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Biotehnologija ï Mikroorganizmi - Preiskava rastlinskih ġkodljivcev iz razliļ nih obstojeļ ih seznamov in izdelava poroļ ila

Biotechnology - Microorganisms - Examination of the various existing lists of plant pathogens and production of a report

Biotechnologie - Mikroorganismen - Prüfung der verschiedenen bestehenden Listen von Pflanzenpathogenen und Anfertigung eines Berichtes

Biotechnologie - Microorganismes - Examen des différentes listes existantes de pathogenes pour les plantes et production d'un rapport

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European Committee for Standardization
Comité Européen de Normalisation
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Foreword

This report was prepared by the Technical Committee CEN/TC 233 "Biotechnology", the secretariat of which is held by AFNOR.

Introduction

A very large majority of microorganisms used in industry are safe and harmless. Very few of them - usually used for manufacturing vaccines or diagnostics - are potentially pathogenic to humans or animals. Those pathogenic microorganisms are used in contained processes according to the level of hazard. The case is the same for plant pathogenic microorganisms as for instance those used for screening new pesticides and resistance in plants against pests and diseases.

One of the main biosafety problems facing users of pathogenic microorganisms is to identify the hazard level of the organisms employed in various fields of activities in order to apply the most appropriate safety measures.

The first basic need for such a purpose would be, where this is possible, to have indicative lists of pathogens available.

1 Scope

This CEN Report examines the various existing lists of plant pathogenic microorganisms and presents in the conclusion recommendations for a further step.

2 Examination of the various existing lists of plant pathogenic microorganisms

For this purpose, an existing list is defined as one issued from a consensual agreement by an Expert Committee and which has been officially published by national competent authorities of a CEN Member State, by the European Union or by an international plant protection organization.

Three main sources were therefore considered :

- the Commission of the European Communities (see annex A [1]) ;
- the European and Mediterranean Plant Protection Organization (EPPO) (see annex A [2]) ;
- the national plant protection agencies and their related ministries or any other national competent authority (see annex A [3]).

On another hand, the European Federation of Biotechnology (EFB) (see annex A [4]) has tried to define three classes of plant pathogenic microorganisms but without any corresponding classification of plant pathogenic microorganisms.

2.1 The main following different lists were examined :

- The list included in the Commission Directive 92/103/EEC (see annex A [1]) of 1 December 1992 amending annexes I to IV to Council Directive 77/93/EEC on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community.

  This list particularly names the relevant harmful microorganisms, whose introduction into, and spread within, all Member States or certain protected zones is or may be prohibited. Such a list takes into account the presence or the absence of those microorganisms in the Community and expresses a broad European consensus on this matter.

  This directive shall be implemented in the Member States and the corresponding lists from France, Germany and Great-Britain have been examined which are obviously in accordance with the directive.

- The EPPO list of quarantine (see annex A [2]) with indication of synonyms (October 1, 1992). EPPO is an intergovernmental organization responsible for international cooperation in plant protection in the European and Mediterranean region. In the sense of article VIII of the FAO international plant protection convention, it is the regional plant protection organization for Europe. This list is very similar to that included in the Commission Directive 92/103/EEC (see annex A [1]) and also represents a consensus at European level.

Those two lists are the most consensual lists for the significant European plant pathogenic microorganisms.

In addition to these two quarantine lists, the Government of the Brussels-Capital Region (see annex A [3]) has issued an official classification of plant pathogenic organisms. This list is based on international or national recognized lists and on scientific publications. The organisms are classified in four groups taking into account the importance of the disease and the risk of infection to healthy plants. However, it is mentioned that such a classification is not definitive or all-inclusive. Moreover, the risk level of each organism and its corresponding containment measures are finally determined according to pathogenicity mechanisms, the host range, the availability of an effective therapy and the facilities location. There is no reference to the indigenous or non-indigenous character of the different organisms and so there is no indication of the real level of risk in the country. It is also stressed that operations involving plant pathogenic organisms of classes 2, 3 or 4 can be authorized in containment level 2 or less on a case by case assessment.

2.2 Definition of three classes of plant pathogenic microorganisms according to EFB (see annex A [4])

Class Ep 1

Microorganisms that may cause diseases in plants of only minor significance. They may be mentioned in lists of pathogens prepared by individual countries. They are frequently indigenous and work with them does not require any special safety measures apart from good microbiological technique.

Class Ep 2

Microorganisms known to cause locally serious outbreaks of disease in crop plants and trees of economic importance as well as in amenity plants, especially those known in the area in which the work is conducted. Work with these plant pathogens may be subject to regulations by national authorities.

Class Ep 3

Microorganisms named in quarantine lists. The importation and handling of these is generally banned and prospective users are required to consult the regulatory authorities.

To each of those three classes correspond specific biosafety measures as described by EFB under safety levels 1, 2 and 3.

These three classes of plant pathogenic microorganisms without any corresponding classification list are not very practicable as the definitions are too strictly related to specific biosafety measures. In fact, the degree of plant pathogenicity is not the only factor in determining the containment level. Containment measures should be much more based on the specific biological and geographical features of each organism. For those reasons, many indigenous plant pathogens can be ranked in the lowest risk class while non-indigenous ones from other countries and specially from other continents may present a high risk.

2.3 General characteristics of plant pathogens

The risk from plant pathogens for cultivated and wild plants strongly depends on geographical considerations :

- many plant pathogens are often present in the vicinity and in that case only good hygiene principles are needed without any special containment measure ;

- host plants sensitive to a given pathogen may be present or absent in a particular region ;

- within the countries themselves, many geographical differences related to plant pathogenicity exist on a regional basis.

For these reasons, plant pathogens may be mentioned only for individual concerned countries. Therefore, there is no universally accepted dangerous plant pathogens. A same plant pathogen may be classified as a high risk in one particular region and as a very low risk in another.

Moreover, plant pathogens are often obligate parasites such as viruses and are endemic in a given region. As obligate parasites their *in vitro* culture is very difficult in many cases or even impossible.

3 Conclusion

From the examination of the various existing lists of plant pathogenic microorganisms as previously defined, it appears that only European quarantine lists are widely recognized. Such quarantine lists also exist at national level through the implementation of European directives.

From the general characteristics of plant pathogens it may be concluded that it is not possible to classify plant pathogenic microorganisms by the same criteria as for human or animal pathogens. Parameters other than pathogenicity are needed to determine the real level of risk. From this point of view, biological and geographical factors should be considered. It seems obvious that the level of risk of plant pathogenic microorganisms should be finally defined at the national level, according to the local conditions, taking into account the rules and recommendations of the national competent authorities.

The main difficulty in setting up a European classification of plant pathogens arises from the fact that the presence of non-indigenous plant pathogens might be taken into account at a country or even at a regional level.

It was also recognized that different climates and agricultural patterns would render an exhaustive and Europe-wide list of plant pathogens impractical. However, it is recommended, in a further step, on the basis of the EFB recommendations (see annex A [4]), to select complementary classification criteria taking into account climate and geographical considerations for defining more accurately risk classes of plant pathogens. Then, based on these new set of criteria, an attempt could be made to set up an indicative classification of plant pathogenic microorganisms.