

APPLICATION FOR AUTHORISATION OF  
GENETICALLY MODIFIED PLANTS  
AND DERIVED FOOD AND FEED  
IN ACCORDANCE WITH REGULATION (EC) No 1829/2003

**DP305423xMON87708xMON89788 SOYBEAN**

**(DP-305423-1xMON-87708-9xMON-89788-1 SOYBEAN)**

**EFSA-GMO-NL-2018-XXX**

**PART VII –**

**SUMMARY**

**Submitted by:**

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**U.S.A.**

**Original submission (CC1)**

**23 February 2018**

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## PART VII – SUMMARY

### 1. GENERAL INFORMATION

#### 1.1 Details of application

<b>a) Member State of application</b> The Netherlands
<b>b) Application number</b> <i>[To be provided]</i>
<b>c) Name of the product (commercial and other names)</b> The product described in this application is DP305423xMON87708xMON89788 soybean.
<b>d) Date of acknowledgement of valid application</b> <i>[To be provided]</i>

#### 1.2. Applicant

<b>a) Name of applicant</b> Pioneer Hi-Bred International, Inc. as represented by Pioneer Overseas Corporation	
<b>b) Address of applicant</b> Pioneer Hi-Bred International, Inc. 7100 NW 62 <sup>nd</sup> Avenue P.O. Box 1014 Johnston, IA 50131-1014 (U.S.A.)	As represented by: Pioneer Overseas Corporation Avenue des Arts, 44 B-1040 Brussels Belgium
<b>c) Name and address of the representative of the applicant established in the Union (if the applicant is not established in the Union)</b> Same as applicant	

### 1.3. Scope of the application

<p>(a) Genetically modified food</p> <p>X Food containing or consisting of genetically modified plants</p> <p>X Food produced from genetically modified plants or containing ingredients produced from genetically modified plants</p> <p>(b) Genetically modified feed</p> <p>X Feed containing or consisting of genetically modified plants</p> <p>X Feed produced from genetically modified plants</p> <p>(c) Genetically modified plants for food and feed use</p> <p>X Products other than food and feed containing or consisting of genetically modified plants with the exception of cultivation</p> <p><input type="checkbox"/> Seeds and plant propagating material for cultivation in the Union</p>
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### 1.4. Is the product or the uses of the associated plant protection product(s) already authorised or subject to another authorisation procedure within the Union?

Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
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### 1.5. Has the GM plant been notified under Part B of Directive 2001/18/EC?

Yes <input type="checkbox"/>	<p>No <input checked="" type="checkbox"/></p> <p>The scope of this application does not include authorisation for the cultivation of DP305423xMON87708xMON89788 soybean in the EU.</p> <p>Agronomic performance, protein expression, composition, efficacy, yield and ecological studies on DP305423xMON87708xMON89788 soybean have been conducted in the US since 2015 in multiple locations. The risk assessment and risk characterisation of DP305423xMON87708xMON89788 soybean summarised in Part VII have been concluded on the basis of the data obtained from these studies.</p> <p>The overall conclusion obtained from the e.r.a. confirms that there are no identified adverse effects to human and animal health or the environment arising from the proposed uses of DP305423xMON87708xMON89788 soybean.</p>
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### 1.6. Has the GM plant or derived products been previously notified for marketing in the Community under Part C of Directive 2001/18/EC?

Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
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**1.7. Has the product been subject to an application and/or authorised in a third country either previously or simultaneously to this application?**

<b>Yes [x]</b>	<b>No [ ]</b>
<p>Notifications concerning all intended uses of DP305423xMON87708xMON89788 soybean, including cultivation of DP305423xMON87708xMON89788 soybean seed products, have been submitted in the US and Canada. Applications for an authorisation for environmental release, and food use have been submitted in Japan.</p>	

**1.8. General description of the product**

<p><b>a) Name of the recipient or parental plant and the intended function of the genetic modification</b></p> <p>The recipient plant is soybean (<i>Glycine max</i> (L.) Merr.), which is the world's leading oilseed crop with a long history of safe use.</p> <p>DP305423xMON87708xMON89788 soybean was developed by use of traditional breeding methods between three currently authorized individual GM soybean lines, DP305423 soybean, MON 87708 soybean, and MON 89788 soybean, to produce the combined trait product DP305423xMON87708xMON89788. No new genetic modifications were performed to obtain DP305423xMON87708xMON89788 soybean.</p> <p>DP305423xMON87708xMON89788 soybean therefore contains increased levels of monounsaturated (oleic) fatty acid and decreased levels of polyunsaturated fatty acids (linoleic and linolenic acid) due to the downregulation of the endogenous omega-6 desaturase, and is tolerant to ALS-inhibiting herbicides, as a well as dicamba and glyphosate herbicides, due to the presence of GM-HRA, DMO and CP4 EPSPS proteins, respectively.</p>
<p><b>b) Types of products planned to be placed on the market according to the authorisation applied for</b></p> <p>The types of products anticipated to be placed on the market according to the authorisation applied for include DP305423xMON87708xMON89788 soybean for all food and feed uses, and for all food, feed and processed products derived from DP305423xMON87708xMON89788 soybean in accordance with Regulation (EC) No 1829/2003. In addition, this application requests authorisation for import and processing of DP305423xMON87708xMON89788 soybean in accordance with Part C of Directive 2001/18/EC. However, this application does not include authorisation for the cultivation of DP305423xMON87708xMON89788 soybean seed products in the EU.</p>
<p><b>c) Intended use of the product and types of users</b></p> <p>The DP305423xMON87708xMON89788 soybean products placed on the market are expected to be used in a manner consistent with current uses of commercial soybean seed and soybean products. The modification of the fatty acid composition of DP305423xMON87708xMON89788 soybean is aimed at improving the functional performance of the oil with improved stability to oxidation and less rancidity and a longer shelf life.</p>

DP305423xMON87708xMON89788 soybean is intended to undergo existing methods of production and manufacturing used for commercial soybean. No novel method of production and manufacturing is envisaged.

**d) Specific instructions and/or recommendations for use, storage and handling, including mandatory restrictions proposed as a condition of the authorisation applied for**

Safety evaluation of DP305423xMON87708xMON89788 soybean has shown that no specific instructions and/or recommendations for use, storage and handling of DP305423xMON87708xMON89788 soybean are necessary. Therefore, DP305423xMON87708xMON89788 soybean can be used, stored and handled in the same way as is currently done for commercial soybean. Labelling of DP305423xMON87708xMON89788 soybean products is anticipated to be carried out in accordance with Community law.

**e) Geographical areas within the Union to which the product is intended to be confined under the terms of the authorisation applied for**

DP305423xMON87708xMON89788 soybean is anticipated to be used throughout the European Union as any other commercial soybean products.

**f) Any type of environment to which the product is unsuited**

The application does not cover cultivation of DP305423xMON87708xMON89788 soybean in the European Union. DP305423xMON87708xMON89788 soybean is anticipated to be used throughout the European Union as any other commercial soybean products.

**g) Any proposed packaging requirements**

The packaging, handling, and storage systems that are currently used for commercial soybean should apply. DP305423xMON87708xMON89788 soybean products are expected to be packaged in the same manner as other commercial soybean products.

**h) Any proposed labelling requirements in addition to those required by other applicable EU legislation than Regulation (EC) No 1829/2003 and when necessary a proposal for specific labelling in accordance with Article 13(2) and (3), Article 25(2)(c) and (d) and Article 25(3) of Regulation (EC) No 1829/2003. In the case of products other than food and feed containing or consisting of genetically modified plants, a proposal for labelling which complies with the requirements of point A(8) of Annex IV to Directive 2001/18/EC must be included.**

Labelling of foods and feeds consisting of or containing DP305423xMON87708xMON89788 soybean

In accordance with Articles 12-14 and 24-26 of Regulation (EC) No 1829/2003, Article 13(2)f and Annex IV of Directive 2001/18/EC, and with Article 4 of Regulation (EC) No 1830/2003, operators shall be required to label products containing or consisting of DP305423xMON87708xMON89788 with the words “genetically modified soybean with increased monounsaturated fat and reduced polyunsaturated fat” or “contains genetically modified soybean with increased monounsaturated fat and reduced polyunsaturated fat”, and operators shall be required to declare the unique identifier in the list of GMOs that have been used to constitute the mixture that contains or consists of this GMO.

Labelling of foods and feeds produced from DP305423xMON87708xMON89788 soybean

For food and feed products produced from DP305423xMON87708xMON89788 that are not exempted according to Article 5(4) of Regulation (EC) No 1830/2003, operators shall be required to label foods and feeds derived from DP305423xMON87708xMON89788 with the words “produced from genetically modified soybean with increased monounsaturated fat and reduced polyunsaturated fat”, in accordance with Articles 12-14 and 24-26 of Regulation (EC) No 1829/2003

and the requirements of Article 5 of Regulation (EC) No 1830/2003. In the case of products for which no list of ingredients exists, operators shall ensure that an indication that the food or feed product is produced from GMOs is transmitted in writing to the operator receiving the product.

#### Measures taken by the applicant

Although Pioneer Hi-Bred International, Inc. is the applicant under Regulation (EC) No 1829/2003 for consent to place DP305423xMON87708xMON89788 seeds on the market for all uses as any other soybean seed in the EU, Pioneer Hi-Bred International, Inc. is not an operator handling or using the product in the EU.

Operators handling or using DP305423xMON87708xMON89788 seeds and derived foods and feeds in the EU are required to be aware of the legal obligations regarding traceability and labelling of these products. Given that explicit requirements for the traceability and labelling of GMOs and derived foods and feeds are laid down in Regulations (EC) No 1829/2003 and 1830/2003, and that authorised foods and feeds shall be entered in the Community Register, operators in the food/feed chain are expected to be fully aware of the traceability and labelling requirements for DP305423xMON87708xMON89788. Therefore, no further specific measures are to be taken by the applicant.

#### **i) Estimated potential demand**

##### **a) In the EU**

The EU imports an average 35 million tonnes of soybean equivalents yearly primarily from the Americas. Germany, Spain, Italy, France and the Netherlands use more than 90% of the total EU import.

##### **b) In EU export markets**

The application does not cover cultivation of DP305423xMON87708xMON89788 soybean in the European Union.

#### **g) Unique identifier in accordance with Regulation (EC) No 65/2004**

DP-3Ø5423-1xMON-877Ø8-9xMON-89788-1

### **9. Measures suggested by the applicant to take in case of unintended release or misuse of the product as well as measures for disposal and treatment**

Based on the conclusions from the environmental risk assessment of DP305423xMON87708xMON89788 soybean, no specific measures need to be taken in case of unintended release or misuse or for disposal and treatment. There are no sexually compatible wild plant species in Europe with which soybean can cross-hybridise and soybean plants generally do not survive as a weed outside agricultural fields. The establishment of soybean volunteer plants is therefore unlikely.

In case of unintended release of DP305423xMON87708xMON89788 soybean, current agronomic measures taken to control other commercially available soybean can be applied, such as use of mechanical means and selective use of herbicides (with the exception of glyphosate, dicamba, and ALS-inhibiting herbicides).

## 2. INFORMATION RELATING TO THE RECIPIENT OR (WHERE APPROPRIATE) PARENTAL PLANTS

### 1. Complete name

<b>a) Family name</b>
Leguminosae
<b>b) Genus</b>
<i>Glycine Willd</i>
<b>c) Species</b>
<i>G. max (L.) Merr.</i>
<b>d) Subspecies</b>
None
<b>e) Cultivar/breeding line</b>
DP305423xMON87708xMON89788
<b>f) Common name</b>
Soybean, soya, soy

### 2.2. Geographical distribution and cultivation of the plant, including the distribution within the Union

Soybean is grown worldwide as an important staple and commercial crop, dominating the international trade in oilseed crops with a cultivation area of more than 120 million hectares and with a harvest of over 348 million tonnes in 2016. In the same year soybean was cultivated in the EU on 831.000 hectares and mainly concentrated in Italy, Romania, and France.

### 2.3. Information concerning reproduction

#### (i) Mode(s) of reproduction

Soybean is a self-pollinated crop, propagated by seed. The soybean stigma is receptive to pollen approximately 24 hours before anthesis and remains receptive after 48 hours of anthesis. The anthers mature in the bud and directly pollinate the stigma of the same flower. As a result, soybean exhibits a high percentage of self-fertilization, and cross-pollination is usually less than 1%. A soybean plant can produce as many as 400 pods, with 2-20 pods at a single node. Each pod contains 1-5 seeds. Neither the seed pods nor the seeds have morphological characteristics that would encourage animal transportation.

#### (ii) Specific factors affecting reproduction

Soybean is a short-day plant and flowering is quicker under short days. Temperature response and photoperiodism determine the cultivar adaptation. The cultivars are identified based on bands of adaptation that run east-west, determined by latitude and day length. There are distinct soybean cultivars that are well adapted to tropical, sub-tropical, and temperate regions.

### **(iii) Generation time**

Soybean seeds germinate in 5-7 days under favourable conditions when the temperature of the soil reaches 50 °F (10 °C). Soybean is an annual crop with a cultural cycle of 2-5 months depending on the variety and area of production.

## **2.4. Sexual compatibility with other cultivated or wild plant species**

Soybean can only cross with other members within the subgenus *Soja*, with *G. soja* and *G. gracilis*; however, the potential for such gene flow is limited by geographic isolation. Additionally, soybean is a highly self-pollinating plant species; the anthers mature in the bud and pollinate the stigma of the same flower, limiting the chances of cross-pollination. The outcrossing rate of soybean is as low as 1.8% making gene introgression very difficult. Cultivated soybean is an annual herb and cannot cross with other perennial species of *Glycine* (subgenus *Glycine*).

## **2.5. Survivability**

### **a) Ability to form structures for survival or dormancy**

Cultivated soybean are not typically found in the unmanaged ecosystems and do not exhibit weedy characteristics. Soybean is a non-frost tolerant crop and dormancy is very rare and restricted to certain environmental conditions. A lack of dormancy is selected for in commercial soybean seeds, therefore commercial soybean seeds germinate quickly. Though it may appear as a volunteer, it does not compete well with succeeding crops and can be controlled mechanically or by selective use of herbicides.

### **b) Specific factors affecting survivability**

Soybean seed will only germinate when the soil temperature reaches 10°C and will emerge in a 5-7 day period under favorable conditions. Soybeans do not yield well on acid soils. The soybean plant has no weedy tendencies and is non-invasive in natural habitats. It does not grow in unmanaged habitats.

## **2.6. Dissemination**

### **a) Ways and extent of dissemination**

It is generally recognized that the domestication of crop plants over thousands of generations has resulted in modern crop cultivars that have lost common distinctive attributes of weeds and rarely grow without human intervention. Dissemination of soybean seed can occur either by mechanical harvesting or transportation, but again these seeds generally do not survive without human intervention. Soybean is a self-pollinating annual crop that is propagated by seed. Neither the seedpod, nor the seed, has morphological characteristics that would encourage animal transportation. Furthermore, dissemination by pollen is also unlikely since soybean is a self-pollinating crop.



**b) Specific factors affecting dissemination**

Mechanical harvesting and transport are ways of disseminating soybean seeds. Insect or wind damage may also cause soybean seeds to fall to the ground and avoid harvest. However, and regardless of these routes of dissemination, soybean seeds cannot survive without human assistance in non-agricultural environments in the EU.

**2.7. Geographical distribution within the Union of the sexually compatible species**

There are no wild plant species that are sexually compatible with soybean in the EU.

**2.8. In the case of plant species not normally grown in the Member State(s), description of the natural habitat of the plant, including information on natural predators, parasites, competitors and symbionts**

Not applicable as soybean is normally grown in the EU.

**2.9. Other potential interactions, relevant to the GM plant, of the plant with organisms in the ecosystem where it is usually grown, or used elsewhere, including information on toxic effects on humans, animals and other organisms**

Soybean is cultivated in the EU and has a long history of safe use. Unprocessed soybeans are not suitable for food and feed use.

### **3. MOLECULAR CHARACTERISATION**

#### **3.1. Information relating to the genetic modification**

##### **(a) Description of the methods used for the genetic modification**

DP305423xMON87708xMON89788 soybean was developed by traditional breeding methods of three individual GM soybean lines, DP305423 soybean, MON 87708 soybean, and MON 89788 soybean, to produce the combined trait product DP305423xMON87708xMON89788. No new genetic modifications were introduced.

##### **(b) Nature and source of the vector used**

DP305423xMON87708xMON89788 soybean was developed by conventional breeding between DP305423 soybean, MON 87708 soybean, and MON 89788 soybean. No vector has been used to produce DP305423xMON87708xMON89788 soybean.

##### **(c) Source of donor DNA, size and intended function of each constituent fragment of the region intended for insertion**

DP305423xMON87708xMON89788 soybean was developed by traditional breeding methods of three individual GM soybean lines, DP305423 soybean, MON 87708 soybean, and MON 89788 soybean, to produce the combined trait product DP305423xMON87708xMON89788. No new genetic modifications were introduced.

#### **3.2. Information relating to the genetically modified plant**

##### **3.2.1. Description of the trait(s) and characteristics which have been introduced or modified**

DP305423xMON87708xMON89788 soybean contains increased levels of monounsaturated (oleic) fatty acid and decreased levels of polyunsaturated fatty acids (linoleic and linolenic acid) due to the downregulation of the endogenous omega-6 desaturase, and is tolerant to glyphosate, dicamba, and ALS-inhibiting herbicides due to the presence of CP4 EPSPS, DMO and GM-HRA proteins, respectively.

### 3.2.2. Information on the nucleic acid(s) sequences actually inserted or deleted

#### a) The copy number of all detectable inserts, both complete and partial

Southern blot analyses confirm the equivalency of the DP305423, MON 87708, and MON 89788 DNA insertions in DP305423xMON87708xMON89788 soybean to the corresponding single soybean lines and that the DP305423, MON 87708 and MON 89788 soybean inserts are integrated into the nuclear genome of DP305423xMON87708xMON89788 soybean. No irregular segregation patterns were observed during the breeding process that would suggest that the inserts were present on genetically linked loci.

Information on the elements present in the single events can be found in the following EFSA opinions:

EFSA, 2013a. Scientific Opinion on application EFSA-GMO-NL-2007-45 for the placing on the market of herbicide-tolerant, high-oleic acid, genetically modified soybean 305423 for food and feed uses, import and processing under Regulation (EC) No 1829/2003 from Pioneer. EFSA Journal 2013;11(12):3499, 35 pp.

EFSA, 2013b. Scientific Opinion on application EFSA-GMO-NL-2011-93 for the placing on the market of the herbicide-tolerant genetically modified soybean MON 87708 for food and feed uses, import and processing under Regulation (EC) No 1829/2003 from Monsanto. EFSA Journal 2013;11(10):3355, 30 pp.

EFSA, 2008. Opinion of the Scientific Panel on Genetically Modified Organisms on an application (Reference EFSA-GMO-NL-2006-36) for the placing on the market of glyphosate-tolerant soybean MON89788 for food and feed uses, import and processing under Regulation (EC) 1829/2003 from Monsanto, The EFSA Journal 758, 1-23.

#### b) In case of deletion(s), size and function of the deleted region(s)

Not applicable.

#### c) Subcellular location(s) of insert(s) (nucleus, chloroplasts, mitochondria, or maintained in a non-integrated form), and methods for its/their determination

DP305423xMON87708xMON89788 soybean inserts are integrated into the soybean nuclear genome as confirmed by the inheritance of the inserts through conventional crosses and by the molecular characterisation of DP305423xMON87708xMON89788 soybean.

#### d) The organisation of the inserted genetic material at the insertion site

A detailed molecular characterisation by Southern blot analysis has confirmed that the copy number, structure and organisation of the inserts in DP305423xMON87708xMON89788 soybean are equivalent to those found in the parental breeding lines DP305423, MON87708 and MON89788 soybean. The organisation of the inserted material in the parental lines is as follows:

**DP305423** soybean contains a *gm-fad2-1* fragment from the coding region of the soybean FAD2-1 gene under the control of the seed-preferred Kunitz trypsin inhibitor (KTI3) promoter and terminator from soybean as well as the coding region of the *gm-hra* gene under the control of the soybean S-adenosyl-L-methionine synthetase (SAMS) promoter including the SAMS 5' untranslated region (UTR) and intron, and the soybean acetolactate synthase (*als*) terminator.

**MON 87708** soybean contains the *dmo* expression cassette, the *PC1SV* promoter, the *TEV* leader, the *RbcS* targeting sequence, the *dmo* coding sequence and the E9 3' non-translated region.

The **MON 89788** insert consists of the *cp4 epsps* gene cassette containing the *FMV/EF-1α* promoter, the *EF-1α* leader and *EF-1α* intron sequences, the *CTP2* chloroplast transit peptide sequence, the *cp4*

*epsps* coding sequence and the *E9* 3' non-translated sequence.

**e) In the case of modifications other than insertion or deletion, describe function of the modified genetic material before and after the modification, as well as direct changes in expression of genes as a result of the modification**

Not applicable.

### 3.2.3. Information on the expression of the insert

#### **a) Information on developmental expression of the insert during the life cycle of the plant**

Field studies have been carried out in order to estimate the level of expression of the insert-encoded proteins in DP305423xMON87708xMON89788 soybean. Key plant tissues were collected from the plants at different developmental stages across the growing season. Protein concentrations were measured using Enzyme Linked Immunosorbent Assay (ELISA) systems developed for each protein. The results of the field studies have shown that the expression of the GM-HRA, DMO and CP4 EPSPS proteins in DP305423xMON87708xMON89788 soybean were comparable to the expression of these proteins in the corresponding single GM lines.

#### **b) Parts of the plant where the insert is expressed**

Studies to evaluate the range of expression of the GM-HRA, DMO and CP4 EPSPS in different tissues (leaf, forage, root, and seed) of DP305423xMON87708xMON89788 soybean have been conducted. The results confirmed that, as expected, the expression of the insert-encoded proteins in DP305423xMON87708xMON89788 soybean tissues is comparable to that of the respective single soybean events.

### 3.2.4. Genetic stability of the insert and phenotypic stability of the genetically modified plant

Genetic and phenotypic stability of the inserts in DP305423xMON87708xMON89788 soybean was confirmed by molecular analysis of DP305423xMON87708xMON89788 soybean.

### 3.2.5. Information on how the genetically modified plant differs from the recipient plant in:

#### **(a) Mode(s) and/or rate of reproduction**

DP305423xMON87708xMON89788 soybean does not differ from conventional soybean in this respect.

#### **(b) Dissemination**

DP305423xMON87708xMON89788 soybean does not differ from conventional soybean in this respect.

#### **(c) Survivability**

DP305423xMON87708xMON89788 soybean does not differ from conventional soybean in this respect.

#### **(d) Other differences**

Not applicable.

### 3.2.6. Any change to the ability of the GM plant to transfer genetic material to other organisms

#### **a) Plant to bacteria gene transfer**

The potential transfer and impact of plant to bacteria gene transfer has been assessed for all the parental single events.

#### **b) Plant to plant gene transfer**

Soybean is a self-pollinated species and there are no other cultivated or wild plant species that are sexually compatible with soybean in the EU.

It should be noted that this application is for authorisation of DP305423xMON87708xMON89788 soybean for all food and feed uses, and for all food, feed and processed products derived from DP305423xMON87708xMON89788 soybean, and not for cultivation of DP305423xMON87708xMON89788 soybean seed products. Any plant to plant gene transfer is therefore expected to be limited to only occasional unintentional releases.

#### **4. COMPARATIVE ANALYSIS**

##### **4.1 Choice of the conventional counterpart and additional comparators**

The comparator chosen for the safety evaluation of DP305423xMON87708xMON89788 soybean consists of non-GM near-isogenic control soybean. Wherever possible, data on other commercial non-GM reference soybean lines have also been used in the comparisons with DP305423xMON87708xMON89788 soybean.

##### **4.2 Experimental design and statistical analysis of data from field trials for comparative analysis**

The field phase of this study was conducted during the 2016 growing season at sites in the United States, which were selected on the basis of their inclusion in the commercial soybean-growing regions of North America. Each site utilized a randomized complete block design and contained four blocks. Each block contained the following entries: conventional herbicide-treated (CHT) DP305423xMON87708xMON89788 soybean, intended herbicide-treated (IHT) DP305423xMON87708xMON89788 soybean, non-genetically modified (non-GM) near-isoline CHT control soybean, and three non-GM CHT commercial reference soybean lines per study. Samples were collected for nutrient composition analysis at eight sites, and consisted of forage (BBCH 71 growth stage) and seed (BBCH 85-99 growth stage).

Statistical analysis was done according to the EFSA Guidelines using difference and equivalence testing.

##### **4.3 Selection of material and compounds for analysis**

Samples were analyzed for the following key nutritional components in accordance with OECD guidelines for the assessment of genetically modified soybean: the forage assessment included proximate and fiber, and the seed assessment included proximate, fiber, fatty acid, amino acid, mineral, vitamin, isoflavones, oligosaccharides, secondary metabolite, anti-nutrient analytes and endogenous allergens. Changes in the fatty acid profile of DP305423xMON87708xMON89788 soybean were intended or expected, while the other nutrient changes were relatively minor and fell within the range of natural biological variation observed in soybean.

##### **4.4 Comparative analysis of agronomic and phenotypic characteristics**

DP305423xMON87708xMON89788 soybean has been tested at different locations across key soybean growing regions of North America for the major agronomic and phenotypic characteristics of soybean. The agronomic data obtained support the conclusion that there are no unexpected agronomic differences between DP305423xMON87708xMON89788 soybean and non-GM control soybean with comparable genetic background and the data fell within the range of natural variation.

It should be noted that this application is for authorisation of DP305423xMON87708xMON89788 soybean for all food and feed uses, and for all food, feed and processed products derived from DP305423xMON87708xMON89788 soybean, and not for cultivation of DP305423xMON87708xMON89788 soybean seed products.

#### 4.5 Effect of processing

Processed products from DP305423xMON87708xMON89788 soybean have been shown to be comparable to processed products from conventional soybean, except for high oleic phenotype of the DP305423xMON87708xMON89788 soybean oil, which is the aim of the genetic modification in this soybean. The processing has no effect on DP305423xMON87708xMON89788 soybean.

### 5. Toxicology

#### a) Toxicological testing of newly expressed proteins

DP305423xMON87708xMON89788 soybean was developed by traditional breeding methods of three individual GM soybean lines, DP305423 soybean, MON 87708 soybean, and MON 89788 soybean, and therefore express the insert encoded proteins inherited from their parents. Potential adverse effects to human and animal health from expression of the GM-HRA, DMO and CP4 EPSPS proteins have previously been assessed taking into account the following considerations:

- the recipient organism and the donor organism for each protein have a history of safe use;
- the molecular and biochemical characteristics of the proteins do not indicate toxicity risks;
- the proteins have no significant amino acid sequence homology to known toxins or other biologically active proteins that could cause adverse effects to humans or animals;
- the proteins show no acute or repeated-dose oral toxicity to mammals.

No reports have appeared in the scientific literature up to now that invalidate these conclusions, nor did a re-analysis of the similarity searches with updated databases reveal any safety concerns. Furthermore, there is no evidence of potential interactions between the different insert-encoded proteins in DP305423xMON87708xMON89788 soybean that would affect the safety of this combined trait soybean. In addition, the low concentration of these proteins in soybean tissues and their rapid digestibility in simulated digestive fluids provide further assurance for the safety of the DP305423xMON87708xMON89788 soybean. It is therefore unlikely that the GM-HRA, DMO and CP4 EPSPS proteins would be expected to cause any adverse effects to human and animal health.

#### b) Testing of new constituents other than proteins

Not applicable as the genetic modification in DP305423xMON87708xMON89788 soybean does not give rise to the expression of any new constituents other than the transgenic proteins.

#### c) Information on natural food and feed constituents

Detailed analyses have demonstrated that the DP305423xMON87708xMON89788 soybean with the exception of the modified fatty acid profile are comparable to those of the conventional counterpart. In addition, the results obtained in 90-day oral toxicity studies in rats with the single GM soybean lines provide further confirmation of the safety of the natural food and feed constituents from DP305423xMON87708xMON89788 soybean and nutritional equivalence between DP305423xMON87708xMON89788 soybean and non-GM control soybean.

#### d) Testing of the whole GM food/feed

The evaluation of the nutrient composition of DP305423xMON87708xMON89788 soybean has confirmed that, except for the modified fatty acid profile, it is equivalent to non-GM control soybean.

### 6. ALLERGENICITY

#### a) Assessment of allergenicity of the newly expressed proteins

In accordance with a weight-of-evidence approach, which accounts for a variety of factors and experimental approaches for an overall assessment of the allergenic potential of the new proteins, the GM-HRA, DMO and CP4 EPSPS proteins were evaluated for their allergenic potential through:

- assessing the allergenicity potential of the source of the genes;
- homology searches against allergen databases;
- *in vitro* simulated digestibility studies;
- analysis of protein glycosylation and heat stability.

No reports have appeared in the scientific literature up to now that invalidate these conclusions, nor did a re-analysis of the similarity searches with updated allergen databases reveal any concerns. The results obtained confirm that the GM-HRA, DMO and CP4 EPSPS proteins expressed in DP305423xMON87708xMON89788 soybean are not potential allergens and DP305423xMON87708xMON89788 soybean is unlikely to cause an allergic reaction in humans or animals..

#### **b) Assessment of allergenicity of the whole GM plant**

The assessment of endogenous allergenic proteins in DP305423xMON87708xMON89788 soybean, obtained from field trials performed in the commercial soybean-growing regions of North America, confirmed the comparability of DP305423xMON87708xMON89788 soybean and the control soybean in terms of their allergenic potential.

## **7. NUTRITIONAL ASSESSMENT**

#### **a) Nutritional assessment of GM food**

The primary food use of soybean is the oil. Modification of the fatty acid composition of oilseeds is aimed at improving the functional performance of the oil. The availability of high oleic DP305423xMON87708xMON89788 soybean with increased levels of monounsaturated (oleic) fatty acids and decreased levels of polyunsaturated fatty acids (linoleic acid and linolenic acid) in soybean seed is intended to be beneficial for the food oil industry with its increased oil stability.

#### **b) Nutritional assessment of GM feed**

Composition analysis of toasted soybean meal, the primary feed use of soybean, confirmed that DP305423xMON87708xMON89788 soybean is comparable to the control soybean in term of meal composition and therefore consumption of DP305423xMON87708xMON89788 soybean feed is not expected to give rise to any adverse nutritional impact.

## **8. EXPOSURE ASSESSMENT – ANTICIPATED INTAKE/EXTENT OF USE**

An exposure assessment, comparing the intake of various fatty acid groups by European consumers, from the replacement of vegetable-based oils with DP305423xMON87708xMON89788 soybean oil concluded on a decreasing intake of SFA, *cis* n-6 PUFA and TFA and increasing intakes of MUFA and *cis* n-3 PUFA fatty acids observed in all three assessment scenarios (100% replacement, 50% replacement and 25% replacement).

The use of DP305423xMON87708xMON89788 soybean feed is not expected to be different from that of commercially available soybean feed. Due to the rapid degradation of the GM-HRA, DMO and CP4 EPSPS proteins during soybean meal production, the exposure of animals to these newly expressed proteins in DP305423xMON87708xMON89788 soybean is negligible.

## **9. RISK CHARACTERISATION**

Soybean food and feed products have a long history of safe use. The information presented in this application confirms no safety concerns for human and animal health or for the environment.

## 10. POST-MARKET MONITORING ON THE GENETICALLY MODIFIED FOOD OR FEED

Based on the current safety assessment, no risks to human and animal health or the environment have been identified from the use of DP305423xMON87708xMON89788 soybean as food or feed. No health claims are associated with the use of DP305423xMON87708xMON89788 soybean, however, due to the modified fatty acid profile, which is similar to that of the single event DP305423, the applicant proposes to apply the post-market monitoring (PMM) plan as described in the DP305423 authorisation decision (EC, 2015 as set out in point (g) of the Annex).

## 11. ENVIRONMENTAL ASSESSMENT

### 11.1 Mechanism of interaction between the GM plant and target organisms

Not applicable since no target organisms are associated with DP305423xMON87708xMON89788 soybean.

### 11.2 Potential changes in the interactions of the GM plant with the biotic environment resulting from the genetic modification

#### a) Persistence and invasiveness

There is negligible likelihood for DP305423xMON87708xMON89788 soybean to become environmentally persistent or invasive giving rise to any weediness. The cultivation of DP305423xMON87708xMON89788 soybean in the EU is not within the scope of this application.

Furthermore, cultivated soybean does not possess any trait for weediness and the expression of the insert-encoded proteins in DP305423xMON87708xMON89788 soybean does not introduce new traits for weediness. Soybean is a highly domesticated crop and generally do not survive without human assistance in non-agricultural environments

#### b) Selective advantage or disadvantage

Soybean is highly domesticated to the extent that it generally cannot become established as a feral species outside the agricultural environment. The specific advantages introduced by the genetic modification in DP305423xMON87708xMON89788 soybean do not confer any selective advantage to the plants in the natural environment, *i.e.* outside the agricultural environment.

In conclusion, expression of the GM-HRA, DMO and CP4 EPSPS proteins in DP305423xMON87708xMON89788 soybean does not confer any selective advantage outside the agricultural environment.

#### c) Potential for gene transfer

There are no sexually compatible wild or weedy relatives of *G. max* known to exist in the EU, which eliminates any known potential for gene transfer to such species. Potential for gene transfer is therefore expected to be limited to other soybean grown in culture. Cultivation of DP305423xMON87708xMON89788 soybean is, however, not part of the scope of this application. The potential for gene transfer to other cultivated soybean is, therefore, expected to be limited and the environmental risk of such gene transfer is negligible.

#### d) Interactions between the GM plant and target organisms

Not applicable since no target organisms are associated with DP305423xMON87708xMON89788 soybean.



**e) Interactions of the GM plant with non-target organisms**

Not applicable since no target organisms are associated with DP305423xMON87708xMON89788 soybean.

**f) Effects on human health**

Soybean has a long history of safe use in human food and animal feed. A detailed evaluation of the potential toxicity and allergenicity to humans of the GM-HRA, DMO and CP4 EPSPS proteins as expressed in DP305423xMON87708xMON89788 soybean, has been carried out. As a result, and in conclusion, DP305423xMON87708xMON89788 soybean does not express any known toxic or allergenic proteins. Therefore, consumption of DP305423xMON87708xMON89788 soybean or derived food products is not expected to result in no adverse effects on human health.

**g) Effects on animal health**

Consumption of DP305423xMON87708xMON89788 soybean or any derived food, feed and processed products is not anticipated to result in any adverse effects on human or animal health. Therefore, use of DP305423xMON87708xMON89788 soybean as feed and consumption of any food, feed and processed products derived from DP305423xMON87708xMON89788 soybean is not expected to result in adverse effects on animal health or the food/feed chain.

**h) Effects on biogeochemical processes**

Because of the natural ubiquity of the donor organisms of the GM-HRA, DMO and CP4 EPSPS proteins in environment, the specific biochemical activity of these proteins, and taking into account the scope of this application, which does not include cultivation, DP305423xMON87708xMON89788 soybean is not expected to cause any significant immediate and/or delayed effects on biogeochemical processes.

**i) Impacts of the specific cultivation, management and harvesting techniques**

Not applicable as cultivation is not part of the scope of this application.

**11.3 Potential interactions with the abiotic environment**

The scope of this application does not include authorisation for the cultivation of DP305423xMON87708xMON89788 soybean seed products in the EU. Exposure to the environment from the import of DP305423xMON87708xMON89788 soybean is expected to be limited to unintended release of DP305423xMON87708xMON89788 soybean. This can be controlled with current measures used to control unintended release of commercially available soybean, such as use of mechanical means and selective use of herbicides (with the exception of glyphosate, dicamba, and ALS-inhibiting herbicides). Moreover, soybean generally do not survive without human assistance in non-agricultural environments. Therefore, the likelihood of adverse interactions with the abiotic environment is negligible.

**11.4 Risk characterisation**

The scope of this application does not include authorisation for the cultivation of DP305423xMON87708xMON89788 soybean seed products in the EU. Exposure to the environment from the import of DP305423xMON87708xMON89788 soybean is expected to be limited to unintended release of DP305423xMON87708xMON89788 soybean. This can be controlled with current measures used to control unintended release of commercially available soybean, such as use of mechanical means and selective use of herbicides (with the exception of glyphosate, dicamba, and ALS-inhibiting herbicides). Moreover, soybean generally do not survive without human assistance in

non-agricultural environments. Therefore, the likelihood of adverse interactions with the abiotic environment is negligible.

## 12. ENVIRONMENTAL MONITORING PLAN

### a) General (risk assessment, background information)

The scope of this application does not include authorisation for the cultivation of DP305423xMON87708xMON89788 soybean seed products in the EU. Exposure to the environment from the import of DP305423xMON87708xMON89788 soybean is expected to be limited to unintended release of DP305423xMON87708xMON89788 soybean which can be controlled with current measures used to control unintended release of commercially available soybean, such as use of mechanical means and selective use of herbicides (with the exception of glyphosate, dicamba, and ALS-inhibiting herbicides).

A proposal for an environmental monitoring plan for DP305423xMON87708xMON89788 soybean has been developed according to the principles and objectives outlined in Annex VII of Directive 2001/18/EC and Council Decision 2002/811/EC establishing guidance notes supplementing Annex VII to Directive 2001/18/EC, and following the Guidance Document of the Scientific Panel on Genetically Modified Organisms on the Post Market Environmental Monitoring of genetically modified organisms (EFSA, 2011).

### b) Interplay between environmental risk assessment and monitoring

The design of the environmental monitoring plan is based on the conclusions of the environmental risk assessment (e.r.a.) carried out for this application for authorisation of genetically modified DP305423xMON87708xMON89788 soybean and derived food and feed in accordance with Regulation (EC) No 1829/2003.

The e.r.a. has been carried out in accordance with Annex II of Directive 2001/18/EC and Commission Decision 2002/623/EC establishing guidance notes supplementing Annex II to Directive 2001/18/EC. The overall conclusion obtained from the e.r.a. confirms that there are no identified potential adverse effects to human and animal health or the environment arising from DP305423xMON87708xMON89788 soybean. Therefore, the risk to human and animal health or the environment from DP305423xMON87708xMON89788 soybean and any derived products is expected to be negligible as for any commercial soybean and any derived products.

### c) Case-specific GM plant monitoring (approach, strategy, method and analysis)

In accordance with Annex VII of Directive 2001/18/EC and Council Decision 2002/811/EC establishing guidance notes supplementing Annex VII to Directive 2001/18/EC, case-specific monitoring should only be carried out in those cases where potential adverse effects have been identified in the e.r.a.

The e.r.a. concluded that the risk to human and animal health or to the environment from DP305423xMON87708xMON89788 soybean and any derived products is as negligible as for any commercial soybean and any derived products. As a result, case-specific monitoring is not applicable for the use of DP305423xMON87708xMON89788 soybean for all food and feed purposes and the import and processing of DP305423xMON87708xMON89788 soybean.

### d) General surveillance of the impact of the GM plant (approach, strategy, method and analysis)

In accordance with Council Decision 2002/811/EC, general surveillance is not based on a particular hypothesis and it should be used to identify the occurrence of unanticipated adverse effects of the

GMO or its use for human and animal health and the environment that were not predicted in the risk assessment.

The scope of this application is for the authorisation of DP305423xMON87708xMON89788 soybean for all food and feed uses in accordance with Articles 3(1) and 15(1) of Regulation (EC) No 1829/2003 and for import and processing of DP305423xMON87708xMON89788 soybean in accordance with Part C of Directive 2001/18/EC. In this application we are not seeking approval for cultivation of DP305423xMON87708xMON89788 soybean seed products in the EU.

As discussed in detail in the e.r.a., exposure to the environment is expected to be limited to unintended release of DP305423xMON87708xMON89788 soybean. However, such limited exposure is highly unlikely to give rise to any adverse effect and, if necessary, can be controlled with current measures used to control unintended release of commercially available soybean, such as use of mechanical means and selective use of herbicides (with the exception of glyphosate, dicamba, and ALS-inhibiting herbicides).

However, and in order to safeguard against any adverse effects on human and animal health or the environment that were not anticipated in the e.r.a., general surveillance on DP305423xMON87708xMON89788 soybean will be undertaken for the duration of the authorisation.

#### **e) Reporting the results of monitoring**

Case-specific monitoring is not applicable for the use of DP305423xMON87708xMON89788 soybean for all food and feed purposes and the import and processing of DP305423xMON87708xMON89788 soybean. As a result, no case-specific monitoring is proposed for this application for authorisation of DP305423xMON87708xMON89788 soybean.

The applicant will inform the European Commission, in accordance with law, of any adverse effects reported arising from the handling and use of imported DP305423xMON87708xMON89788 soybean.

Furthermore, the applicant will submit an annual monitoring report to the European Commission including results of the general surveillance in accordance with the conditions of the authorisation. The report will include a scientific evaluation of any confirmed adverse effect, if any, a conclusion of the safety of DP305423xMON87708xMON89788 soybean and, as appropriate, any measures that were taken to ensure the safety of human and animal health or the environment.

### **13. DETECTION AND IDENTIFICATION TECHNIQUES FOR THE GM PLANT**

Individual PCR-based quantitative event-specific detection methods are available for DP305423xMON87708xMON89788 soybean and have been validated by the European Union Reference Laboratory (EURL) for GM Food and Feed (Joint Research Centre, Italy). In addition, an in-house verification study on the performance of the single event detection methods on the DP305423xMON87708xMON89788 soybean stacked product has been submitted to the EURL for verification, in accordance with the requirements of the EURL/ENGL Guidance document "Definition of minimum performance requirements for analytical methods of GMO testing" of 20 April 2015.

## 14. INFORMATION RELATING TO PREVIOUS RELEASES OF THE GM PLANT

### 14.1. History of previous releases of the GM plant notified under Part B of the Directive 2001/18/EC and under Part B of Directive 90/220/EEC by the same notifier

<b>a) Notification number</b> Not applicable – no previous releases in the EU.
<b>b) Conclusions of post-release monitoring</b> Not applicable.
<b>c) Results of the release in respect to any risk to human health and the environment (submitted to the Competent Authority according to Article 10 of Directive 2001/18/EC)</b> Not applicable.

### 2. History of previous releases of the GM plant carried out outside the Community by the same notifier

<b>a) Release country</b> Field testing of DP305423xMON87708xMON89788 soybean has been carried out in the US since 2015.
<b>b) Authority overseeing the release</b> US: United States Department of Agriculture (USDA)
<b>c) Release site</b> Multiple sites, selected to represent typical growing regions for soybean in the US.
<b>d) Aim of the release</b> Breeding, agronomic performance, efficacy, yield, ecological observations, product development, and regulatory data generation.
<b>e) Duration of the release</b> Included one growing season for soybean in the US.
<b>f) Aim of post-releases monitoring</b> Monitoring of volunteers.
<b>g) Duration of post-releases monitoring</b> 2-4 months.
<b>h) Conclusions of post-release monitoring</b> The DP305423xMON87708xMON89788 soybean plants performed as expected, with no evidence of any unintentional morphological or phenotypical characteristics.
<b>i) Results of the release in respect to any risk to human health and the environment</b> No adverse effects on human health and the environment observed.