Comparability of PT Schemes: What have we learned from COEPT?

5TH EURACHEM/EQALM/CITAC WORKSHOP ON PROFICIENCY TESTING
Portoroz, September 2005
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Aims of COEPT

• To identify the similarities/differences between operating and evaluation protocols of PT schemes in analytical chemistry
• To promote harmonisation and co-operation between PT providers
• To remove trade barriers: mandated participation in specific PT scheme(s)
COEPT: Work Programme

- Project Start (January 2003)
- Initial Workshop (April 2003)
- First Intercomparisons (May - September 2003)
- Second Workshop (October 2003)
- Second Intercomparison (March to December 2004)
- Final Project Workshop (February 2005)
- Project Conclusion (July 2005)
COEPT: Sectors Covered

The following technical sectors were covered in the project:

• Drinking Water
• Milk Powder/Food
• Soil
• Occupational Hygiene
1st Intercomparisons

• Data sets sent to PT providers in 4 sectors
• Some data sets were “real” and submitted by PT providers, others generated by Work Package leader (NMi) using Monte Carlo approach
• PT providers asked to evaluate the data sets using their normal statistical protocol and submit results, plus statistical protocol
• Initial evaluation by sectoral co-ordinators
• Final evaluation by NMi and IRMM
1st Intercomparisons

PT providers asked to:
- Calculate Assigned Values
- Calculate Uncertainty of Assigned Values
- Calculate Assigned Standard Deviation (the denominator in the Z-Score Equation, $s$)
- Evaluate the performance of the “participants”
## Data Sets distributed

<table>
<thead>
<tr>
<th>Sector</th>
<th>No of Data Sets</th>
<th>No of PT Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>24</td>
<td>7</td>
</tr>
<tr>
<td>Food</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>Soil</td>
<td>29</td>
<td>8</td>
</tr>
<tr>
<td>Occupational Hygiene</td>
<td>7 (3 levels per set)</td>
<td>5</td>
</tr>
</tbody>
</table>
1st Intercomparisons: Results
Water sector - means and SDs
for all providers
1st Intercomparisons: Results
Water sector - means and SDs
for all providers

![Graph showing results for different providers with error bars]

- W01
- W02
- W03
- W04
- W05
- W06
- W07
- W08
- W09
- W10
1st Intercomparisons: Results
Water sector - means and SDs for all providers
1st Intercomparisons: Results
Soil sector - means and SDs for all providers
1st Intercomparisons: Results
Soil sector - means and SDs for all providers
1st Intercomparisons: Results
Soil sector - means and SDs for all providers

![Graph showing means and standard deviations for soil samples from different providers.](image)
1st Intercomparisons: Results
Food sector - means and SDs for all providers
1st Intercomparisons: Results OH sector - means and SDs for all providers
1st Intercomparisons: Results
OH sector - means and SDs for all providers
1st Intercomparisons: Conclusions

• Agreement in evaluation of data points (as satisfactory, questionable or unsatisfactory) between providers generally good:
  – 70% (water)
  – 84% (food)
  – 82% (soil)
  – 88% (occupational hygiene)

• In all cases, the differences can be explained by the statistical protocol.
2nd Intercomparisons

- Real samples (RMs or CRMs) sent to PT providers for distribution to their participants
- Samples to be treated like providers’ normal PT samples where possible
- Data to be evaluated as in the providers normal PT:
- Assigned values (and uncertainties), assigned SDs, Evaluations of performance and Reports to be sent to the sectoral co-ordinators
2nd Intercomparisons

- Changes to protocol notified to sectoral co-ordinators
- Initial evaluation by sectoral co-ordinators
- Final evaluation by NMi and IRMM
- Discussion of results at Final Project Workshop (Ede, February 2005)
2nd Intercomparisons: Results
Water Sector - Calcium
Assigned Values and Uncertainties

Calcium

Assigned value (mg/L)

Ref W01 W02 W03 W04 W05 W06 W07 W08 W09 W10
2nd Intercomparisons: Results
Water Sector - Calcium
Evaluation by ISO 13528

CoEPT -- ISO 13528 evaluation

Calcium (mg/L)

PT-scheme
2nd Intercomparisons: Results
Water Sector - Calcium
Distribution of Results

![Graph showing distribution of calcium results with various symbols representing different samples. The x-axis represents calcium concentration in mg/l, ranging from 30.0 to 80.0. The y-axis represents the number of samples. Each symbol represents a sample, with different symbols indicating different laboratories. The graph also shows the certified range with dashed lines.]
2nd Intercomparisons: Results
Water Sector - Calcium
Evaluation of Performance

<table>
<thead>
<tr>
<th>PT</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>cert</td>
<td>61 2</td>
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</table>