Application for renewal of the authorisation of Bt11 maize import in the European Union under Articles 11 and 23 of Regulation (EC) No 1829/2003

PART III: CARTAGENA PROTOCOL

This document is complete as of September 2018. Since it is submitted as one part of a regulatory application, which is subject to an on-going regulatory review, it may be subject to later amendment or replacement. The information may also be supplemented with additional material requested by regulatory authorities. As such, it may only be considered properly with reference to those later amendments or supplementary materials and in the context of the dossier as a whole.

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LIST OF ABBEVIATIONS

A. tumefaciens: *Agrobacterium tumefaciens*
B. thuringiensis: *Bacillus thuringiensis*
CAMV - Cauliflower mosaic virus
E. coli: Escherichia coli
EC: European Commission
ERA: Environmental Risk Assessment
EU: European Union
GM: genetically modified
NTO: non-target organisms
PAT: phosphinothricin acetyltransferase
S. viridochromogenes: Streptomyces viridochromogenes
Z. mays: *Zea mays*

INTRODUCTION

This application under Articles 11 and 23 of Regulation (EC) No 1829/2003 covers the renewal of the authorisation of import, food and feed use and processing of Bt11 maize. The application does not cover cultivation. A detailed description of the scope of the authorisation requested can be found in Section 4 of Part I.

The scope corresponds to:

(a) GM food

☒ Food containing or consisting of GM plants

☒ Food produced from GM plants or containing ingredients produced from GM plants

(b) GM feed

☒ Feed containing or consisting of GM plants

☒ Feed produced from GM plants

(c) GM plants for food or feed use

☒ Products other than food and feed containing or consisting of GM plants with the exception of cultivation

☐ Seeds and plant propagating material for cultivation in the EU

The information presented complies with Annex II to the Cartagena Protocol and may be notified to the Biosafety Clearing-House by the Commission as provided for in Article 44 of Regulation (EC) No 1829/2003.

PART III – CARTAGENA PROTOCOL

a) Name and contact details of the applicant for a decision for domestic use

Name:
Syngenta Crop Protection NV/SA acting on behalf of Syngenta Crop Protection AG.

Address:
Syngenta Crop Protection NV/SA
Avenue Louise, 489
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b) Name and contact details of the authority responsible for the decision

Name:
European Commission
Health and Food Safety Directorate General SANTE

Address:
4 Rue Breydel
1040 Brussels
Belgium

c) Name and identity of the GMO

Bt11 maize

d) Description of the gene modification, the technique used, and the resulting characteristics of the GMO

Bt11 maize which expresses a Cry1Ab protein for control of certain lepidopteran pests and a phosphinothricin acetyltransferase (PAT) protein which was used as a selectable marker and can provide weed control through the tolerance to herbicide products containing glufosinate ammonium. Bt11 maize was produced using a protoplast transformation / regeneration system.

The genetic modification is not intended to change any of the typical crop characteristics of maize (except for the resistance against certain lepidopteran insect pests and tolerance to herbicide products containing glufosinate ammonium) and the handling and use of Bt11 maize is the same as non-GM maize.

e) Any unique identification of the GMO

The unique identifier assigned to this product in accordance with Regulation (EC) No 65/2004 is SYN- BTØ11-1.

f) Taxonomic status, common name, point of collection or acquisition, and characteristics of recipient organism or parental organisms related to biosafety

- **family name:** Poaceae (formerly Gramineae)
- **genus:** *Zea*
- **species:** *Zea mays* L.
- **subspecies:** *mays*
- **cultivar/breeding line:** A Syngenta proprietary line of maize
- **common name:** Maize, corn
- **point of collection** Widespread in agriculture

g) Centres of origin and centres of genetic diversity, if known, of the recipient organism and/or the parental organisms and a description of the habitats where the organisms may persist or proliferate

Maize is the world's most widespread cereal with very diverse morphological and physiological traits; it is grown on approximately 185 million hectares worldwide (James, 2016). Maize probably originated from Central America and was domesticated about 6 000 to 10 000 years ago**.** Maize is distributed over a wide range of conditions: from latitudes 50º North to 50º South, below sea level of the Caspian plains up to 3 000 m in the Andes Mountains and from semi-arid regions to arid regions (Russell and Hallauer, 1980). The greatest maize production occurs where the warmest month isotherms range between 21º and 27º C and the freeze-free season lasts 120-180 days. Maize is believed to have been introduced into Europe in the 15th century by Columbus and since the 16th century it is widely grown in most of the European Union (EU) Member States (Rebourg *et al*., 2003).

Maize is a highly domesticated crop which is not generally able to survive in the environment without appropriate cultivation practices and is non-invasive of natural habitats.

h) Taxonomy status, common name, point of collection or acquisition, and characteristics of the donor organism or organisms related to biosafety

Event	Taxonomic status	Common name	Point of collection	Characteristic
Bt11	*Agrobacterium tumefaciens*	*A. tumefaciens*	widespread in the environment	Donor of the NOS terminator
Bt11	*Bacillus thuringiensis*	*B. thuringiensis* subsp. *kurstaki*	widespread in the environment	Donor of the native *cry1Ab* gene;
Bt11	Cauliflower mosaic virus	CaMV	widespread in the environment	Donor of the 35S promoter, and 35S terminator
	Streptomyces viridochromogenes	*S. viridochromo-genes* strain Tü494	widespread in the environment	Donor of the *pat* coding sequence
Bt11	*Zea mays* L.	*Z. mays*	widespread in the environment	Donor of the IVS2-ADH1 and IVS6-ADH1 promoters is maize

i) Approved uses of the GMO

The approval under Regulation (EC) No 1829/2003 covers all uses apart from cultivation.

j) A risk assessment report consistent with Annex II to Directive 2001/18/EC

An environmental risk assessment (ERA) was provided with the renewal application in April 2007. This ERA, has been conducted following the requirements and methodology described in EFSA (2004) following the principles outlined in Directive 2001/18/EC and is consistent with Annex III of the Cartagena Protocol. The baseline used is the import and food and feed use of maize in the EU, applying the concept of "familiarity". The basic hypothesis used in this risk assessment is that the import and food and feed use in the EU of Bt11 maize will be as safe to the environment as any conventional maize. The genetic modifications are not intended to change any of the typical crop characteristics of maize (except for the intended traits) and Bt11 maize can be cultivated and used like any conventional maize.

Bt11 maize has been shown to be as safe and as wholesome as existing varieties of maize. No additional information has become available that would require specific instructions or recommendations for use, storage and handling of Bt11 maize.

Bt11 maize is a GM maize which expresses these new genes:

- the gene *cry1Ab*, which encodes the insecticidal protein Cry1Ab, that confers resistance against certain lepidopteran insects,
- the gene *pat*, which encodes the PAT enzyme, that confers tolerance to herbicide products containing glufosinate ammonium

1. Identification of characteristics which may cause adverse effects

A comparative safety assessment has been conducted using a weight-of-evidence approach, where data on the molecular characterization, compositional, agronomic and phenotypic characteristics of Bt11 maize compared to the conventional counterpart have been taken into account. This assessment demonstrates that the only differences of biological relevance identified between Bt11 maize plants and conventional control maize are the introduced genes and subsequent control of certain insect pests and tolerance to glufosinate-ammonium herbicides. The results of this assessment show that, despite the large number of parameters compared, the composition, agronomic and phenotypic characteristics of Bt11 maize compared to the conventional counterpart are not materially different apart from the intended modification. The presence of the Cry1Ab and PAT proteins in Bt11 maize did not change any of the typical crop characteristics of this maize. This indicates that there is no potential adverse effect or harmful unintended changes to Bt11 maize as a result of the transformation process and expression of the Cry1Ab and PAT proteins. Therefore, Bt11 maize will not be more persistent or invasive than conventional maize.

2. Evaluation of the potential consequences of each adverse effect, if it occurs

The scope of this application covers the import, processing and food and feed use of Bt11 maize in the EU. Therefore, no deliberate release or commercial cultivation of viable plant material or derived products into the EU environment is expected. Although it is highly unlikely that

this maize would grow in the EU as a result of import and food and feed use, the hypothesis that Bt11 maize will be no more persistent in agricultural habitats or more invasive of natural habitats than the conventional crop has been tested. The assessment has also taken into account the potential for gene flow between maize and cross-compatible wild relative species and the incidence of maize volunteers. The assumption made is that since maize is a very common crop in the EU that has been cultivated for centuries, its persistence and invasive properties are well known and considered safe.

The introduced traits in Bt11 maize are not intended to affect the range or frequency of maize outcrossing, and phenotypic data showed no indication that the genetic modification in Bt11 maize resulted in enhancement of reproductive characteristics or fertility of Bt11 maize, compared with nontransgenic maize. There are no indications of any potential adverse effects that could arise from natural constituents given that the compositional characteristics of Bt11 maize forage and grain, except for the introduced traits, are not different from those of its conventional counterpart comparator or to the non-GM reference varieties, taking into account natural variation. Thus, the probability of Bt11 maize plants becoming more persistent than the recipient or parental plants in agricultural habitats or more invasive in natural habitats as a result of imported maize kernels of Bt11 maize, can be considered negligible.

In addition, the new genes expressed in Bt11 will not confer any selective advantage or disadvantage to this maize compared to conventional maize. No unintended changes or modifications have been identified in Bt11 maize. In the unlikely event that small amounts of grain from Bt11 maize could accidentally find their way into the environment this would represent extremely low levels of exposure and the survival of this grain would be very unlikely, as maize is a highly domesticated plant and cannot survive without human intervention, especially under normal European climatic conditions. Any plants germinating from this grain could be easily controlled using any of the current agronomic measures taken to control other commercially available maize and it would be very unlikely that they would survive long enough to produce pollen.

3. Evaluation of the likelihood of the occurrence of each identified potential adverse effect

An assessment of the likelihood of long-term environmental effects that might occur as a result of the import, processing and food and feed use of Bt11 maize in the EU has been included above.

4. Estimation of the risk posed by each identified characteristic of the GMO(s)

The conclusion is that the risk that the import, processing or food and feed use of Bt11 maize in the EU will result in harm to sustainable agricultural production or biodiversity is negligible and the probability of long-term environmental adverse effects is very low.

None of the proteins produced by Bt11 maize event are known to be toxic or allergenic to humans or animals. Neither Cry1Ab nor PAT has any significant sequence identity to known toxins with known adverse effects in humans or animals or significant amino acid homology to known or putative allergenic protein sequences that are biologically relevant or have implications for allergenic potential. The results of the toxicological assessment indicate that consumption of Bt11 maize food and feed products will be as safe as consuming equivalent products from conventional maize, regardless of the anticipated intake level. In considering the potential risk, it is important to note that humans and animals have always consumed maize

proteins as a normal component of food and there is no evidence that this consumption has had any adverse effect on human or animal health. Therefore, the Cry1Ab nor PAT proteins produced in Bt11 maize can be considered non-toxic, non-allergenic and unlikely to present a health risk to humans or animals.

The assessment of the transfer and integration of the new genes present in Bt11 maize into micro-organisms concluded that it is very unlikely that these genes would become established in the genome of micro-organisms in the environment or human and animal digestive tract and the risk is negligible. In the very unlikely event that such a horizontal gene transfer would take place, no adverse effects on human and animal health or the environment are expected.

Potential interactions with target and NTOs that could lead to harmful environmental effects have also been assessed. The conclusion from these assessments is that adverse effects on sustainable agricultural production or biodiversity due to adverse effects on populations of NTOs as resulting from the import, processing or food and feed use Bt11 maize will be negligible.

5. Application of management strategies for risks from the deliberate release or marketing of GMO(s)

The likelihood that the import, processing or food and feed use of Bt11 maize in the EU would lead to harm to sustainable agricultural production or to biodiversity, as a result of increased persistence or invasiveness or of out-crossing with natural populations of wild relatives has been assessed. The conclusion was that the risk is negligible. Therefore, no specific management practice is warranted.

6. Determination of the overall risk of the GMO(s)

In summary, the overall conclusion of the risk assessment is that none of the components introduced into Bt11 maize are considered to be dangerous to human and animal health or the environment and that the import and food and feed use of Bt11 maize will not result in any harmful effect. Bt11 maize can thus be considered as safe as conventional maize and the same management practices used for conventional maize could be used.

k) Suggested methods for the safe handling, storage, transport and use, including packaging, labelling, documentation, disposal and contingency procedures, where appropriate

The material will be stored, handled and labeled as GM maize, according to current legal requirements, however its uses will be similar to those of conventional maize grown for grain or silage purposes.

The labelling requirements specified in Articles 5(3)(f) and 17(3)(f) of the Regulation (EC) No 1829/2003 are not applicable because the characteristics of the food and feed products from Bt11 maize are not different from the characteristics of its conventional counterpart having regard to the accepted limits of natural variations for such characteristics.

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