“Accurate measurements of Dissolved Oxygen, Phosphorus and Chlorophyll in several aquatic environments for the correct assessment of Biodiversity Monitoring”

Report

Regular Reporting on Subproject Progress

Reporting period: 1st Semester 2017

Report No: 02

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Abbreviations

IBMETRO - Instituto de Metrología de Bolivia
INACAL - Instituto Nacional de Calidad - Perú
INEN - Servicio Ecuatoriano de Normalización - Ecuador
INTI - Instituto Nacional de Tecnología Industrial - Argentina
LATU - Laboratorio Tecnológico del Uruguay.
NMI - National Metrology Institute
CRM - Certified Reference Materials
RM - Reference Material
DO - Dissolved Oxigen
P – Phosphorus
SI – International System of Units
1. INTRODUCTION

Measurement of Dissolved oxygen, Phosphorus and Chlorophyll A, in water bodies is an indispensable input when it comes to nature research from a hydrobiological, ecological or environmental protection point of view.

This project seeks to provide necessary tools to improve the measurements of Dissolved oxygen, Phosphorus and Chlorophyll A in water bodies. In this way, the data from the medium and long-term sensors will be comparable and traceable to the SI. This will be a solid basis for decision-making in environmental policies.

The actions taken based on these measurements directly affect the public, health, economic activity, growing and maintenance of aquatic ecosystems.

2. PERFORMED ACTIVITIES

This project involves five NMIs: LATU, INTI, INEN, IBMETRO and INACAL.

In this period, four CENTRA meetings were held. In addition, the first face-to-face meeting and the corresponding trainings for the determination of phosphorus in river water by different methodologies and determination of dissolved oxygen by the higher metrological hierarchy existent method took place. Furthermore, the trainings on statistic for the ISO 17034 requirements and ISO Guide 35 approach for CRM characterization were carried out focusing on value assignment between different laboratories, which is one of our main objectives.

During the CENTRA meetings, two main topics were defined: the whole organization regarding the first face-to-face meeting and the methodologies for the parameters mentioned in the last paragraph as well as their respective trainings. At the face-to-face meeting, the chronological planning sequence of each step for each parameter was conducted, setting dates for each activity thus adjusting the action plan of the project.

3. IMPLEMENTATION PROGRESS

Regarding the determination of dissolved oxygen, after receiving the corresponding training each country should implement the Winkler volumetric or gravimetric method, based on the available equipment each NMI has or the equipment they will be able to acquire.

Concerning the determination of phosphorus in river water, each NMI is committed to implement the method based on their equipment, and those who already performed the analysis will focus on improving the existing procedure.

In relation to the determination of chlorophyll, the topic remains open to discussion, since the price of the preparation of a homogenous sample is too high and the homogeneity of available batches of commercial pure materials is unknown. On the other hand, The National Research Council (NRC) from Canada have confirmed that they can do a purity assessment using Quantitative Nuclear Magnetic Resonance (QNMR) method and that they could offer training in chromatographic techniques coupled to mass spectrometry. We have asked for a quotation for this as well as technical advice in order to make this purity value applicable to the other NMIs.
4. **ADJUSTMENT REQUIRED**

From the first face-to-face meeting arises the need to conduct a training in Coulometry, in such a way each NMI can prepare its own RM/CRM. For the determination of dissolved oxygen, it could be useful to prepare potassium iodate and for the determination of phosphorus and chlorophyll, it may allow to prepare potassium dichromate needed to calibrate spectrophotometers. The provider of the training would be INMETRO, and it could be carry out in December 2017.

The training of preparation of reference materials in environmental matrices will be considered, which would be helpful for the preparation of reference material of chlorophyll as well as phosphorus in river water. The participants are still searching for a provider of this training.

5. **NEXT STEPS**

Table 1:

<table>
<thead>
<tr>
<th>What?</th>
<th>Who?</th>
<th>When?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implement or improve P measurement method and validation</td>
<td>NMIs</td>
<td>July 2017 to March 2018</td>
</tr>
<tr>
<td>Implement in DO measurement method gravimetric or volumetric and validation</td>
<td>NMIs</td>
<td>July 2017 to March 2018</td>
</tr>
<tr>
<td>Training in Chlorophyll A measurement method</td>
<td>NMIs</td>
<td>October 2017</td>
</tr>
<tr>
<td>Training in Coulometry</td>
<td>NMIs</td>
<td>December 2017</td>
</tr>
</tbody>
</table>

**ANNEX**

Updated Action Plan as annex