



WAGENINGEN EVALUATING PROGRAMS FOR  
ANALYTICAL LABORATORIES



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## International Biomass Exchange Program

# BIMEP

Quarterly Report 2012.1

January - March 2012



WAGENINGEN UNIVERSITY  
ENVIRONMENTAL SCIENCES

# Introduction

Dear WEPAL-participants,

It is getting more difficult to get samples to different countries. Sometimes shipment is delayed by customs, quarantine services (or other sometimes obscure reasons). For us it is impossible to keep track of all changing regulations. Please contact us if you need special permits or other documents to receive your samples.

Our aim is to have the samples in your possession at the start of each round. Contact us if you do not receive the samples in time. Please do not wait until a few weeks before the deadline because we will not be able to send new samples in time.

Enquiry 2012

We are interested in your ideas and questions about the WEPAL proficiency testing programmes. To make it easier for you to give your response we have placed an enquiry on our website. We have kept it short so it will not take up much of your time. Your feedback is much appreciated.

The WEPAL programs are organised to help you to improve the quality of your results. When you have ideas or remarks on the programs that can help us to improve them please feel free to contact us. We are always looking forward to hear from you,

Yours sincerely,



Bram Eijgenraam  
Manager WEPAL

Calculated 03-04-2012 (13:53)

Approved by Bram Eijgenraam, manager WEPAL

## Important Information

The results of the April - June 2012 period will be processed in the first week of July 2012. Participants are kindly requested to take care that the results of this series are in Wageningen **before the first of July 2012**. All results, which are received later, will not be reported.

The 2012.3 samples will be mailed at the end of May 2012.

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# General Information

## Accreditation

The Wageningen Evaluating Programmes for Analytical Laboratories organisation is accredited for the organisation of Interlaboratory Studies by the Dutch Accreditation Council RvA since April 26, 2000. The accreditation is based on the ILAC-requirements (Guidelines for the requirements for the competence of providers of proficiency testing schemes, ISO/IEC 17043). In the following table the scope is given for all WEPAL programs.

**Table 1 Scope of the WEPAL programs.** (Determinands in bold are in the scope of the accreditation)

IPE Group	Determinand
Inorganic Chemical Composition	Ag, <b>As, B, Ba</b> , Be, Bi, Br, <b>Ca, Cd, Cl, Co, Cr</b> , Cs, <b>Cu</b> , F, <b>Fe</b> , Ga, <b>Hg, I, K</b> , Li, <b>Mg, Mn, Mo, N - Kjeldahl</b> , N - NH <sub>4</sub> (as N), <b>N - NO<sub>3</sub></b> , <b>Na, Ni, P, Pb</b> , Pd, Pt, Rb, Rh, <b>S, Sb, Se</b> , Sn, SO <sub>4</sub> , <b>Sr, Ti, V, Zn</b>
Real totals	<b>Al, C - elementary, N - elementary</b> , Si
Acid extractable (So-called totals)	<b>Al</b> , Si
Other determinations	<b>delta <sup>13</sup>C, delta <sup>15</sup>N</b>
Nutritional values	ADF-ash-containing, ADF-ash-free, Crude fibre, NDF-ash-containing, NDF-ash-free, Polysaccharides (starch), TDF, TDF-non-soluble, TDF-soluble, <b>Total ash</b> , Total Disaccharides, Total fat, Total monosaccharides

ISE Group	Determinand
Real totals	Ag, <b>Al, As, B, Ba</b> , Be, Bi, <b>Br, C - elementary, Ca, Cd, Ce, Co, Cr</b> , Cs, <b>Cu, F, Fe, Ga</b> , Ge, <b>Hg, I, K, La, Li, Mg, Mn, Mo, N - elementary, Na, Nb, Nd, Ni, P, Pb</b> , Pd, Pt, <b>Rb, Rh, S, Sb, Sc</b> , Se, <b>Si, Sn, Sr, Te, Th, Ti, Tl, U, V, W, Y, Zn, Zr</b>
Acid extractable (So-called totals)	Ag, <b>Al, As, B, Ba, Be</b> , Bi, Br, <b>Ca, Cd, Ce, Co, Cr, Cu</b> , F, <b>Fe, Ga, Hg, I, K, La, Li, Mg, Mn, Mo, N, Na, Nb, Nd, Ni, P, Pb</b> , Pt, Rb, <b>S, Sb, Sc, Se, Si, Sn, Sr, Te, Th, Ti, Tl, U, V, Y, Zn, Zr</b>
Aqua Regia (ISO 11466)	Ag, <b>Al, As, B, Ba, Be</b> , Bi, Br, <b>Ca, Cd, Ce, Co, Cr, Cu</b> , F, <b>Fe, Ga, Hg, I, K, La, Li, Mg, Mn, Mo, N, Na, Nb, Nd, Ni, P, Pb</b> , Pt, Rb, <b>S, Sb, Sc, Se, Si, Sn, Sr, Te, Th, Ti, Tl, U, V, Y, Zn, Zr</b>
Extraction with boiling 2M HNO <sub>3</sub>	<b>Cd, Co, Cr, Cu, Hg, Mo, Ni, Pb, Tl, Zn</b>
Extraction with 0.1M NaNO <sub>3</sub>	<b>Cd, Cu, Ni, Pb, Zn</b>
Extraction with 0.01M CaCl <sub>2</sub> 1:10	Al, B, Cd, CN, Co, Cr, Cu, Fe, <b>K, Mg</b> , Mn, <b>N - NH<sub>4</sub>, N - NO<sub>3</sub></b> , N total soluble, Na, Ni, P, Pb, SO <sub>4</sub> , Zn
Soil characteristics	<b>C - org others (W&amp;B a.o.), EC-SC (ISO 11265), Fraction &lt; 16 µm, Fraction &lt; 2 µm, Fraction &lt; 63 µm, Fraction &gt; 63 µm, Org.matter (L.O.I.), pH - CaCl<sub>2</sub>, pH - H<sub>2</sub>O, pH - KCl, TC=Total C (org.+inorg.), TIC=Tot.Inorg C(CaCO<sub>3</sub>), TOC=Total Org. C</b>
Other determinations	B - Hot water, CN - Free, CN - Total, delta <sup>13</sup> C, delta <sup>15</sup> N, K - HCl, Mg - NaCl, <b>Moisture-content</b>
Fluoride (Swiss standard procedure)	F - Total
Digestion with conc. HNO <sub>3</sub> + conc. HCl + H <sub>2</sub> O <sub>2</sub> (UNEP-UN/EC 91075A)	Al, As, B, Ba, Be, Br, Ca, Cd, Co, Cr, Cu, F, Fe, Ga, Hg, I, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Rb, S, Sb, Se, Si, Sn, Sr, Tl, V, Y, Zn, Zr
Pot. CEC using 1M NH <sub>4</sub> -acetate at pH=7	Al, <b>Ca, CEC, K, Mg, Na</b>
Pot. CEC using 1M or 0.1M BaCl <sub>2</sub> -TEA at pH=8.1 (ISO 13536 OR BZE)	Al, Ca, <b>CEC, K, Mg, Na</b>

ISE Group	Determinand
Pot. CEC using 1M NH <sub>4</sub> Cl (BZE)	Al, Ca, CEC, Fe, H, K, Mg, Mn, Na
Act. CEC using 0.01M BaCl <sub>2</sub> (ISO 11260)	Al, Ca, CEC, Fe, H, K, Mg, Mn, Na
Act. CEC using 0.1M BaCl <sub>2</sub> (UNEP-UN/EC 91065A)	Al, <b>Ca</b> , CEC, Fe, H, K, Mg, Mn, Na
Act. CEC using cobaltihexamine (AFNOR NFX 31 130)	Al, Ca, CEC, Fe, H, K, Mg, Mn, Na
Mehlich-3	Al, As, <b>B, Ca</b> , Cd, Cr, <b>Cu, Fe, K, Mg, Mn, Na, P, Pb, Zn</b>
Extraction with Ca-lactate (VDLUFA)	K, P
Extraction with double lactate (VDLUFA)	<b>K, P</b>
Water soluble 1:10 (w/v) (EN-12457-4)	Br, Cl, F, N - NO <sub>3</sub>
Extraction with 0.01M CaCl <sub>2</sub> + 0.005M DTPA 1:10 (w/v)	<b>Cu, Fe, Mn, Zn</b>
Extraction with 1M KCl 1:10 (w/v)	N - NH <sub>4</sub> , N - NO <sub>3</sub>
Phosphorus and related analysis	Al - Ox, Fe - Ox, P - Ox, P - AL, <b>P - Bray, P - Olsen, Pw</b>
Extraction with 1M HCl (Polish standard)	<b>B, Cu, Fe, Mn, Zn</b>
Water soluble 1:10 (w/v) (NL VPR C85-06)	Br, Cl, F, SO <sub>4</sub>
UK Soil Methods	<b>K - NH<sub>4</sub>NO<sub>3</sub> (1/5), Mg - NH<sub>4</sub>NO<sub>3</sub> (1/5), P - NaHCO<sub>3</sub> (1/20), pH - H<sub>2</sub>O (2/5)</b>

SETOC Group	Determinand
Polycyclic aromatic hydrocarbons	<b>acenaphtene, acenaphtylene, anthracene, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, dibenz(ah)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphtalene, phenanthrene, pyrene</b>
Polychlorobiphenyls	<b>PCB 028, PCB 031, PCB 052, PCB 077, PCB 081, PCB 101, PCB 105, PCB 114, PCB 118, PCB 123, PCB 126, PCB 128, PCB 138, PCB 149, PCB 153, PCB 156, PCB 157, PCB 167, PCB 169, PCB 180, PCB 189</b>
Organochlorine pesticides	1,2,3 trichlorobenzene, 1,2,3,4 tetrachlorobenzene, 1,2,3,5 tetrachlorobenzene, 1,2,4 trichlorobenzene, 1,2,4,5 tetrachlorobenzene, 1,3,5 trichlorobenzene, aldrin, alpha-endosulfan, alpha-HCH, beta-endosulfan, beta-HCH, chlordane, cis-chlordane, delta-HCH, dieldrin, endosulfan, endosulfan sulfate, endrin, gamma-HCH, heptachlor, heptachlor epoxide, <b>hexachlorobenzene, hexachlorobutadiene</b> , isodrin, <b>o,p`-DDD, o,p`-DDE, o,p`-DDT, p,p`-DDD, p,p`-DDE, p,p`-DDT, pentachlorobenzene</b> , pentachlorophenol, Sum tetrachlorobenzenes, Sum trichlorobenzenes, telodrin, toxaphene, trans-chlord
Other parameters	AOX, CN - Free, <b>CN - Total, EOX</b> , Inorganic carbon, <b>Mineral oil, GC, Mineral oil, IR, Organic carbon, Particles &lt; 2 µm, Particles &lt; 63 µm, Particles &gt; 63 µm</b>
Metals (aqua regia)	<b>As, Ba, Cd, Co, Cr, Cu, Hg, Mo, Ni, Pb, Zn</b>
Dibenzo-P Dioxin	1,2,3,4,6,7,8 Cl <sub>7</sub> DD, 1,2,3,4,7,8 Cl <sub>6</sub> DD, 1,2,3,6,7,8 Cl <sub>6</sub> DD, 1,2,3,7,8 Cl <sub>5</sub> DD, 1,2,3,7,8,9 Cl <sub>6</sub> DD, 2,3,7,8 Cl <sub>4</sub> DD, Cl <sub>8</sub> DD
Dibenzofuran	1,2,3,4,6,7,8 Cl <sub>7</sub> DF, 1,2,3,4,7,8 Cl <sub>6</sub> DF, 1,2,3,4,7,8,9 Cl <sub>7</sub> DF, 1,2,3,6,7,8 Cl <sub>6</sub> DF, 1,2,3,7,8 Cl <sub>5</sub> DF, 1,2,3,7,8,9 Cl <sub>6</sub> DF, 2,3,4,6,7,8 Cl <sub>6</sub> DF, 2,3,4,7,8 Cl <sub>5</sub> DF, 2,3,7,8 Cl <sub>4</sub> DF, Cl <sub>8</sub> DF

<b>SETOC</b> Group	<b>Determinand</b>
Brominated Flame Retarders	BDE 028, BDE 047, BDE 066, BDE 085, BDE 099, BDE 100, BDE 153, BDE 154, BDE 183, BDE 209
Experimental	DEHP, Tributyl Tin (TBT)

<b>MARSEP</b> Group	<b>Determinand</b>
Real totals	Ag, Al, As, B, Ba, Be, Bi, Br, C, Ca, Cd, Co, Cr, Cu, F, Fe, Ga, Hg, I, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, S, Sb, Se, Si, Sn, Sr, Ti, Tl, V, Zn
Acid extractable (So-called totals)	Ag, Al, As, B, Ba, Be, Bi, Br, C, <b>Ca, Cd, Cl, Co, Cr, Cu, F, Fe, Ga, Hg, I, K, Li, Mg, Mn, Mo, N, N - NH4 (as N), N - NO3 (as N), Na, Ni, P, Pb, S, S - SO4, Sb, Se, Si, Sn, Sr, Ti, Tl, V, Zn</b>
Other determinations	<b>AOX, loss-on-ignition</b>

<b>BIMEP</b> Group	<b>Determinand</b>
General Analysis	<b>ash, calorific value, moisture, Volatile Matter</b>
Elementary Analysis	<b>Carbon (C), Cl, Hydrogen (H), Nitrogen (N), S</b>
Water Soluble Elements	Cl, K, Na
Major Elements	Al, Ca, Fe, K, Mg, Na, P, Si
Minor Elements	As, Ba, Be, Cd, Co, Cr, <b>Cu, F, Hg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Te, Ti, Tl, V, Zn</b>

The selection of determinands included in the scope of accreditation is based on information about the homogeneity and stability of the samples. This information is available when sufficient participants have reported results for a determinand in the past 3 years. Determinands which are not reported regularly in sufficient numbers to have a statistical evaluation are not (yet) included in the scope of the accreditation.

### **Subcontracting**

Some aspects of the proficiency testing scheme may from time to time be subcontracted. When subcontracting occurs it is placed with a competent subcontractor. WEPAL is responsible to the scheme participants for the subcontractor's work.

The analysis for the homogeneity tests of the samples used in this proficiency test are carried out by a subcontractor.

### **Confidentiality of results**

The confidentiality of the results is extremely important in the Wepal programs. The participants may opt for a code name that indicates their laboratory, or one that ensures their anonymity. In the reports, only the code names will be mentioned.

When an accrediting body or a regulatory authority requires the proficiency test results to be provided by Wepal the participants shall be notified and asked for permission

### **Complaints and or remarks**

The reports of WEPAL are assembled with the utmost care. Please contact us on [info.wepal@wur.nl](mailto:info.wepal@wur.nl) if you feel that the reports are not at a satisfactory standard or if you encountered errors in your results. Also feel free to contact us if you have any other complaints, remarks and or suggestions.

## **Homogeneity of the distributed samples**

### **Homogeneity tests**

WEPAL has developed special equipment for the production of representative subsamples (Houba, 1993) from a bulk material. The proper functioning of this equipment is tested by a homogeneity test in the final subsamples. To perform this test, samples are collected at regular intervals during the preparation of the

the samples. The collected samples, with a minimum of 10, are analysed in duplicate measurements under repeatability conditions. A selection of critical determinands is chosen for the tests. The results of the homogeneity tests are published in the annual reports.

All samples used in this round of the proficiency test have passed the homogeneity test.

## Check of results

Before distribution of the periodic reports to the participants, a final check is made based on the results found by the participants. This check is made for all reported determinands. The variations between laboratories and concentrations are compared with the patterns as found in the previous 5 years. The expected pattern is a high CV at a low concentration and a gradually decreasing CV at higher concentrations till a more or less constant level of CV-values is reached (Houba et al., 1986). Deviations from this expected pattern are mentioned in the periodic reports. This might be an indication of inhomogeneity of the material for the determinand.

*All data of this period are compared with the general patterns as published in the latest year report. No deviating values were found.*

## The quarterly report

In order to evaluate the accuracy and precision of the analytical procedures used, five proficiency testing programs have been established. At this moment the WEPAL Exchange Programs comprises approximately 600 laboratories in many countries. The participating laboratories receive four air-dried samples every three months and analyse the samples according to their own procedures. The results of the determinations are collected and processed at Wageningen University and published every three months. The participating laboratories are informed of the results in the third week of the next three-month period. Each participant can compare his results with those of all the other members of the exchange program. WEPAL will not comment on results unless asked to do so.

## Reporting of data

The analysed components must be reported in oven-dry (105 °C) material. For this purpose the moisture content has to be determined separately and the analytical results have to be recalculated (see the form to report the results). To get reproducible results of these moisture contents we recommend you to dry the material during at least 3 hours at 105 °C and let cool down in a desiccator before weighing.

## Statistics

### Normal Distribution Approximation (NDA)

Interlaboratory studies like the WEPAL proficiency testing ringtests frequently give rise to datasets that have complex distributions including excessive tailing and multiple modes. Consequently, sophisticated statistical methods are required to obtain meaningful assessments. The strategy that was used until 2009 made use of an outlier test followed by straightforward statistics. Problem with this strategy is that removal of outliers causes an underestimation of variance of the dataset. Therefore a methodology was needed that does not rely on arbitrary outlier removal or subjective manual interpretations. Ideally the used methodology must provide the characteristics of the highest mode of the dataset.

The model that is chosen calculates population characteristics (mean and standard deviation) from experimental datasets (Cofino 2000). The model uses an estimate for the probability density function (pdf) of the measurement process and calculates a best fit based on all observed values. The implementation of the model that is used does not require uncertainty estimates for all data points. Instead it uses a normal distribution approximation (NDA) for the pdf of the individual data points. In essence, the pdf's of the individual datapoints are superposed on each other to create a continuous pdf representing the entire distribution (all datapoints).

With the mathematical model coefficients can be obtained by looking for the combination of data points that has the highest probability in the basis set. This maximization amounts to the identification of the first mode of the dataset. The coefficients can be used to calculate the weighted mean and standard deviation. Subsequent calculations give additional modes of the distribution and for each mode the expectation value (mean), the standard deviation and a percentage indicating the fraction of observations encompassed. In this report only mean and standard deviation for the first mode (combination with the highest probability in the dataset) are given.

The model is tested on simulated data sets and datasets of several interlaboratory studies. It is demonstrated that the model is robust and insensitive to outliers. It can cope with asymmetric, strongly tailing and multimodal distributions. Publications describing the procedure in more detail and results of the tests are in preparation.

With the NDA model mean and standard deviation are calculated using all reported data when at least 8 results are left after removal of reported 'lower than' (<) and 0 (= zero) values. No outliers are removed.

**Table 2.** The model summarised

- Each observation is attributed an ' Observation measurement function' (OMF,  $\varphi_i$ )
- An OMF is defined as the square root of the probability density function appropriate for the observation. If normal distributions are used:  $\varphi_i = \sqrt{N(\mu_i, \sigma_i^2)}$
- The set of  $\varphi_i$  's constitutes a basic set in which the population measurement function  $\Psi$  is constructed:  $\Psi_i = \sum c_{ik} \varphi_k$
- The coefficients are obtained by finding the combination which renders highest probability density (maximise  $\int \Psi^2 dx$ , x being concentration). Mathematically this amounts to solving the eigenvector-eigenvalue equation  $Sc = \lambda c$ ,  $S_{ij}$  being an overlap integral defined as  $\int \varphi_i \varphi_j dx$ ,  $0 \leq S_{ij} \leq 1$
- Mean and standard deviation of  $\Psi_i$  are calculated from the first and second moment of the probability density function  $\Psi_i^2$

$$\bar{m}_i = \frac{\int x \Psi_i^2 dx}{\int \Psi_i^2 dx},$$

$$s_i^2 = \frac{\int x^2 \Psi_i^2 dx}{\int \Psi_i^2 dx} - \bar{m}_i^2$$

- When the NDA approximation is used the variance calculated by the model represents the sum of the estimates for the within-laboratory and between-laboratory variances, i.e.

$$s_i^2 = s_{between\ labs,i}^2 + s_{within\ labs,i}^2$$

## Median and MAD

For each determinand a median value and a median of absolute deviations (MAD) are calculated using all reported data except the reported '<' values. Deviating results like stragglers and outliers are not removed. The median is the middle observation of the sorted observations. In the case of an even number of observations it is the mean of the two middle observations. Using the median instead of mean, extreme data have less influence. MAD is the median of the absolute values of the observations minus their median.

## Z-score

For all analytical data a Z-score is calculated according to the formula:

$$Z\text{-score} = \frac{X - X_{mean}}{S_d}$$

in which:

X = the reported value

$X_{mean}$  = the mean of all values calculated with the NDA model

$S_d$  = standard deviation calculated with the NDA model

## Evaluation of results

For the evaluation of results the absolute value of the Z-score is used. Questionable results  $2 < |Z| < 3$  are marked as stragglers (\*). Deviating results with  $|Z| > 3$  are marked as outliers (\*\*).

Results reported as 'smaller than' (<) are also evaluated. When this 'smaller than' value is lower than the mean a Z-score is calculated. Based on this z-score these 'smaller than' values can also be marked as straggler or outlier. In these cases the 'smaller than' value is set too low.

## Uncertainty of the assigned value

The aim of this proficiency testing scheme is to establish comparability among laboratories. Results for measurands in this scheme are dependent on the methods which are used. It is not feasible to establish metrological traceability of the assigned value. Assigned values are therefore based on consensus values. In this proficiency test the robust standard deviation is used as standard deviation for proficiency assessment. The uncertainty in the assigned value is calculated as :

$$u_x = s / \sqrt{N}$$

s = robust standard deviation

N = number of results

The uncertainty in the assigned value may influence the evaluation of the results (calculated Z-scores). This influence is considered to be negligible if the following conditions is met:

$$u_x \leq 0.3 * \sigma_{pt}$$

$u_x$  = uncertainty in the assigned value

$\sigma_{pt}$  = standard deviation for proficiency assessment ( = s)

Because  $\sigma_{pt} = s$  this evaluation reverts to :

$$s / \sqrt{N} \leq 0.3 * s \text{ or } \sqrt{N} \geq 3$$

The influence of uncertainty on the evaluation of the results is therefore dependent on the number of results. Above 10 results of uncertainty on the assigned value is negligible. From 8 to 10 results uncertainty of the consensus value is larger than  $0.3 \sigma_{pt}$  and therefore may influence the evaluation of the results. Below 8 results no consensus value is given.

## Rounding of results

Rounding interval is set to have at least three significant digits for the results. This is based on the value of the mean. If no mean value is available (less than 8 results) the median is used. In cases where between laboratory variation is small (based on the standard deviation) an extra digiti shown. For the statistical results (mean, standard deviation, median and MAD) one extra digit is shown.

Note that larger results are also rounded (e.g. 1809 may be rounded as 1810).

## Materials Analysed

Table 3 Materials analysed in this period.

Sample	Sample ID	Type	Country
1	426	Cow Manure	Netherlands
2	445	Lucerne / Medicago sativum	Oosterbeek / Netherlands
3	446	Elephant Grass / Pennisetum purpureum schum	Brazil
4	447	Sewage Sludge	Switzerland

## Method Indicating Code (MIC)

In order to evaluate the analytical results for each reported determinand, a Method Indicating Code (MIC) is used in the other WEPAL programs. Details of the analytical procedures used by the individual participants are indicated by four characters, added at the end of each row with results. With this information all

participants can compare the results of their analytical procedures more specifically with the results of other participants. This could be a further valuable tool in judgement of the individual results.

The BIMEP program is still in development therefore the MIC codes are not available yet. After each group of analytes a summary is given of the method details of the participating laboratories. Because this is important information send us your changes or corrections together with the results for the next period.

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## Used abbreviations and symbols

**Table 4** *Used abbreviations and symbols*

Where	Abbreviation	Explanation
Results	MIC	method indicating code
Results	MAD	median absolute deviation
Results	Sd	standard deviation
Results, Z-scores	<	value smaller than
Results, Z-scores	*	straggler
Results, Z-scores	**	outlier
Results, Z-scores	-	no result was submitted
Results statistical values	-	not calculated
Z-scores	#	less than 8 values, no mean and Sd calculated
Errors	C	Correction participant
Errors	D	Results received after deadline (before publication date)
Errors	E	Error WEPAL
Errors	M	Modified results
Errors	N	New results
Errors	R	Results removed

# Analysis BIMEP 2012.1

## BIMEP 2012.1 - General Analysis

Sample		426	445	446	447	MIC
<b>Ash (g/kg)</b>						
IFPO	(145)	324	115	117	620	**
ECN	(460)	325	117	116	592	
NGGBUG	(755)	299 **	110	126 **	590	
INCOLAB	(821)	318	114	120	590	
TLR	(900)	327	112	118	599	
MICHAEL	(904)	320	115	119	567	**
SECIL	(985)	285 **	108	112 *	552 **	
DETS	(1055)	332	117	119	599	
INTER	(1057)	335	112	121	603	
CELA	(1060)	293 **	107	107 **	554 **	
KES	(1080)	327	113	118	598	
ICB-CSIC	(1113)	328	117	117	595	

	Statistical Results			
NDA mean	326.0	113.5	118.3	595.9
NDA st dev	7.8	3.6	2.2	7.8
N	12	12	12	12
Median	324.7	113.4	118.1	593.3
MAD	5.8	2.5	1.6	5.8

### Calorific Value (gross) (MJ/kg)

IFPO	(145)	14.2	17.9 *	16.7	8.39
ECN	(460)	13.9	18.4	17.3	8.10
NGGBUG	(755)	14.3	18.3	17.2	8.44
INCOLAB	(821)	14.4	18.4	17.3	8.25
TLR	(900)	14.5	18.5	17.4	8.66
MICHAEL	(904)	15.3 **	19.3 **	16.3 **	8.86
SECIL	(985)	14.6	18.2	17.4	9.02
DETS	(1055)	14.6	18.5	17.0	8.24
CELA	(1060)	13.4 **	16.7 **	15.8 **	7.67
202	(1065)	-	-	-	4.02 **
KES	(1080)	14.3	18.1	18.7 **	8.42
ICB-CSIC	(1113)	14.6	18.3	17.2	8.93

	Statistical Results			
NDA mean	14.42	18.33	17.23	8.470
NDA st dev	0.26	0.16	0.28	0.410
N	11	11	11	12
Median	14.41	18.34	17.22	8.403
MAD	0.18	0.12	0.20	0.281

### Moisture (g/kg)

IFPO	(145)	60.5 *	79.9	71.8	77.5 **
ECN	(460)	67.0	86.0	76.0	50.0
NGGBUG	(755)	66.2	86.3	76.4	60.2
INCOLAB	(821)	63.9	84.8	76.3	59.6
TLR	(900)	68.4	88.5	79.8	66.5
MICHAEL	(904)	67.1	97.9 *	53.7 **	57.9
SECIL	(985)	53.0 **	81.0	73.0	57.0
DETS	(1055)	72.8 *	91.0	79.9	57.9
INTER	(1057)	57.2 **	70.2 **	69.2	52.8
CELA	(1060)	67.5	85.2	74.3	55.4
KES	(1080)	64.4	85.6	90.1 *	66.3
ICB-CSIC	(1113)	68.3	88.9	80.1	61.7

	Statistical Results			
NDA mean	66.59	86.05	76.04	58.55
NDA st dev	2.97	4.16	5.14	4.80
N	12	12	12	12
Median	66.62	85.80	76.15	58.75
MAD	2.00	2.90	3.70	3.15

## BIMEP 2012.1 - General Analysis

Sample	426	445	446	447	MIC
<b>Volatile Matter (g/kg)</b>					
ECN (460)	600	733 **	694	371	
INCOLAB (821)	618	746	702	368	
TLR (900)	613	742	705	367	
SECIL (985)	658 **	780 **	746 **	399 **	
DETS (1055)	614	746	709	376	
CELA (1060)	707 **	893 **	892 **	446 **	
KES (1080)	613	743	688	356	
ICB-CSIC (1113)	328 **	744	703	364	
	===== Statistical Results =====				
NDA mean	612.3	744.1	700.7	367.6	
NDA st dev	11.5	2.9	9.9	7.8	
N	8	8	8	8	
Median	613.7	745.0	703.8	369.4	
MAD	9.0	2.3	7.4	5.7	
	=====				

## BIMEP 2012.1 - Elementary Analysis

Sample		426	445	446	447	MIC
<b>Carbon (C) (g/kg)</b>						
IFPO	(145)	365	452	433	235	
ECN	(460)	365	454	430	248	
NGGBUG	(755)	375	458	438	228	
INCOLAB	(821)	381	460	442	233	
TLR	(900)	374	463	447	244	
SECIL	(985)	365	455	436	247	
DETS	(1055)	386	471 *	461 **	252	
INTER	(1057)	387	448	436	241	
CELA	(1060)	347	411 **	443	232	
KES	(1080)	386	461	444	243	
ICB-CSIC	(1113)	380	459	440	247	

	Statistical Results			
NDA mean	375.5	457.5	439.0	241.9
NDA st dev	14.4	5.7	5.9	7.9
N	11	11	11	11
Median	375.5	457.8	439.8	243.0
MAD	10.5	3.8	4.0	5.0

<b>Cl (g/kg)</b>						
ECN	(460)	4.92	5.27	10.40	1.75	
NGGBUG	(755)	4.70	4.96	9.85	1.29	
INCOLAB	(821)	5.35	5.05	10.40	1.85	
TLR	(900)	6.59 **	6.60 **	11.04	2.04	
SECIL	(985)	-	4.70	8.70	2.20	
DETS	(1055)	4.85	6.16 *	10.11	1.48	
CELA	(1060)	4.46	4.64	8.63	1.28	
KES	(1080)	4.00	7.40 **	7.20 **	1.60	
ICB-CSIC	(1113)	5.00	4.90	9.60	2.22	

	Statistical Results			
NDA mean	4.809	4.986	9.903	1.743
NDA st dev	0.437	0.498	0.865	0.420
N	8	9	9	9
Median	4.885	5.050	9.850	1.750
MAD	0.305	0.350	0.550	0.290

<b>Hydrogen (H) (g/kg)</b>						
IFPO	(145)	40.7	53.7	51.3	20.0	
ECN	(460)	46.1	61.4	57.7	27.5 *	
NGGBUG	(755)	43.1	57.9	54.9	21.8	
INCOLAB	(821)	44.6	57.4	54.8	23.4	
TLR	(900)	42.8	59.1	56.1	22.9	
SECIL	(985)	42.8	54.0	50.5	24.5	
DETS	(1055)	5.0 **	5.5 **	5.2 **	1.7 **	
INTER	(1057)	45.7	56.7	53.8	24.0	
KES	(1080)	46.7	56.0	56.7	24.4	
ICB-CSIC	(1113)	44.7	57.7	54.7	22.5	

	Statistical Results			
NDA mean	44.27	57.05	54.85	23.31
NDA st dev	2.12	2.30	2.40	1.84
N	10	10	10	10
Median	43.85	57.04	54.75	23.15
MAD	1.46	1.55	1.65	1.29

## BIMEP 2012.1 - Elementary Analysis

Sample		426	445	446	447	MIC
<b>Nitrogen (N) (g/kg)</b>						
IFPO	(145)	33.4	29.5	15.8	17.9	
ECN	(460)	31.4	29.1	16.1	17.8	
NGGBUG	(755)	34.0	29.2	17.0	17.4	
INCOLAB	(821)	33.2	28.5	15.8	16.9	
TLR	(900)	32.8	30.3	16.0	17.9	
SECIL	(985)	33.0	28.6	16.5	18.5	
DETS	(1055)	31.3	29.4	16.2	17.4	
INTER	(1057)	35.7	27.7	15.1 *	17.4	
CELA	(1060)	30.7	25.8 **	13.8 **	15.4 **	
KES	(1080)	30.1	25.6 **	12.5 **	15.9 *	
ICB-CSIC	(1113)	37.7 *	31.3 *	16.3	19.3 *	

	Statistical Results				
NDA mean	32.69	29.12	16.11	17.62	
NDA st dev	2.27	0.92	0.44	0.70	
N	11	11	11	11	
Median	33.00	29.10	16.00	17.44	
MAD	1.60	0.60	0.30	0.46	

<b>S (g/kg)</b>						
ECN	(460)	4.20	2.87	1.42	2.35	
NGGBUG	(755)	5.55	3.21 *	1.38	2.63	
INCOLAB	(821)	5.30	2.70	1.50 **	2.30	
TLR	(900)	3.80	2.70	1.40	1.60	
SECIL	(985)	5.60	2.90	1.40	2.40	
DETS	(1055)	4.69	2.64	1.14 **	2.07	
CELA	(1060)	4.35	2.58	1.31 **	1.71	
KES	(1080)	4.40	1.30 **	1.20 **	1.20 *	
ICB-CSIC	(1113)	4.80	2.70	1.42	2.65	

	Statistical Results				
NDA mean	4.717	2.729	1.404	2.195	
NDA st dev	0.712	0.167	0.027	0.495	
N	9	9	9	9	
Median	4.690	2.700	1.400	2.300	
MAD	0.490	0.120	0.020	0.330	

## BIMEP 2012.1 - Water Soluble Elements

Sample		426	445	446	447	MIC
<b>Cl (g/kg)</b>						
DETS	(1055)	6.15	6.19	12.4	2.15	
KES	(1080)	4.00	7.40	7.2	1.60	
ICB-CSIC	(1113)	5.12	5.22	10.2	1.62	
===== Statistical Results (no NDA) =====						
N		3	3	3	3	
Median		5.120	6.190	10.21	1.620	
MAD		1.030	0.970	2.17	0.020	
=====						
<b>K (g/kg)</b>						
DETS	(1055)	23.2	23.0	42.8	6.64	
ICB-CSIC	(1113)	24.0	26.4	34.8	8.66	
===== Statistical Results (no NDA) =====						
N		2	2	2	2	
Median		23.61	24.71	38.78	7.650	
MAD		0.41	1.71	4.03	1.010	
=====						
<b>Na (g/kg)</b>						
DETS	(1055)	3.02	0.241	0.072	1.60	
ICB-CSIC	(1113)	3.96	0.860	0.890	1.24	
===== Statistical Results (no NDA) =====						
N		2	2	2	2	
Median		3.490	0.5505	0.4810	1.420	
MAD		0.470	0.3095	0.4090	0.180	
=====						

## BIMEP 2012.1 - Major Elements

Sample		426	445	446	447	MIC
<b>Al (g/kg)</b>						
INCOLAB	(821)	2.000 <	0.720 <	0.760 <		21.9
SECIL	(985)	0.500	0.300	0.400		15.1
DETS	(1055)	0.291	0.285	0.185		4.7
CELA	(1060)	0.580	0.463	2.430		18.3
KES	(1080)	0.810	0.600	0.330		21.1
===== Statistical Results (no NDA) =====						
N		4	4	4		5
Median		0.5400	0.3815	0.3650		18.30
MAD		0.1445	0.0890	0.1075		3.20
=====						
<b>Ca (g/kg)</b>						
INCOLAB	(821)	86.2	23.9	3.47		75.6
SECIL	(985)	51.7	19.4	2.90		54.9
DETS	(1055)	103.3	27.5	3.26		90.7
CELA	(1060)	74.1	21.1	3.03		155.0
KES	(1080)	91.0	22.9	3.04		71.8
===== Statistical Results (no NDA) =====						
N		5	5	5		5
Median		86.23	22.91	3.040		75.57
MAD		12.13	1.81	0.140		15.13
=====						
<b>Fe (g/kg)</b>						
INCOLAB	(821)	1.030	0.290	0.610		12.9
SECIL	(985)	0.700	0.200	0.400		9.1
DETS	(1055)	0.813	0.265	0.564		10.6
CELA	(1060)	0.850	0.220	0.530		10.0
KES	(1080)	1.030	0.280	0.510		11.8
===== Statistical Results (no NDA) =====						
N		5	5	5		5
Median		0.8500	0.2650	0.5300		10.60
MAD		0.1500	0.0250	0.0340		1.15
=====						
<b>K (g/kg)</b>						
INCOLAB	(821)	27.2	28.2	38.4		16.2
SECIL	(985)	21.1	20.2	28.8		11.5
DETS	(1055)	30.2	27.5	36.9		10.9
CELA	(1060)	13.2	17.9	28.6		14.4
202	(1065)	27.4	25.7	40.1		11.4
KES	(1080)	25.9	25.7	36.5		14.7
===== Statistical Results (no NDA) =====						
N		6	6	6		6
Median		26.56	25.71	36.70		12.95
MAD		2.25	2.13	2.57		1.67
=====						
<b>Mg (g/kg)</b>						
INCOLAB	(821)	10.4	1.73	1.46		6.46
SECIL	(985)	10.3	1.60	1.30		5.60
DETS	(1055)	10.4	1.65	1.25		4.40
CELA	(1060)	11.5	1.55	1.38		15.80
KES	(1080)	10.2	1.66	1.27		5.84
===== Statistical Results (no NDA) =====						
N		5	5	5		5
Median		10.40	1.650	1.300		5.840
MAD		0.10	0.050	0.050		0.620
=====						

## BIMEP 2012.1 - Major Elements

Sample		426	445	446	447	MIC
<b>Na (g/kg)</b>						
INCOLAB	(821)	3.67	0.260	0.110 <	5.08	
SECIL	(985)	3.20	0.200	0.200	2.90	
DETS	(1055)	3.34	0.297	0.141	1.02	
CELA	(1060)	3.69	0.270 <	0.270 <	4.49	
KES	(1080)	3.32	0.240	0.120	5.06	
===== Statistical Results (no NDA) =====						
N		5	4	3	5	
Median		3.340	0.2500	0.1410	4.490	
MAD		0.140	0.0285	0.0210	0.590	
=====						
<b>P (g/kg)</b>						
INCOLAB	(821)	19.9	2.46	2.55	3.04	
SECIL	(985)	16.6	2.00	2.10	3.00	
DETS	(1055)	20.5	2.58	2.50	2.65	
CELA	(1060)	19.9	2.26	2.43	2.56	
202	(1065)	19.4	2.42	2.60	2.86	
KES	(1080)	18.4	2.30	2.26	2.71	
===== Statistical Results (no NDA) =====						
N		6	6	6	6	
Median		19.65	2.360	2.465	2.785	
MAD		0.57	0.100	0.110	0.175	
=====						
<b>Si (g/kg)</b>						
INCOLAB	(821)	8.26	1.43	14.0	151.7	
SECIL	(985)	4.40	0.70	13.8	68.8	
DETS	(1055)	6.27	1.15	16.6	98.9	
CELA	(1060)	2.95	0.55	9.4	70.8	
KES	(1080)	8.41	1.40	12.5	149.4	
===== Statistical Results (no NDA) =====						
N		5	5	5	5	
Median		6.270	1.150	13.80	98.90	
MAD		1.990	0.280	1.26	30.10	
=====						

## BIMEP 2012.1 - Minor Elements

Sample		426	445	446	447	MIC
<b>As (mg/kg)</b>						
INCOLAB	(821)	1.000	0.700	0.400 <	5.20	
TLR	(900)	0.580	0.477	0.045	4.07	
SECIL	(985)	1.100	1.800	0.800	5.20	
DETS	(1055)	1.080	1.370	0.706	4.67	
CELA	(1060)	5.360 <	5.470 <	5.400 <	5.29 <	
202	(1065)	0.760	0.630	0.160	6.67	
KES	(1080)	0.110	0.870	0.050 <	2.80	
===== Statistical Results (no NDA) =====						
N		6	6	4	6	
Median		0.8800	0.7850	0.4330	4.935	
MAD		0.2100	0.2315	0.3200	0.563	
=====						
<b>Ba (mg/kg)</b>						
INCOLAB	(821)	64.0	11.0	24.0	300	
TLR	(900)	20.0	10.0	24.1	177	
SECIL	(985)	16.5	6.8	24.8	222	
DETS	(1055)	22.7	15.4	25.5	14	
CELA	(1060)	17.5	8.9	20.9	141	
202	(1065)	26.5	10.1	22.1	161	
KES	(1080)	88.3	12.8	8.1	38	
===== Statistical Results (no NDA) =====						
N		7	7	7	7	
Median		22.70	10.10	24.00	161.3	
MAD		5.20	1.19	1.50	60.6	
=====						
<b>Be (mg/kg)</b>						
INCOLAB	(821)	0.200 <	0.200 <	0.200 <	0.800	
DETS	(1055)	0.200 <	0.200 <	0.200 <	0.318	
CELA	(1060)	0.530 <	0.550 <	0.500 <	0.560	
KES	(1080)	0.500 <	0.500 <	0.500 <	0.500 <	
===== Statistical Results (no NDA) =====						
N		-	-	-	3	
Median		-	-	-	0.5600	
MAD		-	-	-	0.2400	
=====						
<b>Cd (mg/kg)</b>						
INCOLAB	(821)	0.300	0.2000 <	0.200 <	0.600	
TLR	(900)	0.318	0.0550	0.034	0.550	
SECIL	(985)	2.900	2.7000	2.600	3.300	
DETS	(1055)	0.324	0.1000 <	0.100 <	0.637	
CELA	(1060)	1.070 <	1.0900 <	1.080 <	1.060 <	
202	(1065)	0.380	0.0670	0.035	0.800	
KES	(1080)	0.650	0.0700	0.220	0.180	
===== Statistical Results (no NDA) =====						
N		6	4	4	6	
Median		0.3520	0.06850	0.1275	0.6185	
MAD		0.0430	0.00750	0.0930	0.1250	
=====						
<b>Co (mg/kg)</b>						
INCOLAB	(821)	3.40	1.100	0.300 <	4.50	
TLR	(900)	2.79	0.250	0.100 <	2.84	
SECIL	(985)	4.90	1.100	1.500	4.60	
DETS	(1055)	2.64	0.700 <	0.700 <	3.72	
===== Summary Statistics (No NDA) =====						
Median		2.790	0.5700	0.5100	3.720	
MAD		0.610	0.3200	0.4500	0.780	
N		7	5	3	7	

(cont.)

## BIMEP 2012.1 - Minor Elements

Sample		426	445	446	447	MIC
<b>Co (mg/kg)</b> (cont.)						
CELA	(1060)	2.58	1.090 <	1.080 <	3.70	
202	(1065)	3.59	0.340	0.060	4.18	
KES	(1080)	1.96	0.570	0.510	1.38	
===== Statistical Results (no NDA) =====						
N		7	5	3	7	
Median		2.790	0.5700	0.5100	3.720	
MAD		0.610	0.3200	0.4500	0.780	
=====						
<b>Cr (mg/kg)</b>						
INCOLAB	(821)	9.00	3.00	2.60	38.0	
TLR	(900)	6.80	5.00 <	5.00 <	21.2	
SECIL	(985)	6.40	0.20	0.70	49.6	
DETS	(1055)	6.42	1.59	1.63	20.7	
CELA	(1060)	7.99	1.09 <	1.08 <	33.2	
202	(1065)	8.96	1.17	1.34	33.3	
KES	(1080)	14.72	3.16	2.71	9.0	
===== Statistical Results (no NDA) =====						
N		7	5	5	7	
Median		7.990	1.590	1.630	33.20	
MAD		1.190	1.390	0.930	12.00	
=====						
<b>Cu (mg/kg)</b>						
INCOLAB	(821)	75.0	4.60	5.50	63.0	
TLR	(900)	85.1	5.00 <	6.42	64.2	
SECIL	(985)	78.7	2.00	4.50	92.4	
DETS	(1055)	77.1	4.56	5.33	59.4	
CELA	(1060)	68.1	10.90 <	10.80 <	46.5	
202	(1065)	98.9	5.16	6.95	72.1	
KES	(1080)	62.1	22.10	6.25	16.7	
===== Statistical Results (no NDA) =====						
N		7	5	6	7	
Median		77.10	4.600	5.875	63.00	
MAD		7.99	0.560	0.545	9.10	
=====						
<b>F (mg/kg)</b>						
INCOLAB	(821)	88.0	38.0	11.0	233	
TLR	(900)	73.1	30.2	5.0 <	185	
DETS	(1055)	200.0	110.0	109.0	106	
CELA	(1060)	0.0	0.0 <	0.0 <	0	
KES	(1080)	22.0	5.1	21.0	60	
===== Statistical Results (no NDA) =====						
N		5	4	3	5	
Median		73.10	34.10	21.00	106.0	
MAD		51.10	16.45	10.00	78.6	
=====						
<b>Hg (mg/kg)</b>						
INCOLAB	(821)	0.0070	0.0080	0.00400	0.150	
TLR	(900)	0.0200 <	0.0200 <	0.02000 <	0.121	
DETS	(1055)	0.3000 <	0.3000 <	0.30000 <	0.300 <	
CELA	(1060)	0.1100 <	0.1100 <	0.11000 <	0.150	
KES	(1080)	0.0200	0.0200	0.01000 <	0.010 <	
===== Statistical Results (no NDA) =====						
N		2	2	1	3	
Median		0.01350	0.01400	0.004000	0.1500	
MAD		0.00650	0.00600	-	-	
=====						

## BIMEP 2012.1 - Minor Elements

Sample		426	445	446	447	MIC
<b>Mn (mg/kg)</b>						
INCOLAB	(821)	347	41.0	50.0	430	
TLR	(900)	423	38.5	50.4	403	
SECIL	(985)	313	33.1	47.8	363	
DETS	(1055)	405	50.0	57.1	419	
CELA	(1060)	376	42.0	50.7	366	
202	(1065)	487	49.7	60.0	492	
KES	(1080)	74	14.0	62.8	48	
===== Statistical Results (no NDA) =====						
N		7	7	7	7	
Median		376.0	41.00	50.70	403.3	
MAD		47.4	7.90	2.90	37.3	
=====						
<b>Mo (mg/kg)</b>						
INCOLAB	(821)	5.20	4.000 <	4.000 <	4.00 <	
TLR	(900)	5.10	0.600 <	0.900	1.40	
SECIL	(985)	6.10	1.700	2.100	2.80	
DETS	(1055)	4.26	0.400 <	0.400 <	1.11	
CELA	(1060)	4.66	1.090 <	1.080 <	1.37	
202	(1065)	5.87	0.430	0.330	1.47	
KES	(1080)	2.03	0.510	0.310	0.37	
===== Statistical Results (no NDA) =====						
N		7	3	4	6	
Median		5.100	0.5100	0.6150	1.385	
MAD		0.770	0.0800	0.2950	0.180	
=====						
<b>Ni (mg/kg)</b>						
INCOLAB	(821)	5.00	1.00	0.70	15.0	
TLR	(900)	5.60	3.00 <	3.00 <	12.9	
SECIL	(985)	6.70	1.30	1.00	14.9	
DETS	(1055)	5.34	1.65	1.09	12.2	
CELA	(1060)	6.96	1.20	1.08 <	12.0	
202	(1065)	7.39	2.26	1.03	17.6	
KES	(1080)	161.50	49.27	32.10	157.3	
===== Statistical Results (no NDA) =====						
N		7	6	5	7	
Median		6.700	1.475	1.030	14.90	
MAD		1.100	0.375	0.060	2.70	
=====						
<b>Pb (mg/kg)</b>						
INCOLAB	(821)	2.70	1.10	1.10	109.0	
TLR	(900)	2.26	0.75	0.68	86.4	
SECIL	(985)	0.40	-	-	88.6	
DETS	(1055)	2.48	1.05	0.92	86.5	
CELA	(1060)	10.70 <	10.90 <	10.80 <	88.1	
202	(1065)	2.97	1.47	2.36	96.7	
KES	(1080)	62.46	11.40	9.91	97.5	
===== Statistical Results (no NDA) =====						
N		6	5	5	7	
Median		2.590	1.100	1.100	88.60	
MAD		0.355	0.350	0.420	2.18	
=====						

## BIMEP 2012.1 - Minor Elements

Sample		426	445	446	447	MIC
<b>Sb (mg/kg)</b>						
INCOLAB	(821)	0.5 <	0.50 <	0.50 <	1.30	
TLR	(900)	2.0 <	2.00 <	2.00 <	2.00 <	
SECIL	(985)	-	-	-	0.10	
DETS	(1055)	1.0 <	1.00 <	1.00 <	1.38	
CELA	(1060)	2.7 <	2.73 <	2.70 <	2.65 <	
KES	(1080)	46.1	1.58	1.30	3.41	
===== Statistical Results (no NDA) =====						
N		1	1	1	4	
Median		46.11	1.580	1.300	1.340	
MAD		-	-	-	0.640	
=====						
<b>Se (mg/kg)</b>						
INCOLAB	(821)	1.00 <	1.000 <	1.000 <	1.000 <	
TLR	(900)	1.24	1.000 <	1.000 <	1.000 <	
SECIL	(985)	0.90	-	-	0.600	
DETS	(1055)	1.46	0.500 <	0.500 <	0.500 <	
CELA	(1060)	2.68 <	2.730 <	2.700 <	2.650 <	
KES	(1080)	0.10 <	0.100 <	0.100 <	0.100 <	
===== Statistical Results (no NDA) =====						
N		3	-	-	1	
Median		1.240	-	-	0.6000	
MAD		0.220	-	-	-	
=====						
<b>Sn (mg/kg)</b>						
INCOLAB	(821)	0.30 <	0.300 <	0.300 <	9.60	
SECIL	(985)	0.80	0.600	1.100	9.90	
DETS	(1055)	1.00 <	1.000 <	1.000 <	7.85	
CELA	(1060)	1.07 <	1.090 <	1.080 <	14.50	
KES	(1080)	6.21	1.360	0.840	3.11	
===== Statistical Results (no NDA) =====						
N		2	2	2	5	
Median		3.505	0.9800	0.9700	9.600	
MAD		2.705	0.3800	0.1300	1.750	
=====						
<b>Te (mg/kg)</b>						
INCOLAB	(821)	0.500 <	0.500 <	0.500 <	0.500 <	
TLR	(900)	1.000 <	1.000 <	1.000 <	1.000 <	
CELA	(1060)	1.070 <	1.090 <	1.080 <	1.060 <	
KES	(1080)	0.500 <	0.500 <	0.500 <	0.500 <	
===== No Statistical Results =====						
<b>Ti (mg/kg)</b>						
INCOLAB	(821)	80.0	40.0	30.0	1200	
DETS	(1055)	17.1	11.1	2.9	61	
CELA	(1060)	13.7	12.9	26.7	283	
KES	(1080)	309.3	41.7	47.4	72	
===== Statistical Results (no NDA) =====						
N		4	4	4	4	
Median		48.55	26.45	28.35	177.7	
MAD		33.15	14.40	10.35	111.0	
=====						

## BIMEP 2012.1 - Minor Elements

Sample		426	445	446	447	MIC
<b>TI (mg/kg)</b>						
INCOLAB	(821)	0.200 <	0.200 <	0.20 <	0.200	
TLR	(900)	3.900 <	3.900 <	3.90 <	3.900 <	
DETS	(1055)	1.000 <	1.000 <	1.00 <	1.000 <	
CELA	(1060)	1.070 <	1.090 <	1.08 <	1.060 <	
KES	(1080)	0.500 <	0.500 <	6.25	1.080	
===== Statistical Results (no NDA) =====						
N		-	-	1	2	
Median		-	-	6.250	0.6400	
MAD		-	-	-	0.4400	
=====						
<b>V (mg/kg)</b>						
INCOLAB	(821)	3.40	1.50	0.800	24.0	
TLR	(900)	3.20	1.00 <	1.000 <	14.5	
SECIL	(985)	3.10	0.50	0.500	24.8	
DETS	(1055)	2.37	0.80 <	0.800 <	10.0	
CELA	(1060)	2.94	1.09 <	1.080 <	18.0	
202	(1065)	4.24	1.14	0.790	24.0	
KES	(1080)	15.37	4.29	10.100	9.6	
===== Statistical Results (no NDA) =====						
N		7	4	4	7	
Median		3.200	1.320	0.7950	18.00	
MAD		0.260	0.500	0.1500	6.00	
=====						
<b>Zn (mg/kg)</b>						
INCOLAB	(821)	325	15.0	23.0	253	
TLR	(900)	404	19.4	32.3	255	
SECIL	(985)	380	18.5	36.2	255	
DETS	(1055)	345	22.0	33.7	212	
CELA	(1060)	351	54.7 <	54.0 <	194	
202	(1065)	556	30.1	50.0	358	
KES	(1080)	101	12.7	4.5	48	
===== Statistical Results (no NDA) =====						
N		7	6	6	7	
Median		351.0	18.95	33.00	253.0	
MAD		29.1	3.50	6.60	40.7	
=====						

# BIMEP 2012.1 Z - Scores

## BIMEP 2012.1 Z - Scores - Per Participant

Sample	426	445	446	447
<b>IFPO (145)</b>				
Ash (GEN)	-0.21	0.39	-0.65	3.05 **
Calorific Value (gross) (GEN)	-0.84	-2.52 *	-1.77	-0.19
Moisture (GEN)	-2.05 *	-1.48	-0.83	3.95 **
Carbon (C) (ELEM)	-0.73	-0.98	-1.01	-0.87
Hydrogen (H) (ELEM)	-1.68	-1.45	-1.48	-1.80
Nitrogen (N) (ELEM)	0.31	0.42	-0.72	0.40
<b>ECN (460)</b>				
Ash (GEN)	-0.12	0.97	-1.05	-0.49
Calorific Value (gross) (GEN)	-2.00	0.44	0.25	-0.90
Moisture (GEN)	0.14	-0.01	-0.01	-1.78
Volatile Matter (GEN)	-1.07	-3.81 **	-0.67	0.44
Carbon (C) (ELEM)	-0.73	-0.63	-1.52	0.78
Cl (ELEM)	0.25	0.57	0.57	0.02
Hydrogen (H) (ELEM)	0.87	1.89	1.19	2.27 *
Nitrogen (N) (ELEM)	-0.57	-0.02	-0.03	0.26
S (ELEM)	-0.73	0.84	0.57	0.31
<b>NGGBUG (755)</b>				
Ash (GEN)	-3.40 **	-0.98	3.33 **	-0.75
Calorific Value (gross) (GEN)	-0.36	0.08	-0.05	-0.06
Moisture (GEN)	-0.12	0.06	0.07	0.35
Carbon (C) (ELEM)	0.00	0.05	-0.22	-1.70
Cl (ELEM)	-0.25	-0.05	-0.06	-1.08
Hydrogen (H) (ELEM)	-0.56	0.37	0.02	-0.81
Nitrogen (N) (ELEM)	0.58	0.11	1.92	-0.36
S (ELEM)	1.17	2.88 *	-0.89	0.88
<b>INCOLAB (821)</b>				
Ash (GEN)	-1.00	0.09	0.73	-0.74
Calorific Value (gross) (GEN)	-0.03	0.25	0.29	-0.54
Moisture (GEN)	-0.91	-0.30	0.05	0.22
Volatile Matter (GEN)	0.49	0.50	0.10	0.01
Carbon (C) (ELEM)	0.40	0.35	0.45	-1.19
Cl (ELEM)	1.24	0.13	0.57	0.26
Hydrogen (H) (ELEM)	0.16	0.15	-0.02	0.05
Nitrogen (N) (ELEM)	0.22	-0.67	-0.72	-1.03
S (ELEM)	0.82	-0.17	3.48 **	0.21
Al (MAJOR)	< #	< #	< #	#
Ca (MAJOR)	#	#	#	#
Fe (MAJOR)	#	#	#	#
K (MAJOR)	#	#	#	#
Mg (MAJOR)	#	#	#	#
Na (MAJOR)	#	#	< #	#
P (MAJOR)	#	#	#	#
Si (MAJOR)	#	#	#	#
As (MINOR)	#	#	< #	#
Ba (MINOR)	#	#	#	#
Be (MINOR)	< #	< #	< #	#
Cd (MINOR)	#	< #	< #	#
Co (MINOR)	#	#	< #	#
Cr (MINOR)	#	#	#	#
Cu (MINOR)	#	#	#	#
F (MINOR)	#	#	#	#
Hg (MINOR)	#	#	#	#
Mn (MINOR)	#	#	#	#
Mo (MINOR)	#	< #	< #	< #
Ni (MINOR)	#	#	#	#
Pb (MINOR)	#	#	#	#
Sb (MINOR)	< #	< #	< #	#
Se (MINOR)	< #	< #	< #	< #
Sn (MINOR)	< #	< #	< #	#
Te (MINOR)	< #	< #	< #	< #
Ti (MINOR)	#	#	#	#
Tl (MINOR)	< #	< #	< #	#
V (MINOR)	#	#	#	#

(cont)

## BIMEP 2012.1 Z - Scores - Per Participant

Sample	426	445	446	447
<b>INCOLAB (821) (cont.)</b>				
Zn (MINOR)	#	#	#	#
<b>TLR (900)</b>				
Ash (GEN)	0.18	-0.41	-0.05	0.38
Calorific Value (gross) (GEN)	0.47	0.79	0.79	0.47
Moisture (GEN)	0.61	0.59	0.73	1.66
Volatile Matter (GEN)	0.01	-0.60	0.39	-0.04
Carbon (C) (ELEM)	-0.11	1.02	1.33	0.31
Cl (ELEM)	4.08 **	3.24 **	1.31	0.71
Hydrogen (H) (ELEM)	-0.69	0.89	0.52	-0.22
Nitrogen (N) (ELEM)	0.05	1.29	-0.26	0.40
S (ELEM)	-1.29	-0.17	-0.16	-1.20
As (MINOR)	#	#	#	#
Ba (MINOR)	#	#	#	#
Cd (MINOR)	#	#	#	#
Co (MINOR)	#	#	< #	#
Cr (MINOR)	#	< #	< #	#
Cu (MINOR)	#	< #	#	#
F (MINOR)	#	#	< #	#
Hg (MINOR)	< #	< #	< #	#
Mn (MINOR)	#	#	#	#
Mo (MINOR)	#	< #	#	#
Ni (MINOR)	#	< #	< #	#
Pb (MINOR)	#	#	#	#
Sb (MINOR)	< #	< #	< #	< #
Se (MINOR)	#	< #	< #	< #
Te (MINOR)	< #	< #	< #	< #
Tl (MINOR)	< #	< #	< #	< #
V (MINOR)	#	< #	< #	#
Zn (MINOR)	#	#	#	#
<b>MICHAEL (904)</b>				
Ash (GEN)	-0.80	0.34	0.50	-3.71 **
Calorific Value (gross) (GEN)	3.23 **	6.24 **	-3.29 **	0.95
Moisture (GEN)	0.17	2.85 *	-4.35 **	-0.14
<b>SECIL (985)</b>				
Ash (GEN)	-5.22 **	-1.51	-2.88 *	-5.60 **
Calorific Value (gross) (GEN)	0.66	-0.74	0.51	1.34
Moisture (GEN)	-4.58 **	-1.22	-0.59	-0.32
Volatile Matter (GEN)	3.97 **	12.25 **	4.56 **	4.00 **
Carbon (C) (ELEM)	-0.73	-0.45	-0.50	0.65
Cl (ELEM)	-	-0.57	-1.39	1.09
Hydrogen (H) (ELEM)	-0.69	-1.32	-1.81	0.65
Nitrogen (N) (ELEM)	0.13	-0.57	0.89	1.26
S (ELEM)	1.24	1.02	-0.16	0.41
Al (MAJOR)	#	#	#	#
Ca (MAJOR)	#	#	#	#
Fe (MAJOR)	#	#	#	#
K (MAJOR)	#	#	#	#
Mg (MAJOR)	#	#	#	#
Na (MAJOR)	#	#	#	#
P (MAJOR)	#	#	#	#
Si (MAJOR)	#	#	#	#
As (MINOR)	#	#	#	#
Ba (MINOR)	#	#	#	#
Cd (MINOR)	#	#	#	#
Co (MINOR)	#	#	#	#
Cr (MINOR)	#	#	#	#
Cu (MINOR)	#	#	#	#
Mn (MINOR)	#	#	#	#
Mo (MINOR)	#	#	#	#
Ni (MINOR)	#	#	#	#
Pb (MINOR)	#	-	-	#
Sb (MINOR)	-	-	-	#
Se (MINOR)	#	-	-	#

(cont)

## BIMEP 2012.1 Z - Scores - Per Participant

Sample	426	445	446	447
<b>SECIL (985) (cont.)</b>				
Sn (MINOR)	#	#	#	#
V (MINOR)	#	#	#	#
Zn (MINOR)	#	#	#	#
<b>DETS (1055)</b>				
Ash (GEN)	0.73	1.03	0.36	0.43
Calorific Value (gross) (GEN)	0.75	0.77	-0.77	-0.56
Moisture (GEN)	2.09 *	1.19	0.75	-0.14
Volatile Matter (GEN)	0.18	0.50	0.81	1.02
Carbon (C) (ELEM)	0.76	2.40 *	3.70 **	1.25
Cl (ELEM)	0.09	2.36 *	0.24	-0.62
Hydrogen (H) (ELEM)	-18.55 **	-22.38 **	-20.69 **	-11.70 **
Nitrogen (N) (ELEM)	-0.61	0.31	0.20	-0.31
S (ELEM)	-0.04	-0.53	-9.62 **	-0.25
Cl (WS)	#	#	#	#
K (WS)	#	#	#	#
Na (WS)	#	#	#	#
Al (MAJOR)	#	#	#	#
Ca (MAJOR)	#	#	#	#
Fe (MAJOR)	#	#	#	#
K (MAJOR)	#	#	#	#
Mg (MAJOR)	#	#	#	#
Na (MAJOR)	#	#	#	#
P (MAJOR)	#	#	#	#
Si (MAJOR)	#	#	#	#
As (MINOR)	#	#	#	#
Ba (MINOR)	#	#	#	#
Be (MINOR)	< #	< #	< #	#
Cd (MINOR)	#	< #	< #	#
Co (MINOR)	#	< #	< #	#
Cr (MINOR)	#	#	#	#
Cu (MINOR)	#	#	#	#
F (MINOR)	#	#	#	#
Hg (MINOR)	< #	< #	< #	< #
Mn (MINOR)	#	#	#	#
Mo (MINOR)	#	< #	< #	#
Ni (MINOR)	#	#	#	#
Pb (MINOR)	#	#	#	#
Sb (MINOR)	< #	< #	< #	#
Se (MINOR)	#	< #	< #	< #
Sn (MINOR)	< #	< #	< #	#
Ti (MINOR)	#	#	#	#
Tl (MINOR)	< #	< #	< #	< #
V (MINOR)	#	< #	< #	#
Zn (MINOR)	#	#	#	#
<b>INTER (1057)</b>				
Ash (GEN)	1.17	-0.32	1.01	0.95
Moisture (GEN)	-3.17 **	-3.82 **	-1.33	-1.19
Carbon (C) (ELEM)	0.81	-1.71	-0.54	-0.13
Hydrogen (H) (ELEM)	0.69	-0.16	-0.43	0.36
Nitrogen (N) (ELEM)	1.33	-1.58	-2.44 *	-0.26
<b>CELA (1060)</b>				
Ash (GEN)	-4.20 **	-1.78	-5.16 **	-5.34 **
Calorific Value (gross) (GEN)	-3.76 **	-9.93 **	-5.11 **	-1.95
Moisture (GEN)	0.31	-0.21	-0.34	-0.66
Volatile Matter (GEN)	8.20 **	50.84 **	19.27 **	10.03 **
Carbon (C) (ELEM)	-1.99	-8.23 **	0.68	-1.25
Cl (ELEM)	-0.80	-0.69	-1.47	-1.10
Nitrogen (N) (ELEM)	-0.88	-3.62 **	-5.31 **	-3.18 **
S (ELEM)	-0.52	-0.89	-3.43 **	-0.98
Al (MAJOR)	#	#	#	#
Ca (MAJOR)	#	#	#	#
Fe (MAJOR)	#	#	#	#
K (MAJOR)	#	#	#	#

(cont)

## BIMEP 2012.1 Z - Scores - Per Participant

Sample	426	445	446	447
<b>CELA (1060)</b> (cont.)				
Mg (MAJOR)	#	#	#	#
Na (MAJOR)	#	< #	< #	#
P (MAJOR)	#	#	#	#
Si (MAJOR)	#	#	#	#
As (MINOR)	< #	< #	< #	< #
Ba (MINOR)	#	#	#	#
Be (MINOR)	< #	< #	< #	#
Cd (MINOR)	< #	< #	< #	< #
Co (MINOR)	#	< #	< #	#
Cr (MINOR)	#	< #	< #	#
Cu (MINOR)	#	< #	< #	#
F (MINOR)	#	< #	< #	#
Hg (MINOR)	< #	< #	< #	#
Mn (MINOR)	#	#	#	#
Mo (MINOR)	#	< #	< #	#
Ni (MINOR)	#	#	< #	#
Pb (MINOR)	< #	< #	< #	#
Sb (MINOR)	< #	< #	< #	< #
Se (MINOR)	< #	< #	< #	< #
Sn (MINOR)	< #	< #	< #	#
Te (MINOR)	< #	< #	< #	< #
Ti (MINOR)	#	#	#	#
Tl (MINOR)	< #	< #	< #	< #
V (MINOR)	#	< #	< #	#
Zn (MINOR)	#	< #	< #	#
<b>202 (1065)</b>				
Calorific Value (gross) (GEN)	-	-	-	-10.84 **
K (MAJOR)	#	#	#	#
P (MAJOR)	#	#	#	#
As (MINOR)	#	#	#	#
Ba (MINOR)	#	#	#	#
Cd (MINOR)	#	#	#	#
Co (MINOR)	#	#	#	#
Cr (MINOR)	#	#	#	#
Cu (MINOR)	#	#	#	#
Mn (MINOR)	#	#	#	#
Mo (MINOR)	#	#	#	#
Ni (MINOR)	#	#	#	#
Pb (MINOR)	#	#	#	#
V (MINOR)	#	#	#	#
Zn (MINOR)	#	#	#	#
<b>KES (1080)</b>				
Ash (GEN)	0.13	-0.13	-0.14	0.27
Calorific Value (gross) (GEN)	-0.62	-1.20	5.21 **	-0.13
Moisture (GEN)	-0.74	-0.11	2.73 *	1.61
Volatile Matter (GEN)	0.06	-0.39	-1.28	-1.48
Carbon (C) (ELEM)	0.73	0.61	0.85	0.14
Cl (ELEM)	-1.85	4.84 **	-3.12 **	-0.34
Hydrogen (H) (ELEM)	1.15	-0.45	0.77	0.59
Nitrogen (N) (ELEM)	-1.14	-3.83 **	-8.29 **	-2.46 *
S (ELEM)	-0.45	-8.54 **	-7.44 **	-2.01 *
Cl (WS)	#	#	#	#
Al (MAJOR)	#	#	#	#
Ca (MAJOR)	#	#	#	#
Fe (MAJOR)	#	#	#	#
K (MAJOR)	#	#	#	#
Mg (MAJOR)	#	#	#	#
Na (MAJOR)	#	#	#	#
P (MAJOR)	#	#	#	#
Si (MAJOR)	#	#	#	#
As (MINOR)	#	#	< #	#
Ba (MINOR)	#	#	#	#
Be (MINOR)	< #	< #	< #	< #
Cd (MINOR)	#	#	#	#

(cont)

## BIMEP 2012.1 Z - Scores - Per Participant

Sample	426	445	446	447
<b>KES (1080) (cont.)</b>				
Co (MINOR)	#	#	#	#
Cr (MINOR)	#	#	#	#
Cu (MINOR)	#	#	#	#
F (MINOR)	#	#	#	#
Hg (MINOR)	#	#	< #	< #
Mn (MINOR)	#	#	#	#
Mo (MINOR)	#	#	#	#
Ni (MINOR)	#	#	#	#
Pb (MINOR)	#	#	#	#
Sb (MINOR)	#	#	#	#
Se (MINOR)	< #	< #	< #	< #
Sn (MINOR)	#	#	#	#
Te (MINOR)	< #	< #	< #	< #
Ti (MINOR)	#	#	#	#
Tl (MINOR)	< #	< #	#	#
V (MINOR)	#	#	#	#
Zn (MINOR)	#	#	#	#
<b>ICB-CSIC (1113)</b>				
Ash (GEN)	0.23	0.94	-0.60	-0.17
Calorific Value (gross) (GEN)	0.54	-0.24	-0.07	1.12
Moisture (GEN)	0.58	0.68	0.79	0.66
Volatile Matter (GEN)	-24.72 **	0.09	0.23	-0.43
Carbon (C) (ELEM)	0.32	0.33	0.14	0.65
Cl (ELEM)	0.44	-0.17	-0.35	1.14
Hydrogen (H) (ELEM)	0.20	0.28	-0.06	-0.44
Nitrogen (N) (ELEM)	2.20 *	2.38 *	0.43	2.41 *
S (ELEM)	0.12	-0.17	0.57	0.92
Cl (WS)	#	#	#	#
K (WS)	#	#	#	#
Na (WS)	#	#	#	#

# Errors and Corrections

## BIMEP 2011 Period 4

## Errors and Corrections BIMEP 2011 Period 4

Sample		442	444	443	422	Code
<b>General Analysis</b>						
<b>Ash (g/kg)</b>						
DETS	(1055)	62.2 **	411	562	5.02	D, N
		===== Statistical Results =====				
NDA mean		52.19	413.7	579.4	3.029	
NDA st dev		3.02	7.3	22.5	1.635	
N		12	12	12	12	
Median		52.50	413.0	582.8	3.150	
MAD		1.90	5.2	15.5	1.155	
		=====				
<b>Calorific Value (gross) (MJ/kg)</b>						
DETS	(1055)	18.1 **	13.1	8.77	19.6 **	D, N
		===== Statistical Results =====				
NDA mean		19.01	13.43	8.838	20.49	
NDA st dev		0.13	0.21	0.155	0.19	
N		11	11	10	11	
Median		19.00	13.41	8.805	20.41	
MAD		0.10	0.15	0.101	0.12	
		=====				
<b>Moisture (g/kg)</b>						
DETS	(1055)	50.0 **	84.2	34.6 **	51.6 **	D, N
		===== Statistical Results =====				
NDA mean		75.82	97.26	51.96	77.17	
NDA st dev		3.94	7.15	5.17	3.23	
N		12	12	12	12	
Median		75.10	95.16	51.18	77.10	
MAD		2.85	4.65	3.52	2.05	
		=====				
<b>Volatile Matter (g/kg)</b>						
DETS	(1055)	799	570	376	853	D, N
		===== Statistical Results =====				
NDA mean		781.4	570.1	366.6	846.1	
NDA st dev		13.4	6.9	19.8	13.9	
N		9	9	9	9	
Median		781.0	570.4	369.0	852.0	
MAD		10.0	4.6	14.0	11.0	
		=====				
<b>Elementary Analysis</b>						
<b>Carbon (C) (g/kg)</b>						
DETS	(1055)	476	315	261	505	D, N
		===== Statistical Results =====				
NDA mean		476.5	316.9	250.7	506.7	
NDA st dev		5.5	6.1	6.7	5.1	
N		11	11	11	11	
Median		475.5	317.0	249.7	507.0	
MAD		3.9	3.9	4.4	3.4	
		=====				

## Errors and Corrections BIMEP 2011 Period 4

Sample		442	444	443	422	MIC
<b>Cl (g/kg)</b>						
DETS	(1055)	0.632 **	0.545	1.04	0.8430 **	D, N
===== Statistical Results =====						
NDA mean		0.9098	0.5568	1.128	0.08756	
NDA st dev		0.0685	0.0548	0.530	0.05107	
N		9	9	9	8	
Median		0.9000	0.5600	1.036	0.09850	
MAD		0.0500	0.0400	0.374	0.03800	
=====						
<b>Hydrogen (H) (g/kg)</b>						
DETS	(1055)	58.2	45.2	25.4	62.9	D, N
===== Statistical Results =====						
NDA mean		59.25	44.98	25.88	62.80	
NDA st dev		1.39	1.16	1.21	1.23	
N		10	10	10	10	
Median		59.52	45.39	25.77	62.94	
MAD		1.00	0.80	0.76	0.86	
=====						
<b>Nitrogen (N) (g/kg)</b>						
LNEG-IP	(919)	7.91	48.1	18.9	2.190 <	C, M
DETS	(1055)	7.23	45.4 **	19.7	0.740	D, N
===== Statistical Results =====						
NDA mean		7.556	48.07	19.54	0.8596	
NDA st dev		0.571	0.50	0.64	0.4903	
N		11	11	11	8	
Median		7.650	47.86	19.50	0.8890	
MAD		0.420	0.34	0.44	0.3340	
=====						
<b>S (g/kg)</b>						
LNEG-IP	(919)	0.966	9.28	2.66	0.657 <	C, M
DETS	(1055)	0.630	7.37	2.02	0.100 <	D, N
===== Statistical Results =====						
NDA mean		0.8449	8.112	2.161	-	
NDA st dev		0.2043	1.074	0.573	-	
N		10	10	10	5	
Median		0.9000	8.270	2.160	0.1000	
MAD		0.1450	0.770	0.402	0.0100	
=====						
<b>Water Soluble Elements</b>						
<b>Cl (g/kg)</b>						
DETS	(1055)	0.500	0.240	0.813	0.035	D, N
===== Statistical Results (no NDA) =====						
N		3	3	3	3	
Median		0.9274	0.4897	0.8130	0.1066	
MAD		0.1326	0.0703	0.3230	0.0716	
=====						
<b>K (g/kg)</b>						
DETS	(1055)	2.91	0.93	7.12	0.330	D, N
===== Statistical Results (no NDA) =====						
N		2	2	2	2	
Median		3.115	1.118	8.855	0.3560	
MAD		0.205	0.187	1.735	0.0260	
=====						

## Errors and Corrections BIMEP 2011 Period 4

Sample		442	444	443	422	Code
<b>Na (g/kg)</b>						
DETS	(1055)	0.173	0.562	0	0.0900	D, N
		===== Statistical Results (no NDA) =====				
N		2	2	2	2	
Median		0.1381	0.6660	1055	0.09835	
MAD		0.0349	0.1040	1054	0.00835	
		=====				
<b>Major Elements</b>						
<b>Al (g/kg)</b>						
DETS	(1055)	0.253	18.0	11.9	0.0630	D, N
		===== Statistical Results (no NDA) =====				
N		6	6	6	5	
Median		0.5150	17.50	17.70	0.04000	
MAD		0.0800	1.80	3.45	0.02100	
		=====				
<b>Ca (g/kg)</b>						
DETS	(1055)	3.47	56.8	52.8	1948.000	D, N
		===== Statistical Results (no NDA) =====				
N		6	6	6	6	
Median		3.000	56.90	55.30	0.6850	
MAD		0.145	4.16	2.74	0.0835	
		=====				
<b>Fe (g/kg)</b>						
DETS	(1055)	0.344	43.7	12.4	0.0860	D, N
		===== Statistical Results (no NDA) =====				
N		6	6	6	5	
Median		0.3600	43.35	12.22	0.04000	
MAD		0.0230	3.13	1.10	0.01000	
		=====				
<b>K (g/kg)</b>						
DETS	(1055)	3.26	3.93	15.5	0.374	D, N
		===== Statistical Results (no NDA) =====				
N		6	6	6	6	
Median		3.380	3.600	17.10	0.2750	
MAD		0.305	0.365	0.88	0.0635	
		=====				
<b>Mg (g/kg)</b>						
DETS	(1055)	0.789	5.95	8.29	0.216	D, N
		===== Statistical Results (no NDA) =====				
N		6	6	6	6	
Median		0.8550	6.225	8.395	0.1300	
MAD		0.0460	0.825	0.500	0.0345	
		=====				
<b>Na (g/kg)</b>						
DETS	(1055)	0.184	1.36	0.47	0.1690	D, N
		===== Statistical Results (no NDA) =====				
N		6	6	6	6	
Median		0.1920	1.430	2.445	0.08500	
MAD		0.0295	0.165	1.055	0.02500	
		=====				

## Errors and Corrections BIMEP 2011 Period 4

Sample		442	444	443	422	Code
<b>P (g/kg)</b>						
DETS	(1055)	0.774	31.7	3.42	0.0680	D, N
		===== Statistical Results (no NDA) =====				
N		6	6	6	6	
Median		0.7515	30.40	3.460	0.04200	
MAD		0.0370	2.25	0.325	0.01500	
=====						
<b>Si (g/kg)</b>						
DETS	(1055)	3.31	37.3	106	0.153	D, N
		===== Statistical Results (no NDA) =====				
N		5	5	5	5	
Median		8.200	37.34	105.7	0.1500	
MAD		4.890	8.14	47.0	0.0300	
=====						
<b>Minor Elements</b>						
<b>As (mg/kg)</b>						
DETS	(1055)	0.631	4.69	4.92	0.316	D, N
		===== Statistical Results (no NDA) =====				
N		4	5	6	2	
Median		0.5655	5.300	5.740	0.7080	
MAD		0.1870	0.610	0.868	0.3920	
=====						
<b>Ba (mg/kg)</b>						
DETS	(1055)	24.7	4	114	12.13	D, N
		===== Statistical Results (no NDA) =====				
N		7	7	7	5	
Median		19.00	417.0	139.0	5.200	
MAD		1.47	9.0	17.0	0.400	
=====						
<b>Be (mg/kg)</b>						
DETS	(1055)	0.200 <	0.200 <	0.414	0.200 <	D, N
		===== Statistical Results (no NDA) =====				
N		-	1	2	-	
Median		-	0.3000	0.6070	-	
MAD		-	-	0.1930	-	
=====						
<b>Cd (mg/kg)</b>						
DETS	(1055)	0.105	1.58	0.414	0.10 <	D, N
		===== Statistical Results (no NDA) =====				
N		3	7	5	2	
Median		0.1100	1.400	0.4140	1.239	
MAD		0.0050	0.200	0.1080	1.162	
=====						
<b>Co (mg/kg)</b>						
DETS	(1055)	0.70 <	6.77	0.40	0.70 <	D, N
		===== Statistical Results (no NDA) =====				
N		1	7	7	1	
Median		2.700	6.770	5.080	1.500	
MAD		-	1.160	0.680	-	
=====						

## Errors and Corrections BIMEP 2011 Period 4

Sample		442	444	443	422	Code
<b>Cr (mg/kg)</b>						
DETS	(1055)	1.53	74.8	66.8	1.10	D, N
		===== Statistical Results (no NDA) =====				
N		3	7	7	2	
Median		3.300	78.88	91.80	1.750	
MAD		1.770	4.88	21.20	0.650	
		=====				
<b>Cu (mg/kg)</b>						
DETS	(1055)	4.42	262	49.7	1.00	D, N
		===== Statistical Results (no NDA) =====				
N		5	7	7	2	
Median		4.420	262.1	51.00	1.700	
MAD		0.680	17.1	4.23	0.700	
		=====				
<b>F (mg/kg)</b>						
DETS	(1055)	0.02	0	0.0	0.1 <	D, N
		===== Statistical Results (no NDA) =====				
N		3	4	4	1	
Median		8.200	105.1	96.93	17.00	
MAD		8.179	105.0	96.90	-	
		=====				
<b>Hg (mg/kg)</b>						
DETS	(1055)	0.3000 <	0.93	0.300 <	0.300 <	D, N
		===== Statistical Results (no NDA) =====				
N		3	6	4	2	
Median		0.02200	1.114	0.1225	0.1080	
MAD		0.00700	0.271	0.0375	0.1050	
		=====				
<b>Mn (mg/kg)</b>						
DETS	(1055)	83.2	420	506	100.8	D, N
		===== Statistical Results (no NDA) =====				
N		7	7	7	6	
Median		71.00	376.0	424.6	79.70	
MAD		2.00	36.0	29.6	5.85	
		=====				
<b>Mo (mg/kg)</b>						
DETS	(1055)	1.06	5.35	3.16	0.400 <	D, N
		===== Statistical Results (no NDA) =====				
N		4	7	6	2	
Median		1.300	5.700	3.795	0.7000	
MAD		0.172	0.180	0.600	0.5000	
		=====				
<b>Ni (mg/kg)</b>						
DETS	(1055)	0.684	42.0	23.8	0.580	D, N
		===== Statistical Results (no NDA) =====				
N		3	7	7	3	
Median		0.6840	37.30	25.20	0.5800	
MAD		0.1840	4.70	3.70	0.0200	
		=====				

## Errors and Corrections BIMEP 2011 Period 4

Sample		442	444	443	422	Code
<b>Pb (mg/kg)</b>						
DETS	(1055)	2.74	50.2	50.2	0.300 <	D, N
		===== Statistical Results (no NDA) =====				
N		5	7	7	2	
Median		2.740	52.80	59.40	0.2300	
MAD		0.260	7.80	3.00	0.1700	
		=====				
<b>Sb (mg/kg)</b>						
DETS	(1055)	1.000 <	5.68	1.61	1.00 <	D, N
		===== Statistical Results (no NDA) =====				
N		1	4	4	-	
Median		0.2000	3.770	2.055	-	
MAD		-	0.800	0.450	-	
		=====				
<b>Se (mg/kg)</b>						
DETS	(1055)	0.50 <	0.93	0.500 <	0.500 <	D, N
		===== Statistical Results (no NDA) =====				
N		2	4	2	-	
Median		3.300	1.500	0.7000	-	
MAD		3.200	0.536	0.3000	-	
		=====				
<b>Sn (mg/kg)</b>						
DETS	(1055)	0.100 <	29.5	4.35	1.000 <	D, N
		===== Statistical Results (no NDA) =====				
N		2	6	6	1	
Median		0.7000	31.10	4.975	1.0000	
MAD		0.4000	2.65	1.975	-	
		=====				
<b>Ti (mg/kg)</b>						
DETS	(1055)	8.7	257	207	1.00 <	D, N
		===== Statistical Results (no NDA) =====				
N		4	5	5	2	
Median		28.55	1404	1300	2.505	
MAD		13.45	196	48	1.095	
		=====				
<b>Tl (mg/kg)</b>						
DETS	(1055)	1.000 <	1.000 <	1.000 <	1.00 <	D, N
		===== Statistical Results (no NDA) =====				
N		-	-	1	-	
Median		-	-	0.3000	-	
MAD		-	-	-	-	
		=====				
<b>V (mg/kg)</b>						
DETS	(1055)	0.80 <	12.0	20.7	0.800 <	D, N
		===== Statistical Results (no NDA) =====				
N		2	6	6	1	
Median		1.350	10.50	24.40	0.2000	
MAD		0.050	1.51	4.54	-	
		=====				

## Errors and Corrections BIMEP 2011 Period 4

Sample		442	444	443	422	Code
Zn (mg/kg)						
DETS	(1055)	30.5	595	166	12.65	D, N
===== Statistical Results (no NDA) =====						
N		6	7	7	5	
Median		27.75	609.9	198.0	9.900	
MAD		4.75	14.1	18.0	2.500	
=====						



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