKline	380ml		MAY 2006	485BB	05.06	08.03.06	E211, E222	Lusher News
06-207-033	Original lemonade made with real lemons	Schweppes	Coca-Cola Enterprises Ltd	2 litre		JUL 06	A334EM2	05:20 (x3)	08.03.06	E211	Spar
06-207-034	Diet sparkling florida orange	Marks and Spencer	Marks and Spencer Plc	500ml	UK	24/08/2006	DU 27/07/2006 C	20:48 (x3)	08.03.06	E211, E220	Marks and Spencer
06-207-035	Bitter lemon	Marks and Spencer	Marks and Spencer Plc	500ml		18/05/06	DU 04/06/06 G		08.03.06	E211, E202	Marks and Spencer
06-207-036	Blackcurrant high juice	Marks and Spencer	Marks and Spencer Plc	1 litre	UK	20/07/06	DU 22/06/06 M		08.03.06	E211, E202, E223	Marks and Spencer
06-207-037	Fizzy Vimto	Vimto	Vimto Soft Drinks	150 ml		JAN 07	L2A5288	08:54 (x3)	08.03.06	E211, E202	Woolworths
06-207-038	Orange - NAS	Panda Still	Vimto Soft Drinks	330ml		JUN 06	K2C58(3?)1 2	00:29 (x3)	08.03.06	E211, E202	Woolworths
06-207-039	Raspberry - NAS	Panda Still	Vimto Soft Drinks	330ml		JUN 06	K2C5322	12:40 (x3)	08.03.06	E211, E202	Woolworths
06-207-040	Blackcurrant - NAS	Panda Still	Vimto Soft Drinks	330ml		JUN 06	K2C5327	10:23 (x3)	08.03.06	E211, E202	Woolworths
06-207-041	Pineapple and grapefruit fruit crush	Lilt	Coca-Cola Enterprises Ltd	500 ml		JUN 06	A011WA9	08:08 (x3)	08.03.06	E211	Woolworths
06-207-042	Cranberry and raspberry high juice	Marks and Spencer	Marks and Spencer Plc	1 litre	UK	18/05/06	DU 20/04/06 I		08.03.06	E211, E202, E223	Marks and Spencer
06-207-043	High juice orange squash - no added sugar	Tesco	Tesco Stores Ltd	1 litre	UK	FEB 07	D76032	09:50 (x3)	08.03.06	E211, E223	Tesco
06-207-044	Original Vimto	Vimto	Vimto Soft Drinks	725 ml		FEB 07	L36028	11:44 (x3)	08.03.06	E211, E202	Tesco
06-207-045	Active Energy sparkling orange glucose high energy drink	Tesco	Tesco Stores Ltd	380ml	UK	AUG 06	SSTB L5341	05:06 (x3)	08.03.06	E211, E223	Tesco
06-207-046	High juice apple and blackcurrant squash - no added sugar	Tesco	Tesco Stores Ltd	1 litre	UK	FEB 07	D76033	13:31 (x3)	08.03.06	E211, E223	Tesco
06-207-047	Glucose energy drink	Spar	Spar (UK) Ltd	500ml		SEP 2006	5338 K3A	01:00 (x3)	09.03.06	E211, E223	Spar

Sample code	Product as described	Brand	Manufacturer	Pack size	Country of origin	Best before/use by date	Batch code	Time code	Date purchased/sampled	Declared preservative	Place of purchase
06-207-048	Orangeade - sugar free	Tesco	Tesco Stores Ltd	2 litre	UK	JUN 06	5362 C1	01:19 (x1) 00:15 (x1) 01:20 (x1)	08.03.06	E211, E202	Tesco
06-207-049	Orange and pineapple squash	Kia-ora	Coca-Cola Enterprises Ltd	1 litre		MAY 06	AS146SC8	10:12 (x3)	08.03.06	E211, E223	Costcutter - Burwell Stores
06-207-050	Orange squash - no added sugar	Jucee	Princes Soft Drinks	2 litre	UK	OCT 06	6020 D6	14:57 (x3)	08.03.06	E211, E223	Costcutter - Burwell Stores
06-207-051	Orange juice drink	Libby's	Libby's C Consumer Service	1 litre		MAY 06	L5234 1	04:20 (x3)	08.03.06	None declared	Costcutter - Burwell Stores
06-207-052	Orangeade - no added sugar	Heritage	Nisa Today's (Holdings) Ltd	2 litre		MAR 06	5257 C1	20:58 (x3)	08.03.06	E211, E202	Costcutter - Burwell Stores
06-207-053	Mixed citrus	Lucozade Sport	GlaxoSmithKline	500 ml		JUN 2006	515C C	14:31 (x3)	08.03.06	E211, E202	Mace
06-207-054	Lime flavour cordial	Co-op	Co-operative Group (CWS) Ltd	1 litre	UK	DEC 06	6004 D4	23:57 (x3)	08.03.06	E211, E223	Co-op
06-207-055	Low calorie bitter lemon	Co-op	Co-operative Group (CWS) Ltd	1 litre	UK	10AUG06	L 6012 SSTG	19:51 (x3)	08.03.06	E211, E220	Co-op
06-207-056	Apple juice	Copella	Copella Fruit Juices	1 litre		11/04/06	CBW	12:48 (x1) 12:49(x2)	08.03.06	None declared	Co-op
06-207-057	Lemon and lime flavour drink - NAS	Co-op	Co-operative Group (CWS) Ltd	1 litre	UK	AUG 06	5320 D4	18:14 (x3)	08.03.06	E211, E223	Co-op
06-207-058	Orangeade - no added sugar	Co-op	Co-operative Group (CWS) Ltd	2 litre	UK	07SEP06	L6040 SSTC	22:11 (x3)	08.03.06	E211	Co-op
06-207-059	Orange glucose drink	Lucozade Energy	GlaxoSmithKline	1 litre		DEC 2006	515DD	19:34(x1) 19:33(x2)	09.03.06	E211, E222	Budgens
06-207-060	Isotonic orange flavour sports drink	Spar	Spar (UK) Ltd	500ml		MAY 06	K2C 5347	04:31 (x3)	09.03.06	E211, E202	Spar
06-207-061	Wild berry	Lucozade Energy	GlaxoSmithKline	380ml		JUN 2006	505FB	10:38 (x3)	09.03.06	E211, E222	Budgens
06-207-062	Tropical - no added sugar	Robinsons Fruit Shoot	Robinsons Soft Drinks Ltd	300ml		OCT 06	N8 60061001		09.03.06	E211, E202, E242	Spar
06-207-063	Orange and peach - no added sugar	Robinsons Fruit Shoot	Robinsons Soft Drinks Ltd	300ml		NOV 06	N8 60521419		09.03.06	E211, E202, E242	Spar
06-207-064	Mango exotic juice drink	Rubicon	Rubicon Products Ltd	1 litre		FEB 07	6032	11:39 (x3)	09.03.06	None declared	Waitrose
06-207-065	Ribena berry burst	Ribena	GlaxoSmithKline	1 litre		SEP 2006	505B	19:04 (x2) 19:48 (x1)	09.03.06	E211, E222	Sainsbury's
06-207-066	Bitter lemon	Waitrose	Waitrose Limited	1 litre	UK	AUG 2006	K3B 5345	16:37 (x1) 16:47 (x2)	09.03.06	E211	Waitrose
06-207-067	Bitter lemon low calorie	Waitrose	Waitrose Limited	1 litre	UK	AUG 2006	K3B 5331	06:53 (x3)	09.03.06	E211	Waitrose
06-207-068	High juice orange squash	Sainsbury's	Sainsbury's Supermarkets Ltd	1 litre	UK	OCT 06	D7 6011	10:46 (x3)	09.03.06	E211, E223	Sainsbury's
06-207-069	High juice tropical fruit	Sainbury's	Sainsbury's Supermarkets Ltd	1 litre	UK	OCT 06	D7 6018	04:16 (x2) 04:17 (x1)	09.03.06	E211, E233	Sainsbury's
06-207-070	Lemon and lime squash - no added sugar	Sainsbury's	Sainsbury's Supermarkets Ltd	1 litre	UK	OCT 06	D4 6017	10:23 (x3)	09.03.06	E211, E223	Sainsbury's
06-207-071	Apple squash - no added sugar	Sainsbury's	Sainsbury's Supermarkets Ltd	2 litre	UK	NOV 06	D6 6046	08:13 (x2) 08:10 (x1)	09.03.06	E211, E223	Sainsbury's

Sample code	Product as described	Brand	Manufacturer	Pack size	Country of origin	Best before/use by date	Batch code	Time code	Date purchased/sampled	Declared preservative	Place of purchase
06-207-072	Tropical fruit squash - NAS	Sainsbury's	Sainsbury's Supermarkets Ltd	1 litre	UK	NOV 06	D4 6037	14:30 (x3)	09.03.06	E211, E223	Sainsbury's
06-207-073	Cherry flavoured iced tea	Twinings	R. Twining and Company Limited	400ml		JUN 06	K2C 5153	23:04 (x1) 23:03 (x2)	09.03.06	E211, E242	Sainsbury's
06-207-074	Raspberry flavoured iced tea	Twinings	R. Twining and Company Limited	400ml		JUN 06	K2C 5175	10:41 (x1) 15:31 (x2)	09.03.06	E211, E242	Sainsbury's
06-207-075	Green tea & peach flavoured iced tea	Twinings	R. Twining and Company Limited	400ml		JUN 06	K2C 5152	12:14 (x3)	09.03.06	E211, E242	Sainsbury's
06-207-076	Sparkling elderflower spring	Waitrose	Waitrose Limited	1 litre	UK	DEC 06	094005347		09.03.06	E211	Waitrose
06-207-077	Green tea & lemon iced tea	Twinings	R. Twining and Company Limited	400 ml		JUN 06	K2C 5173	22:33 (x1) 22:58 (x1) 23:01 (x1)	09.03.06	E211, E242	Sainsbury's
06-207-078	Still cranberry juice	Boots Shapers	The Boots Company Plc	500ml		15AUG06	L6018 SSTB	21:35 (x2) 21:36 (x1)	11.03.06	E211, E202, E242	Boots
06-207-079	Pomegranate & raspberry still hi juice drink	Boots Delicious	The Boots Company Plc	500ml		06JUL06	L5342 SSB	22:42 (x3)	11.03.06	E211, E202, E242	Boots
06-207-080	Orange, pineapple and passion fruit still hi juice drink	Boots Delicious	The Boots Company Plc	500ml		15AUG06	L6018 SSTB	12:26 (x1) 12:27 (x2)	13.03.06	E211, E202, E242	Boots
06-207-081	Sparkling cloudy apple spring water drink	Boots Shapers	The Boots Company Plc	500ml		15AUG06	L6017 SSTB	15:58 (x3)	11.03.06	E211, E202, E242	Boots
06-207-082	Rock shandy	Club	C & C (Ireland) Ltd	2 litre		25JUL06	DL5 298	16:23 (x2) 15:52 (x1)	09.03.06	E211, E223	Supervalu
06-207-083	Pineappleade	C & C	C & C (Ireland) Ltd	2 litre		06SEP06	DL5 340	09:12 (x1) 08:12 (x2)	09.03.06	E211	Supervalu
06-207-084	Orange and pineapple - no added sugar	Mi Wadi	C & C (Ireland) Ltd	1 litre		20SEP06	DL6 020	08:42 (x3)	09.03.06	E211, E223	Supervalu
06-207-085	Mixed berry	Explosade	Aldi Stores	6 x 500 ml		AUG06	L6041		12.03.06	E211, E202	Aldi
06-207-086	Australian peachee	Bundaberg	Bundaberg Brewed Drinks UK Pty Ltd	340ml	Australia	11/04/06		13:38 (x1) 13:29 (x2)	09.03.06	E211, E202	Waitrose
06-207-087	Apple and blackcurrant - no added sugar	Fruit squeeze	The Silver Spring Mineral Water Company Ltd	6 x 330ml		26SEP06	L6059		11.03.06	E211, E202, E242	Netto
06-207-088	Mango	Maaza	Union Beverages Factory	1 litre		10 09 2006	P 11 09 2005 12 20		12.03.06	E211, E202	Nasreen Dar Supermarket
06-207-089	Pear and blackcurrant squash	Kia-ora	Coca-Cola Enterprises Ltd	1 litre		MAY 06	AS 130SC7	07:38 (x3)	12.03.06	E211, E223	Nasreen Dar Supermarket
06-207-090	Sparkling orange	Silver Spring	The Silver Spring Mineral Water Company Ltd	1 litre		01AUG06	L5308 SSTG	17:42 (x1) 17:43 (x2)	12.03.06	E211	Nasreen Dar Supermarket
06-207-091	Strawberry and mango	Slayker	464 Drinks Ltd	500ml		DEC 06	6039(8?)	09:39	13.03.06	E211, E202	Budgens Express
06-207-092	Peach and apple	Slayker	464 Drinks Ltd	500ml		DEC 06	6039	09:03	13.03.06	E211, E202	Budgens Express
06-207-093	Sparkling energy drink	VK Energy	Global Brands Ltd	250ml		MAR 07	L2A 5271	23:10 (x3)	13.03.06	E211	Budgens Express
06-207-094	Lemon and lime squash - no added sugar	Morrisons	W M Morrison Supermarkets Plc	2 litre		AUG 06	60375	09:30 (x3)	11.03.06	E211, E223	Morrisons

Sample code	Product as described	Brand	Manufacturer	Pack size	Country of origin	Best before/use by date	Batch code	Time code	Date purchased/sampled	Declared preservative	Place of purchase
06-207-095	Lemon and lime crush - no added sugar	Morrisons	W M Morrison Supermarkets Plc	2 litre		AUG 06	6041C3	19:14 (x3)	11.03.06	E211, E202	Morrisons
06-207-096	No added sugar orange crush	Morrisons	W M Morrison Supermarkets Plc	2 Litre		JUL 06	6026C2	08:03 (x1) 08:04 (x1) 10:20 (x1)	11.03.06	E211, E202, E223	Morrisons
06-207-097	Pineapple and grapefruit crush - NAS	Morrisons	W M Morrison Supermarkets Plc	2 Litre		JUL 06	6024C3	06:43 (x3)	11.03.06	E211	Morrisons
06-207-098	Orange, lemon and pineapple squash	Morrisons	W M Morrison Supermarkets Plc	1 Litre		AUG 06	60465	04:19 (x1) 04:17 (x1) 02:04 (x1)	11.03.06	E211, E223	Morrisons
06-207-099	Orangeade	Mace	Mace	330ml		MAY 2006	V1 L5196	07:56 (x3)	12.03.06	E211	Mace
06-207-100	Multi Vitamin	Christinen	Chritinen Brunnen	500ml		17.01.07	JY		12.03.06	E211, E202	Mace
06-207-101	High juice blackcurrant squash - NAS	Hyberry	Aldi Stores	1 Litre		SEP06	L4 5339	11:50 (x3)	12.03.06	E211, E223	Aldi
06-207-102	Fruity Shots - orange and peach	Sunsqueeze	Aldi Stores	6 X 330ml		SEP06	L6052		12.03.06	E211, E202, E242	Aldi
06-207-103	Orange crush - NAS	Netto	Netto Foodstores Ltd	2 Litre		OCT06	L6037SSQC	23:53 (x3)	12.03.06	E211, E202	Netto
06-207-104	Blackcurrant multivitamins juice drink no added sugar	C-Vit	GlaxoSmithKline	2 Litre		OCT 2006	036B	03:21 (x3)	12.03.06	E211, E202, E222	Netto
06-207-105	Orange and passionfruit fruit juice drink	Asda Jooce	Asda Stores Limited	4 x 330ml		MAY 06	5333 NO1	15:38 (x2), 16:53 (x1)	11.03.06	E211, E202, E242	Asda
06-207-106	High performance health and vitality for men	Wellman	Vitabiotics Ltd	250 ml		01 07	BN5265852 53L2A MF0905	13:59 (x3)	11.03.06	E211	Asda
06-207-107	Citrus isotonic pro>performance sports drink	Umbro	Calypso Soft Drinks Ltd	500 ml		SEP2006	5291	23:21 (x3)	11.03.06	E211, E202, E242	Asda
06-207-108	Orange energy drink	Explosade	Aldi Stores	1 Litre		OCT06	SST L6048	17:01 (x3)	12.03.06	E211, E223	Aldi
06-207-109	Tropical fruit squash	Jucee	Princes Soft Drinks	3 Litre	UK	NOV06	6044D5	19:42 (x1) 19:41 (x2)	12.03.06	E211, E223	Netto
06-207-110	Orange squash no added sugar	Somerfield	Somerfield Stores Ltd	1 Litre	UK	OCT06	6013 D4	21:44 22:11 22:18	14.03.06	E211, E223	Somerfield
06-207-111	Tropical fruit squash no added sugar	Somerfield	Somerfield Stores Ltd	1 Litre	UK	NOV06	6041 D4	19:17	14.03.06	E211, E223	Somerfield
06-207-112	High juice summer fruits squash	Hyberry	Aldi Stores	1 Litre		FEB 07	L4 6059	08:36 (x2) 08:09 (x1)	12.03.06	E211, E223	Aldi
06-207-113	Still Floridan orange juice spring water	Boots Shapers	The Boots Company Plc	500ml		15 AUG 06	L6018 SSTB	09:51 x 2 09:50 x 1	11.03.06	E211, E202	Boots
06-207-114	Cranberry & blueberry still hi juice drink	Boots Delicious	The Boots Company Plc	500ml		14 JUL 06	L5350 SSB	08:20	11.03.06	E211, E202, E242	Boots
06-207-115	Original energy drink	Explosade	Aldi Stores	1 litre		OCT 06	SST L6048	10:25	12.03.06	E211	Aldi
06-207-116	Bitter lemon	Asda	Asda Stores Limited	1 litre		OCT 2006	6035 K3B	11:03	11.03.06	E211, E220	Asda
06-207-117	Isotonic mixed berry flavour sports drink	Asda	Asda Stores Limited	500ml		AUG 06	6047 PAH	14:33	11.03.06	E211, E202	Asda
06-207-118	Orange	Explosade	Aldi Stores	6 x 500ml		SEP 06	SSTB L6060		12.03.06	E211, E202	Aldi
06-207-119	Orange squash	Jucee	Princes Soft Drinks	2 litre		OCT 06	6031 D6	14:10	12.03.06	E211, E223	Mace
06-207-120	Apple crush - NAS	Morrisons	W M Morrison Supermarkets Plc	2 litre		JUL 06	6023 C3	14:10	11.03.06	E211	Morrisons

Sample code	Product as described	Brand	Manufacturer	Pack size	Country of origin	Best before/use by date	Batch code	Time code	Date purchased/sampled	Declared preservative	Place of purchase
06-207-121	Fruity Shots - apple and blackcurrant	Sunsqueeze	Aldi Stores	6 X 330ml		SEP 06	L6053		12.03.06	E211, E242, E202	Aldi
06-207-122	Fruity Shots - strawberry and apple	Sunsqueeze	Aldi Stores	6 X 330ml		AUG 06	L6030		12.03.06	E211, E242, E202	Aldi
06-207-123	Orange squash - no added sugar	Kia-ora	Coca-Cola Enterprises Ltd	1 Litre		JUL 06	A 294SC8	04:06	11.03.06	E211, E202, E223	Morrisons
06-207-124	Still fruit salad	Smashers	The Silver Spring Mineral Water Company Ltd	500ml		13 JUN 06	L5253(8?) SSTG	04:34	19.03.06	E211	Mace
06-207-125	Still apple & blackberry	Smashers	The Silver Spring Mineral Water Company Ltd	500ml		28 APRIL 06	L5213 SST	08:57	19.03.06	E211	Mace
06-207-126	Icecream soda	Popstar	The Silver Spring Mineral Water Company Ltd	330ml		28 MAY 06	L5243 SS	20:08 x 2 20:07 x 1	19.03.06	E211	Mace
06-207-127	Irish sparkling orange	Finches	M & J Gleeson & Co	2 Litre		NOV 06	1402	14:53	10.03.06	E211, E223	Dunnes
06-207-128	Detox orange peach	Coolwater	Shannon Minerals Ltd	500ml		JAN 07	6013	11:39	19.03.06	E211, E202	One Stop Convenience Store
06-207-129	Still sherbert orange	Smashers	The Silver Spring Mineral Water Company Ltd	500ml		27 MAY 06	L5242 SST	19:38	19.03.06	E211	Mace
06-207-130	Orange glucose drink	Lucozade Energy	GlaxoSmithKline	330ml		JUL 06	5192 L1B	00:01	17.03.06	E211	Bottisham Costcutter
06-207-131	Icy lemon	Fanta	Coca-Cola Enterprises Ltd	330 ml		OCT 06	275WA2B	19:40 (x3)	17.03.06	E211	Lusher News
06-207-132	Lemon and lime flavour still drink - sugar free	Popstar	The Silver Spring Mineral Water Company Ltd	330 ml		30 JUL 06	L5306 SS	17:15	25.03.06	E211	Mace
06-207-133	Mango	Rubicon	Rubicon Products Ltd	500ml		OCT 06	6005 M3	11:46	18.03.06	E211, E202	V G Supermarket
06-207-134	Orange (pomaranczowa)	Mirinda	Pepsi Cola General Bottlers Poland	330ml		09/2006	601701124A	00:46	18.03.06	E211, E202	Bell News Food & Wine
06-207-135	High juice blackcurrant	Lind House	Lidl Uk GmbH	1 Litre		FEB 07	L460330	00:07 (x3)	17.03.06	E211, E223	Lidl
06-207-136	Orange drink	Freeway	Lidl Uk GmbH	2 Litre		SEP06	K4D 6017	20:49 (x3)	17.03.06	E211	Lidl
06-207-137	Summer fruits fruit and barley- no added sugar	Robinsons	Robinsons Soft Drinks Ltd	1 litre		JAN 07	6019 N12	04:20	19.03.06	E202, E223	One Stop Convenience Store
06-207-138	Orange	Tango	Robinsons Soft Drinks Ltd	500ml		MAR 06	5271 B3L	05:21	19.03.06	E202	Budgens
06-207-139	Apple & mango juice drink	J2O	Britvic Soft Drinks Ltd	275ml		OCT 06	5300 ZL3 1805		19.03.06	E202	Budgens
06-207-140	Still Florida orange style	Barr Simply Citrus	A G Barr plc	500ml		JUN 06	5271 M1	18:16 x 2, 18:15 x 1	19.03.06	E202, E242	Bell News Food & Wine
06-207-141	Green tea & peach flavoured iced tea	Twinings	R. Twining and Company Limited	400 ml		AUG 06	K2C 5221	02:16 x 2, 02:17 x 1	24.03.06	E211, E242	Asda

Sample code	Product as described	Brand	Manufacturer	Pack size	Country of origin	Best before/use by date	Batch code	Time code	Date purchased/sampled	Declared preservative	Place of purchase
06-207-142	Low calorie bitter lemon	Co-op	Co-operative Group (CWS) Ltd	1 Litre		JUN2006	5328 K3A	17:41 (x1) 14:43 (x1) 17:40 (x1)	17.03.06	E211	United Co-operatives Ltd
06-207-143	Orangeade - no added sugar	Co-op	Co-operative Group (CWS) Ltd	2 Litre		12SEP06	L6045 SSTC	15:02 (x1) 15:03 (x2)	17.03.06	E211	United Co-operatives Ltd
06-207-144	Ice tea - lemon	Lipton	Unilever UK	500ml		05/12/06	L5340 1559 FE		22.03.06	None declared	Sainsbury's
06-207-145	Vimto - NAS	Vimto	Vimto Soft Drinks	725 ml		MAR 07	L3 6040	00:54 x 100:56 x 2	21.03.06	E211, E202	Tesco
06-207-146	Bitter lemon low calorie	Waitrose	Waitrose Limited	1 litre	UK	SEPT 2006	K3B 6003	08:45 (x3)	22.03.06	E211	Waitrose
06-207-147	Apple - NAS	Robinsons Fruit Shoot	Robinsons Soft Drinks Ltd	300 ml		OCT 06	N8 6005	11:51	22.03.06	E211, E202, E242	Bottisham Costcutter
06-207-148	Pear and Blackcurrant squash	Kia-ora	Coca-cola Enterprises Ltd	1 litre		JAN 07	AS 004SC7	05:15	22.03.06	E211, E223	Bottisham Costcutter
06-207-149	High performance health and vitality for men	Wellman	Vitabiotics Ltd	250 ml		02 07	BN5278530 72 L2A MF1005	20:43	24.03.06	E211	Asda
06-207-150	Pineapple and grapefruit drink	Lilt	Coca-Cola Enterprises Ltd	500 ml		MAR 06	A 301WA9	16:20	25.03.06	E211	Bottisham Costcutter

Table 2 – Results of analysis for benzene (µg/kg) for samples as purchased (not as prepared for consumption)

Notes

< 1 = less than reporting limit of 1 µg/kg.

All the results are reported 'as purchased' e.g. the results have not been altered to take into account the recommended dilution factors.

Sample Code	Product as described	Brand	Recommended dilution Concentrate : Water	Date of analysis	Result of benzene µg/kg
06-207-001	Original Ribena blackcurrant drink	Ribena	1:5	10/03/2006	<1
06-207-002	Apple - no added sugar	Robinsons Fruit Shoot	-	11/03/2006	2
06-207-003	Original Lucozade energy drink	Lucozade	-	10/03/2006	<1
06-207-004	Orange squash	Kia-ora	1:4	11/03/2006	<1
06-207-005	Vimto - no added sugar	Vimto	1:4	11/03/2006	3
06-207-006	Strawberry	Robinsons Fruit Shoot	-	11/03/2006	<1
06-207-007	Peach high juice	Robinsons	1:4	11/03/2006	<1
06-207-008	High juice apple squash	Tesco	1:4	10/03/2006	<1
06-207-009	Cox apple and elderflower crush drink	Sainsbury's	-	11/03/2006	<1
06-207-010	Apple and melon fizzy fruit - no added sugar	Sainsbury's	-	11/03/2006	1
06-207-011	Fruit crush pineapple & grapefruit	Lilt	-	13/03/2006	<1
06-207-012	Aqua Blackberry Boost drink - sugar free	Tesco	-	10/03/2006	1
06-207-013	Sparkling diet orange	Tesco	-	10/03/2006	<1
06-207-014	Mixed fruit squash	Kia-ora	1:4	11/03/2006	<1
06-207-015	Orange, lemon and pineapple squash	Spar	1:4	10/03/2006	<1
06-207-016	Citrus clear	Lucozade Energy	-	10/03/2006	<1
06-207-017	Icy Lemon	Fanta	-	10/03/2006	1
06-207-018	Lemon and lime	Oasis Light	-	11/03/2006	<1
06-207-019	Isotonic orange flavour sports drink	Asda	-	10/03/2006	<1
06-207-020	Orange glucose energy drink	Asda	-	10/03/2006	<1
06-207-021	Blackcurrant flavour still drink - sugar free	Popstar	-	10/03/2006	<1
06-207-022	Mixed berry	Lucozade Sport	-	11/03/2006	<1
06-207-023	Low calorie bitter lemon	Asda	-	10/03/2006	<1
06-207-024	Orange breaker frantic fruit frenzee	Spar	-	11/03/2006	<1
06-207-025	Blackcurrant & apple - no added sugar	Robinsons Fruit Shoot	-	11/03/2006	<1
06-207-026	Original florida style drink	Sunny Delight	-	11/03/2006	<1
06-207-027	Fruit juice fizzy drink	Vimto	-	11/03/2006	<1
06-207-028	Cranberry classic juice drink	Ocean Spray	-	11/03/2006	<1
06-207-029	Blackcurrant squash - no added sugar	Spar	1:4	11/03/2006	<1
06-207-030	Lemon and lime flavour still drink - sugar free	Popstar	-	11/03/2006	7
06-207-031	Lemon	Lucozade Energy	-	11/03/2006	<1
06-207-032	Tropical	Lucozade Energy	-	11/03/2006	<1
06-207-033	Original lemonade made with real lemons	Schweppes	-	11/03/2006	<1
06-207-034	Diet sparkling florida orange	Marks and Spencer	-	13/03/2006	<1
06-207-035	Bitter lemon	Marks and Spencer	-	14/03/2006	<1
06-207-036	Blackcurrant high juice	Marks and Spencer	1:4	14/03/2006	<1
06-207-037	Fizzy Vimto	Vimto	-	22/03/2006	<1

Sample Code	Product as described	Brand	Recommended dilution Concentrate : Water	Date of analysis	Result of benzene µg/kg
06-207-038	Orange - NAS	Panda Still	-	14/03/2006	1
06-207-039	Raspberry - NAS	Panda Still	-	14/03/2006	<1
06-207-040	Blackcurrant - NAS	Panda Still	-	14/03/2006	<1
06-207-041	Pineapple and grapefruit fruit crush	Lilt	-	22/03/2006	7
06-207-042	Cranberry and raspberry high juice	Marks and Spencer	1:4	14/03/2006	<1
06-207-043	High juice orange squash - no added sugar	Tesco	1:4	14/03/2006	<1
06-207-044	Original Vimto	Vimto	1:4	21/03/2006	<1
06-207-045	Active Energy sparkling orange glucose high energy drink	Tesco	-	14/03/2006	<1
06-207-046	High juice apple and blackcurrant squash - no added sugar	Tesco	1:4	14/03/2006	<1
06-207-047	Glucose energy drink	Spar	-	16/03/2006	<1
06-207-048	Orangeade - sugar free	Tesco	-	14/03/2006	<1
06-207-049	Orange and pineapple squash	Kia-ora	1:4	14/03/2006	<1
06-207-050	Orange squash - no added sugar	Jucee	1:4	15/03/2006	<1
06-207-051	Orange juice drink	Libby's	-	15/03/2006	<1
06-207-052	Orangeade - no added sugar	Heritage	-	15/03/2006	<1
06-207-053	Mixed citrus	Lucozade Sport	-	15/03/2006	<1
06-207-054	Lime flavour cordial	Co-op	1:4	15/03/2006	<1
06-207-055	Low calorie bitter lemon	Co-op	-	16/03/2006	10
06-207-056	Apple juice	Copella	-	16/03/2006	<1
06-207-057	Lemon and lime flavour drink - NAS	Co-op	1:4	16/03/2006	<1
06-207-058	Orangeade - no added sugar	Co-op	-	16/03/2006	3
06-207-059	Orange glucose drink	Lucozade Energy	-	16/03/2006	<1
06-207-060	Isotonic orange flavour sports drink	Spar	-	16/03/2006	<1
06-207-061	Wild berry	Lucozade Energy	-	16/03/2006	<1
06-207-062	Tropical - no added sugar	Robinsons Fruit Shoot	-	16/03/2006	<1
06-207-063	Orange and peach - no added sugar	Robinsons Fruit Shoot	-	16/03/2006	<1
06-207-064	Mango exotic juice drink	Rubicon	-	16/03/2006	<1
06-207-065	Ribena berry burst	Ribena	1:5	16/03/2006	<1
06-207-066	Bitter lemon	Waitrose	-	16/03/2006	<1
06-207-067	Bitter lemon low calorie	Waitrose	-	16/03/2006	2
06-207-068	High juice orange squash	Sainsbury's	1:4	16/03/2006	<1
06-207-069	High juice tropical fruit	Sainbury's	1:4	16/03/2006	<1
06-207-070	Lemon and lime squash - no added sugar	Sainsbury's	1:4	16/03/2006	<1
06-207-071	Apple squash - no added sugar	Sainsbury's	1:4	16/03/2006	<1
06-207-072	Tropical fruit squash - NAS	Sainsbury's	1:4	16/03/2006	<1
06-207-073	Cherry flavoured iced tea	Twinings	-	16/03/2006	8
06-207-074	Raspberry flavoured iced tea	Twinings	-	16/03/2006	7
06-207-075	Green tea & peach flavoured iced tea	Twinings	-	16/03/2006	4
06-207-076	Sparkling elderflower spring	Waitrose	-	18/03/2006	<1
06-207-077	Green tea & lemon iced tea	Twinings	-	22/03/2006	2
06-207-078	Still cranberry juice	Boots Shapers	-	18/03/2006	1
06-207-079	Pomegranate & raspberry still hi juice drink	Boots Delicious	-	18/03/2006	<1
06-207-080	Orange, pineapple and passion fruit still hi juice drink	Boots Delicious	-	18/03/2006	1
06-207-081	Sparkling cloudy apple spring water drink	Boots Shapers	-	17/03/2006	1

Sample Code	Product as described	Brand	Recommended dilution Concentrate : Water	Date of analysis	Result of benzene µg/kg
06-207-082	Rock shandy	Club	-	17/03/2006	1
06-207-083	Pineappleade	C & C	-	17/03/2006	2
06-207-084	Orange and pineapple - no added sugar	Mi Wadi	1:4	17/03/2006	<1
06-207-085	Mixed berry	Explosade	-	21/03/2006	1
06-207-086	Australian peachee	Bundaberg	-	18/03/2006	1
06-207-087	Apple and blackcurrant - no added sugar	Fruit squeeze	-	18/03/2006	<1
06-207-088	Mango	Maaza	-	18/03/2006	2
06-207-089	Pear and blackcurrant squash	Kia-ora	1:4	18/03/2006	2
06-207-090	Sparkling orange	Silver Spring	-	18/03/2006	5
06-207-091	Strawberry and mango	Slayker	-	18/03/2006	<1
06-207-092	Peach and apple	Slayker	-	18/03/2006	<1
06-207-093	Sparkling energy drink	VK Energy	-	18/03/2006	<1
06-207-094	Lemon and lime squash - no added sugar	Morrison's	1:4	18/03/2006	<1
06-207-095	Lemon and lime crush - no added sugar	Morrison's	-	18/03/2006	3
06-207-096	No added sugar orange crush	Morrison's	-	21/03/2006	<1
06-207-097	Pineapple and grapefruit crush - NAS	Morrison's	-	22/03/2006	7
06-207-098	Orange, lemon and pineapple squash	Morrison's	1:4	22/03/2006	<1
06-207-099	Orangeade	Mace	-	17/03/2006	2
06-207-100	Multi Vitamin	Christinen	-	17/03/2006	<1
06-207-101	High juice blackcurrant squash - NAS	Hyberry	1:4	21/03/2006	9
06-207-102	Fruity Shots - orange and peach	Sunsqueeze	-	21/03/2006	<1
06-207-103	Orange crush - NAS	Netto	-	21/03/2006	1
06-207-104	Blackcurrant multivitamins juice drink no added sugar	C-Vit	1:4	21/03/2006	<1
06-207-105	Orange and passionfruit fruit juice drink	Asda Jooce	-	21/03/2006	2
06-207-106	High performance health and vitality for men	Wellman	-	22/03/2006	2
06-207-107	Citrus isotonic pro>performance sports drink	Umbro	-	21/03/2006	<1
06-207-108	Orange energy drink	Explosade	-	21/03/2006	<1
06-207-109	Tropical fruit squash	Jucee	1:4	21/03/2006	<1
06-207-110	Orange squash no added sugar	Somerfield	1:4	20/03/2006	<1
06-207-111	Tropical fruit squash no added sugar	Somerfield	1:4	20/03/2006	<1
06-207-112	High juice summer fruits squash	Hyberry	1:4	22/03/2006	<1
06-207-113	Still Floridan orange juice spring water	Boots Shapers	-	22/03/2006	<1
06-207-114	Cranberry & blueberry still hi juice drink	Boots Delicious	-	22/03/2006	1
06-207-115	Original energy drink	Explosade	-	22/03/2006	<1
06-207-116	Bitter lemon	Asda	-	22/03/2006	<1
06-207-117	Isotonic mixed berry flavour sports drink	Asda	-	22/03/2006	<1
06-207-118	Orange	Explosade	-	22/03/2006	<1
06-207-119	Orange squash	Jucee	1:4	22/03/2006	<1
06-207-120	Apple crush - NAS	Morrison's	-	22/03/2006	4
06-207-121	Fruity Shots - apple and blackcurrant	Sunsqueeze	-	22/03/2006	<1
06-207-122	Fruity Shots - strawberry and apple	Sunsqueeze	-	22/03/2006	<1
06-207-123	Orange squash - no added sugar	Kia-ora	1:4	22/03/2006	<1
06-207-124	Still fruit salad	Smashers	-	23/03/2006	2
06-207-125	Still apple & blackberry	Smashers	-	23/03/2006	2

Sample Code	Product as described	Brand	Recommended dilution Concentrate : Water	Date of analysis	Result of benzene $\mu\text{g}/\text{kg}$
06-207-126	Icecream soda	Popstar	-	23/03/2006	1
06-207-127	Irish sparkling orange	Finches	-	23/03/2006	<1
06-207-128	Detox orange peach	Coolwater	-	23/03/2006	<1
06-207-129	Still sherbert orange	Smashers	-	27/03/2006	<1
06-207-130	Orange glucose drink	Lucozade Energy	-	23/03/2006	<1
06-207-131	Icy lemon	Fanta	-	23/03/2006	<1
06-207-132	Lemon and lime flavour still drink - sugar free	Popstar	-	27/03/2006	<1
06-207-133	Mango	Rubicon	-	27/03/2006	<1
06-207-134	Orange (pomaranczowa)	Mirinda	-	23/03/2006	<1
06-207-135	High juice blackcurrant	Lind House	1:4	23/03/2006	<1
06-207-136	Orange drink	Freeway	-	23/03/2006	<1
06-207-137	Summer fruits fruit and barley- no added sugar	Robinsons	1:4	23/03/2006	<1
06-207-138	Orange	Tango	-	23/03/2006	<1
06-207-139	Apple & mango juice drink	J2O	-	23/03/2006	<1
06-207-140	Still Florida orange style	Barr Simply Citrus	-	23/03/2006	<1
06-207-141	Green tea & peach flavoured iced tea	Twinings	-	27/03/2006	2
06-207-142	Low calorie bitter lemon	Co-op	-	23/03/2006	23
06-207-143	Orangeade - no added sugar	Co-op	-	23/03/2006	<1
06-207-144	Ice tea - lemon	Lipton	-	25/03/2006	<1
06-207-145	Vimto - NAS	Vimto	1:4	25/03/2006	<1
06-207-146	Bitter lemon low calorie	Waitrose	-	24/03/2006	<1
06-207-147	Apple - NAS	Robinsons Fruit Shoot	-	24/03/2006	<1
06-207-148	Pear and Blackcurrant squash	Kia-ora	1:4	24/03/2006	<1
06-207-149	High performance health and vitality for men	Wellman	-	27/03/2006	2
06-207-150	Pineapple and grapefruit drink	Lilt	-	27/03/2006	4

Table 3 – Results of RSSL duplicate analysis for benzene (µg/kg) for samples as purchased (not as prepared for consumption)

Notes

< 1 = less than reporting limit of 1 µg/kg. As mentioned previously if the result was above 2 µg/kg another sample with a different batch code was analysed.

* Samples with a different batch code are not yet available so will be analysed at a later date.

All the results are reported 'as purchased' e.g. the results have not been altered to take into account the recommended dilution factors.

Product as described	Brand	Recommended dilution Concentrate : Water	Sample Code	Date of analysis	Result of benzene µg/kg	Sample Code of second sample*	Date of analysis	Result of benzene µg/kg
Apple - no added sugar	Robinsons Fruit Shoot	-	06-207-002	19/03/2006	3	06-207-147	24/03/2006	<1
Vimto - no added sugar	Vimto	1:4	06-207-005	19/03/2006	4	06-207-145	25/03/2006	<1
Lemon and lime flavour still drink - sugar free	Popstar	-	06-207-030	18/03/2006	8	06-207-132	27/03/2006	<1
Pineapple and grapefruit fruit crush	Lilt	-	06-207-041	25/03/2006	8	06-207-150	28/03/2006	4
Low calorie bitter lemon	Co-op	-	06-207-055	19/03/2006	12	06-207-142	25/03/2006	23
Orangeade - no added sugar	Co-op	-	06-207-058	19/03/2006	4	06-207-143	23/03/2006	<1
Bitter lemon low calorie	Waitrose	-	06-207-067	19/03/2006	2	06-207-146	24/03/2006	<1
Cherry flavoured iced tea	Twinings	-	06-207-073	19/03/2006	8	*		
Raspberry flavoured iced tea	Twinings	-	06-207-074	19/03/2006	7	*		
Green tea & peach flavoured iced tea	Twinings	-	06-207-075	19/03/2006	5	06-207-141	28/03/2006	2
Green tea & lemon iced tea	Twinings	-	06-207-077	25/03/2006	2	*		
Pineappleade	C & C	-	06-207-083	22/03/2006	2	*		
Mango	Maaza	-	06-207-088	23/03/2006	2	*		
Pear and blackcurrant squash	Kia-ora	1:4	06-207-089	22/03/2006	2	06-207-148	24/03/2006	<1
Sparkling orange	Silver Spring	-	06-207-090	23/03/2006	5	*		
Lemon and lime crush - no added sugar	Morrisons	-	06-207-095	22/03/2006	4	*		
Pineapple and grapefruit crush - NAS	Morrisons	-	06-207-097	25/03/2006	8	*		
Orangeade	Mace	-	06-207-099	22/03/2006	2	*		
High juice blackcurrant squash - NAS	Hyberry	1:4	06-207-101	25/03/2006	9	*		
Orange and passionfruit fruit juice drink	Asda Jooce	-	06-207-105	25/03/2006	2	*		
High performance health and vitality for men	Wellman	-	06-207-106	27/03/2006	1	06-207-149	28/03/2006	2
Apple crush - NAS	Morrisons	-	06-207-120	27/03/2006	5	*		
Still fruit salad	Smashers	-	06-207-124	24/03/2006	2	*		
Still apple & blackberry	Smashers	-	06-207-125	25/03/2006	2	*		

Table 4 – Results of CSL analysis for benzene (µg/kg) for samples as purchased (not as prepared for consumption)

Notes

< 1 = less than reporting limit of 1 µg/kg.

All the results are reported 'as purchased' e.g. the results have not been altered to take into account the recommended dilution factors.

Sample Code	Product as described	Brand	Recommended dilution Concentrate : Water	Date of analysis	Result of benzene µg/kg	Date of duplicate analysis	Result of benzene duplicate analysis µg/kg
06-207-010	Apple and melon fizzy fruit drink	Sainsbury's	-	29/03/06	2	29/03/06	1
06-207-023	Low calorie bitter lemon	Asda	-	29/03/06	<1	29/03/06	<1
06-207-030	Still sugar free lemon and lime drink	Popstar	-	29/03/06	25	29/03/06	28
06-207-033	Original lemonade made with real lemons	Schweppes	-	29/03/06	2	29/03/06	2
06-207-041	Pineapple and grapefruit drink	Lilt	-	29/03/06	6	29/03/06	7
06-207-045	Active sparkling orange glucose high energy drink	Tesco	-	29/03/06	1	29/03/06	1
06-207-049	Orange and pineapple squash	Kia-ora	1:4	29/03/06	<1	29/03/06	<1
06-207-053	Mixed citrus body fuel	Lucozade Sport	-	29/03/06	<1	29/03/06	<1
06-207-055	Low calorie bitter lemon	Co-op	-	29/03/06	11	29/03/06	12
06-207-073	Cherry flavoured iced tea	Twinnings	-	29/03/06	9	29/03/06	9
06-207-074	Raspberry flavoured iced tea	Twinnings	-	29/03/06	9	29/03/06	9
06-207-090	Sparkling orange	Silver Spring	-	29/03/06	6	29/03/06	6
06-207-097	No added sugar pineapple and grapefruit crush	Morrisons	-	29/03/06	14	29/03/06	15
06-207-101	High juice no added sugar blackcurrant squash	Hyberry	1:4	29/03/06	13	29/03/06	15
06-207-142	Low calorie bitter lemon	Co-op	-	29/03/06	30	29/03/06	36

Table 5 – Comparison of RSSL and CSL analysis for benzene ($\mu\text{g}/\text{kg}$) for 15 samples as purchased (not as prepared for consumption)

Notes

< 1 = less than reporting limit of 1 $\mu\text{g}/\text{kg}$.

All the results are reported 'as purchased' e.g. the results have not been altered to take into account the recommended dilution factors.

In the calculation of the average results, if a sample was <1 then the level has been assumed to be 1 $\mu\text{g}/\text{kg}$

Sample Code	Product as described	Brand	Recommended dilution Concentrate : Water	RSSL analysis		CSL analysis		Average result
				Benzene level $\mu\text{g}/\text{kg}$	Benzene level $\mu\text{g}/\text{kg}$	Benzene level $\mu\text{g}/\text{kg}$	Benzene level $\mu\text{g}/\text{kg}$	
06-207-010	Apple and melon fizzy fruit drink	Sainsbury's	-	1		2	1	1
06-207-023	Low calorie bitter lemon	Asda	-	<1		<1	<1	<1
06-207-030	Still sugar free lemon and lime drink	Popstar	-	7	8	25	28	17
06-207-033	Original lemonade made with real lemons	Schweppes	-	<1		2	2	2
06-207-041	Pineapple and grapefruit drink	Lilt	-	7	8	6	7	7
06-207-045	Active sparkling orange glucose high energy drink	Tesco	-	<1		1	1	1
06-207-049	Orange and pineapple squash	Kia-ora	1:4	<1		<1	<1	<1
06-207-053	Mixed citrus body fuel	Lucozade Sport	-	<1		<1	<1	<1
06-207-055	Low calorie bitter lemon	Co-op	-	10	12	11	12	11
06-207-073	Cherry flavoured iced tea	Twinnings	-	8	8	9	9	9
06-207-074	Raspberry flavoured iced tea	Twinnings	-	7	7	9	9	8
06-207-090	Sparkling orange	Silver Spring	-	5	5	6	6	6
06-207-097	No added sugar pineapple and grapefruit crush	Morrisons	-	7	8	14	15	11
06-207-101	High juice no added sugar blackcurrant squash	Hyberry	1:4	9	9	13	15	12
06-207-142	Low calorie bitter lemon	Co-op	-	23	23	30	36	28

ANNEX 1 WRITTEN COMMENTS RECEIVED FROM COMPANIES

The comments in this Annex were sent by the companies named below to the Food Standards Agency in response to their being notified of results for samples of drinks that they supply..

From: R. Twining & Co. Ltd

“We have recently become aware of this issue in relation to our products and the results from the FSA survey are consistent with the investigation that we have carried out ourselves.

Twining's iced teas are safe to consume and they comply with the relevant UK and EU food legislation. Nevertheless we do recognise consumer concern regarding this issue and, as a responsible manufacturer, we are taking immediate steps to reformulate our products to avoid the combination of ascorbic acid and sodium benzoate in our ready to drink iced teas.”

From: Vimto Soft Drinks Ltd

“Whilst we were encouraged that the FSA analyses confirm our own in terms of the negligible amounts of benzene present in our brands, we would still point out that the Panda samples analysed were of old Panda which in its new incarnation no longer contains sodium benzoate. It also contains no artificial flavours, no artificial colours and no added sugar.

Vimto is a cordial product which when diluted contains undetectable amounts of benzene. this is borne out by both our results and those of the FSA.”

From: The Co-operative Group

“As part of our continual review of ingredients used within Co-op Brand products we are in dialogue with our suppliers and other appropriate bodies to identify opportunities to remove or reduce the potential for this reaction.

In response to the Agency's finding we have withdrawn all batches of Co-op Low Calorie Bitter Lemon (1 litre). Whilst of concern, the level found in the product represents a small part of total human exposure. Benzene is also present in air and, on average, people breathe in 220 micrograms every day.

For a refund or for further information customers are invited to ring our Customer Careline on Freephone 0800 0686727”