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CENTRAL AND EASTERN EUROPEAN WORKSHOP ON THE DETECTION AND IDENTIFICATION OF LIVING MODIFIED ORGANISMS
Ljubljana, 7-11 March 2016

REPORT OF THE CENTRAL AND EASTERN EUROPEAN WORKSHOP ON THE DETECTION AND IDENTIFICATION OF LIVING MODIFIED ORGANISMS

INTRODUCTION

1. At its seventh meeting, the Conference of the Parties serving as the meeting of the Parties to the Cartagena Protocol on Biosafety requested the Executive Secretary to organize, in cooperation with relevant organizations, capacity-building activities such training workshops on sampling, detection and identification of living modified organisms (LMOs) to assist Parties in fulfilling the requirements under Article 17 and towards achieving the relevant outcomes of the Strategic Plan for the Cartagena Protocol on Biosafety for the period 2011-2020.[1]

2. With support from the Government of Japan through the Japan Biodiversity Fund, the Government of the Republic of Korea through the Korea Biosafety Capacity Building Initiative and in collaboration with Slovenian National Institute of Biology and the Slovenian Ministry of the Environment and Spatial Planning, the Secretariat held the Central and Eastern European Workshop on the Detection and Identification of Living Modified Organisms in Ljubljana from 7 to 11 March 2016, with the objective of providing theoretical and hands-on training on:

(a) Sampling, detection and identification of LMOs in the context of the Cartagena Protocol on Biosafety;

(b) Laboratory methodologies used for the analysis of test samples;

(c) Sharing experiences and assessing national needs and gaps for the effective implementation of the relevant outcomes under the Strategic Plan for the Cartagena Protocol.

3. The workshop was attended by ten participants from ten Parties in the Central and Eastern European region (Bulgaria, Georgia, Hungary, Kyrgyzstan, Latvia, Lithuania, Republic of Moldova, Slovakia, Tajikistan and Turkey). The list of participants is contained in annex I.

ORGANIZATIONAL MATTERS

ITEM 1. OPENING OF THE WORKSHOP

4. The workshop was opened by Mr. Charles Gbedemah on behalf of Mr. Braulio Dias, Executive Secretary of the Convention on Biological Diversity, at 9:30 a.m. on Monday, 7 March 2016. In his

[1] Available at http://bch.cbd.int/protocol/issues/cpb_stplan_txt.shtml.

remarks, Mr. Gbedemah welcomed the participants to the workshop and noted the importance of detection and identification of LMOs for the effective implementation of the Protocol.

5. On behalf of the Ministry of Environment and Spatial Planning of Slovenia, Mr. Martin Batič welcomed the participants and the Secretariat. He emphasized the importance of effective training in the field of detection and identification of LMOs and the pivotal role that international and regional networks of detection and identification laboratories play in stimulating cooperation and information sharing among laboratories.

6. Ms. Tamara Lah Turnšek, director of the National Institute of Biology, also welcomed the participants to the workshop and recalled the history of the Institute and its key involvement in the establishment of the Slovenian Biosafety Framework. She reiterated the vital role of detection and identification in the successful implementation of the provisions of the Cartagena Protocol on Biosafety.

7. After self-introductions by the participants, Ms. Dina Abdelhakim of the Secretariat introduced the workshop objectives and its organization of work and invited participants to consider and adopt the provisional agenda circulated by the Secretariat as document UNEP/CBD/BS/DI/WS/2016/1/1. The agenda was adopted without amendments.

ITEM 2. OVERVIEW OF BIOSAFETY AND THE CARTAGENA PROTOCOL ON BIOSAFETY

8. Under this agenda item, Ms. Manoela Miranda and Ms. Abdelhakim of the Secretariat gave an overview of the Protocol's provisions and recent developments related to the detection and identification of LMOs, including:

(a) Relevant provisions under the Cartagena Protocol on Biosafety;

(b) Information exchange through the Biosafety Clearing-House;

(c) Relevant decisions of the COP-MOP and the Strategic Plan for the Cartagena Protocol;

(d) Other international biosafety-related bodies and organizations;

(e) Overview of the activities of the Network of Laboratories for the Detection and Identification of Living Modified Organisms.

9. Furthermore, Ms. Jana Žel introduced the participants to the activities of the Department of Biotechnology and Systems Biology within the National Institute of Biology. In her presentation Ms. Žel discussed the various research and development projects that were underway in the department as well as its facilities. She emphasized their role as a national reference laboratory for the detection of LMOs and their products. She also noted that as part of its mandate, the National Institute of Biology performed analysis on a regular basis for other countries in Europe.

ITEM 3. INTRODUCTION TO THE DETECTION AND IDENTIFICATION OF LIVING MODIFIED ORGANISMS IN THE CONTEXT OF THE CARTAGENA PROTOCOL ON BIOSAFETY

10. In opening the hands-on portion of the workshop, Ms. Mojca Milavec outlined the practical and theoretical activities of the workshop. Ms. Milavec provided an overview of the importance of laboratories establishing an operational strategy that would enable them to efficiently operate within their National Regulatory Framework to detect and identify LMOs. Ms. Milavec also shared information on the sources of reference material and tools that are used in her laboratory.

3.1. Laboratory sampling and preparation of test samples

11. Under this agenda item, a presentation was made by Ms. Tina Demšar on the theory and general principles of handling test samples for LMO detection and identification in a regulatory context. Ms. Demšar introduced key concepts and considerations regarding the adequate size of bulk samples that arrive at the laboratory, strategies for reducing the size of bulk samples to test samples while maintaining sample integrity, and the steps for homogenizing samples from commonly encountered matrices, including corn, soybean and rapeseed as well and their food products, such as noodles, cookies and cereals. Strategies to avoid contamination during handling and preparation of test samples were also discussed. Ms. Demšar followed her presentation with a practical demonstration of the steps involved in sample homogenization, including appropriate methods for handling the samples and cleaning equipment to avoid cross contamination of samples.

3.2. Procedures for the extraction and purification of DNA from test samples

12. Under this agenda item a presentation was made by Ms. Demšar on the methodologies used for extracting and purifying DNA from test samples. Her presentation included an overview of the various methods that can be used for DNA extraction while focussing on the key steps involved in the DNA extraction process and the significance of each step to the outcomes of the analysis. This was followed by a brief discussion on DNA quantification methods.

13. Furthermore, Ms. Demšar also discussed considerations on the use of controls to ensure that no contaminants are introduced during the extraction procedure and discussed the presence of inhibitors and troubleshooting options to minimize their effect when extracting DNA from difficult samples such as highly processed products, samples with high fat or starch content.

14. Following the theoretical presentation, Ms. Demšar and Mr. Dejan Štebih guided the participants through a hands-on practical exercise to extract DNA from various samples using a silica column-based method.

3.3. Testing methods and analysis of results

15. In introducing this agenda item, Ms. Milavec presented the theory behind a number of methodologies and techniques that are used to detect, identify and quantify LMOs including a comparison of the advantages and limitations of each method, as well as important considerations in the adoption of particular methods in the laboratory.

16. The presentation comprised an overview of common protein-based methods, such as lateral flow strip tests, ELISAs and western blots. This was followed by a discussion on DNA-based detection, identification and quantification methods based on the polymerase chain reaction (PCR), including end-point and real-time PCR. The discussion also provided an overview of the principles behind the “matrix approach” as a tool to facilitate the process of screening samples for the presence of LMOs using PCR.

17. In elaborating on the use of DNA-based detection, identification and quantification methods, Mr. Štebih presented the theory and practical considerations involved in the set up and analysis of different types of PCR.

18. Finally, Ms. Milavec introduced the theory behind new and emerging methodologies that can be used to detect, identify and quantify LMOs, including digital PCR and loop mediated isothermal amplification (LAMP) method.

19. Following the presentations, Mr. Štebih and Ms. Demšar guided the participants through a hands-on practical exercise to prepare and analyse a sample using real-time PCR.

3.4. Considerations on quality assurance and quality control

20. In this session, Ms. Milavec made a series of presentations on the various aspects that need to be considered for the establishment of a quality assurance and quality control system (QA/QC) in an LMO detection laboratory. The topics covered in her presentation included an overview of several guidance documents and standards that can be used to guide the implementation a laboratory's QA/QC system. Furthermore, consideration on effective laboratory organization, documentation and method verification were also discussed.

21. Participants shared their experiences in the implementation of their laboratory's QA/QC systems, and discussed the challenges, needs and gaps in their laboratories.

3.5. Reporting of testing results

22. Under this agenda item, Ms. Milavec made a presentation on how a report may be structured to effectively communicate the laboratory's findings to the regulatory authority in a clear and concise manner. Her presentation also included the typical contents in a laboratory report, a description of relevant reporting guidelines and the use of appropriate reporting language as well as considerations for reporting uncertainty.

ITEM 4. CONCLUSIONS AND RECOMMENDATIONS

23. Under the agenda item, participants were invited to put forward their conclusions from the workshop and propose recommendations, including future actions to facilitate the implementation of activities relating to the detection and identification of LMOs at the national and regional levels, for consideration by the Conference of the Parties serving as the meeting of the Parties to the Protocol at its eighth meeting.

24. The participants of the workshop agreed that a series of online activities by the group would facilitate the consolidation of the knowledge gained during the workshop and encourage the sharing of information between labs within the region, including an open discussion to provide the participants with an online forum to discuss experimental procedures and troubleshooting approaches.

25. As such the participants of the workshop suggested that the Secretariat could organize online discussions through the Biosafety Clearing House (BCH) to facilitate participants continued sharing of knowledge and practical experiences on the following topics:

(a) *Sample preparation*: Sharing of practical experiences and knowledge on adequate sample size for various matrices, considerations for adequate sample storage and procedures for sample homogenization were among the issues to be discussed under this topic with the view to developing a reference table to be shared among the group;

(b) *Extraction methods*: Compilation of information and best practices on the most efficient extraction procedures for specific matrices and considerations for troubleshooting difficult samples;

(c) *Testing methods*: Assemble an inventory of commonly used testing methods and experiences involving the adaptation of such methods to specific purposes.

26. Furthermore, the participants agreed that the online discussions will be moderated. Volunteers were identified from within the group to moderate each of the topics of discussion. It was agreed that the moderators will also take the lead in drafting the necessary documents to serve as a basis for the discussions.

27. Participants also agreed among themselves that the Secretariat will draft a tentative work plan with a timeline for the activities that have been agreed upon. The draft work plan is available as annex II.

28. In making their recommendations, participants agreed that the Conference of the Parties serving as the meeting of the Parties to the Protocol may wish to:

(a) Encourage Parties to establish, support, and participate in regional and subregional LMO detection networks to promote technical cooperation within the field and, subject to the availability of funds, provide the networks with opportunities to host training workshops;

(b) Encourage Parties to establish effective mechanisms to support the workflow for sampling, detection and identification by, for example, providing the relevant officials at the border and LMO detection laboratories with the appropriate mandates within the Party's regulatory system to sample, detect and identify LMOs;

(c) Encourage Parties to make funds available for the training of laboratory personnel in the field of the detection and identification of LMOs, including the provision of co-financing opportunities;

(d) Request the Executive Secretary to continue organizing, in cooperation with relevant organizations, subject to the availability of funds, capacity-building activities such as online training and face-to-face meetings/workshops in the fields of sampling, detection and identification of LMOs, with a specific emphasis on the topics of (i) sampling at the border; (ii) establishment and maintenance of quality assurance and quality control systems; and (iii) interpretation of the results of LMO analysis reports.

ITEM 5. EVALUATION OF THE WORKSHOP

29. Participants were invited to complete an evaluation of the workshop and propose suggestions for improvements. A summary of the results of the evaluation is attached as annex III.

30. Furthermore, participants expressed appreciation to the Government of Japan through the Japan Biodiversity Fund, the Government of the Republic of Korea through the Korea Biosafety Capacity Building Initiative. They also extended their gratitude to the Slovenian Ministry of the Environment and Spatial Planning and the National Institute of Biology for hosting the workshop as well as the Secretariat for organizing it.

ITEM 6. ADOPTION OF THE REPORT

31. A draft report was circulated online among the workshop participants for their comments for a period of one week. The Secretariat made the necessary amendments into the final version of the present report.

ITEM 7. CLOSURE OF THE WORKSHOP

32. The workshop closed at 1:45 p.m. on 11 March 2016.

Annex I

LIST OF PARTICIPANTS

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Annex II

PLAN OF WORK

Activity	Moderator	Tentative dates
Online Discussion: Sharing of knowledge and experience on sample preparation	Ms. Krasimira Ivanova	9-23 May 2016
Online Discussion: Compilation of information on extraction methods	Ms. Mojca Milavec	30 May - 12 June 2016
Online Discussion: Inventory of available testing methods	Ms. Miroslava Feketová	20 June - 4 July 2016
Drafting of outlines on each of the chosen topics	Ms. Krasimira Ivanova, Ms. Mojca Milavec, Ms. Miroslava Feketová and SCBD	4 July – 1 August 2016
Online Discussion: Drafting of outline on best practices for sample preparation	Ms. Krasimira Ivanova	1-15 August 2016
Online Discussion: Drafting of outline on information on extraction methods	Ms. Mojca Milavec	22 August – 5 September 2016
Online Discussion: Follow up discussion on testing methods	Ms. Miroslava Feketová	12-26 September 2016

Annex III

EVALUATION QUESTIONNAIRE

Participants were invited to undertake an exercise to evaluate the workshop by completing the questionnaire below. Participants were instructed to select one of the boxes that best reflected their assessment of the workshop.

Ten participants representing Parties took part in the exercise. The number of respondents for each option is shown below.

A. OBJECTIVES OF THE WORKSHOP

Level of satisfaction					
How useful was the workshop in improving your knowledge or understanding of:					
The provisions of the Cartagena Protocol?	-	-	-	1	9
The role that detection and identification of LMOs plays under the Protocol?	-	-	-	3	7
Parties' obligations under the Protocol that rely on the detection and identification of LMOs?	-	-	1	3	6
Laboratory sampling and preparation of test samples?	-	-	-	2	8
Methods for the extraction and purification of DNA from test samples?	-	-	-	2	8
Testing methods and analysis of results?	-	-	-	1	9
Considerations on quality assurance and quality control?	-	-	1	-	9
Existing capacities and experience in other countries?	-	-	2	1	7

B. OVERALL WORKSHOP ASSESSMENT

Level of satisfaction					
Did the workshop meet your expectations?	-	-	-	-	10
How well organized was the workshop?	-	-	-	2	8
How did you find the balance between presentations and discussions?	-	-	-	2	8
Was the workshop useful?	-	-	-	-	10
Overall, how would you rate the workshop?	-	-	-	1	9