

# Renewal of the authorisation for import and processing of genetically modified soybean MON 87708

## COGEM advice CGM/240828-01

- The present application (GMFF-2023-21237) concerns the renewal of the authorisation for import and processing for use in feed and food of genetically modified (GM) soybean (*Glycine max*) MON 87708;
- GM soybean MON 87708 was previously authorised for import and processing in 2015;
- COGEM has advised positively on the import and processing of soybean MON 87708 in 2011;
  
- MON 87708 expresses the *dmo* gene, which confers tolerance to herbicides that contain dicamba;
  
- In the Netherlands, feral soybean populations do not occur;
- Hybridisation of soybean with other species is not possible in the Netherlands, as there are no wild relatives of soybean;
  
- The molecular characterisation of soybean MON 87708 has been updated and meets the criteria of COGEM;
- The updated bioinformatics analyses, literature review and monitoring reports do not give any indication of a potential environmental risk;
  
- COGEM is of the opinion that import, and processing of GM soybean MON 87708 poses a negligible risk to the environment in the Netherlands;
- As other organisations conduct a food/feed assessment, COGEM abstains from giving advice on the potential risks of incidental consumption.

### 1. Introduction

The present application (GMFF-2023-21237; RX038), filed by Bayer Agriculture BV on behalf of Bayer CropScience LP, concerns the renewal of the authorisation for import and processing for use in feed and food of genetically modified (GM) soybean (*Glycine max*) MON 87708. This authorisation was granted in 2015.<sup>1</sup> As import and processing authorisations remain valid for a period of 10 years, the applicant has filed an application for the renewal of the authorisation granted in 2015. The application contains – among other things – monitoring reports, updated bioinformatics analyses, and a systematic literature search. MON 87708 expresses the *dmo* gene, which confers tolerance to herbicides that contain dicamba.

### 2. Previous COGEM Advice

The COGEM has advised positively on the import and processing of GM soybean MON 87708 in 2011.<sup>2</sup> In addition, COGEM has also advised positively on four different stacked events that contain

MON 87708, in 2013, 2016, and 2018.<sup>3,4,5,6</sup> Furthermore, in 2023, COGEM has advised positively on one other GM soybean event that – amongst other genes – express the *dmo* gene.<sup>7</sup>

### 3. Environmental risk assessment

The objective of an environmental risk assessment (ERA) is to identify and evaluate potential adverse effects of the genetically modified organism (GMO), direct or indirect, immediate, or delayed, on human health and the environment. This ERA involves the import and processing of GM soybean. Any concerns relating to cultivation, management or harvesting practices are beyond the scope of this advice. When assessing the environmental risk of incidental spillage of GM soybean COGEM first considers the likelihood that the event could establish itself in the Netherlands or could hybridise with related species. Other so-called ‘areas of concern’ (e.g., effects on non-target organisms) are addressed only if there is a chance that the event could establish itself or if gene flow to other species might occur.

#### 3.1 Characteristics of the crop

Soybean (*Glycine max*) belongs to the Leguminosae (Fabaceae) family and is cultivated from equatorial to temperate zones. The optimum temperature for soybean growth is between 25 °C and 30 °C. Soybean is sensitive to frost and therefore does not survive freezing conditions.<sup>8,9,10</sup> The soybean plant is not weedy in character.<sup>9,10</sup> To reduce yield losses during harvest, soybean plants with minimal seed scattering have been selected for breeding. Soybean seeds rarely display dormancy, survive poorly in soil, and do not form a persistent soil seed bank.<sup>9,11</sup> Soybean volunteers are rarely observed throughout the world and do not compete effectively with other cultivated plants or primary colonisers.<sup>9,10</sup> In addition, volunteers are easily controlled mechanically or chemically.<sup>10</sup>

Soybean is a predominantly self-pollinating species. The anthers mature in the bud and directly pollinate the stigma of the same flower.<sup>9,10</sup> Pollinators such as honey bees (*Apis mellifera* L.) may improve the distribution of pollen on the stigmatic surface, which is known to increase seed set in many crops, and may as well facilitate transfer of soybean pollen and enable cross-pollination.<sup>12,13,14,15</sup> The cross-pollination rate of soybean is low and on average between 1 to 3%.<sup>9,10,16,17,18,19,20</sup> Usually, soybean pollen only disperse over short distances.

#### 3.2 Receiving environment

As mentioned previously, soybean is sensitive to frost. Temperatures below 0 °C are common in the Netherlands, with an average of 51 frost days a year between 1991 and 2020.<sup>21</sup> Although the Dutch climate is not optimal, soybean is cultivated on a small scale (442 hectares in 2023).<sup>22</sup> Soybean volunteers are very uncommon in the Netherlands and have never resulted in establishment of wild populations.<sup>23,24</sup> To the best of COGEM’s knowledge, there are no reports of feral soybean populations in Europe. Additionally, hybridisation with other species is not possible in Europe because there are no wild relatives of soybean.<sup>9,10</sup>

**Conclusion:** In the Netherlands feral soybean populations do not occur and hybridization of soybean with other species is not possible.

### 3.3 Description of the introduced genes and traits

MON 87708 was developed by *Agrobacterium*-mediated transformation of the conventional soybean line A3525. Two expression cassettes were initially introduced in MON 87708. One cassette contains the *dmo* gene from the bacteria *Stenotrophomonas maltophilia*, conferring tolerance to dicamba. The cassette with the *dmo* gene was present on the binary vector PV-GMHT4355, which contains two transfer DNA regions (T-DNAs) and the *dmo* gene expression cassette. The other cassette expresses the *cp4 epsps* gene derived from *Agrobacterium* sp., conferring tolerance to glyphosate containing herbicides.<sup>25</sup> Glyphosate tolerance was used as a tool to select transformed plants. This cassette was subsequently removed from the line by conventional breeding and selection, resulting in MON 87708 soybean which is tolerant to dicamba herbicides, but sensitive to herbicides containing glyphosate.<sup>26</sup>

Introduced gene	Encoded protein	Regulatory elements	Traits
<i>dmo</i>	Dicamba mono-oxygenase enzyme (DMO) from <i>Stenotrophomonas maltophilia</i> <sup>27,28</sup>	Promoter from peanut chlorotic streak caulimovirus (PCSV, species <i>Soymovirus virgarrachidis</i> )  E9 3' non-translated region from the <i>rbcS2</i> gene of <i>Pisum sativum</i>	Tolerance to herbicides containing diacamba
For a detailed description of the introduced genes and traits, see references.			

### 3.4 Updated bioinformatic analyses

The applicant updated the bioinformatic analyses of MON 87708 using databases assembled in January 2023. Assessment of the insertion site of the MON 87708 T-DNA indicated that the insert is likely to be located on chromosome 6. Based on the annotations of the most recent version of the GenBank *Glycine max* reference genome, the applicant concluded that no endogenous genes were disrupted by the insert. Furthermore, the insert and the junctions with the 5' and 3' flanking regions were bioinformatically analysed from in all six reading frames. The ORF sequences were compared from stop-to-stop codon with an updated database of general proteins, as well as an updated database with toxins and venoms. No alignments with any known toxin or biologically active protein were found.

The COGEM is of the opinion that the molecular characterisation of MON 87708 has been performed correctly and meets the requirements set by COGEM.<sup>29</sup>

**Conclusion:** The bioinformatics analyses of GM soybean MON 87708 been updated and performed adequately. No indications for potential environmental risks have been identified.

### 3.5 Systematic literature search and unpublished studies

The applicant performed a literature search using several bibliographic databases and internet pages of relevant key organisations involved in the risk assessment of GM plants covering a publication period from 1 January 2014 to 4 January 2024. The literature search was performed for multiple GM soybean

events at once and addressed the question “Does the Bayer GM soybean products, derived food/feed products and the introduced improved fatty acid profile and dicamba tolerance traits have adverse effects on human and animal health and the environment?”. The applicant states that they are not in possession of unpublished studies that could influence the could influence the risk assessment of GM soybean MON 87708.

The literature search identified 1865 publications in electronic databases and 520 records of internet pages of relevant key organisations. Seven studies – four of which were retrieved from literature databases and three from internet pages of key organisations – were considered relevant for soybean MON 87708.<sup>30,31,32,33,34,35,36</sup> According to the applicant, none of these studies were found to contain new data relevant to the risk assessment. A publication by Wang *et al.* (2016) considered to be relevant for MON 87708 makes no mention of this GM soybean.<sup>31</sup> However, a publication by Bell *et al.* (2018) that was not considered relevant for MON 87708 does include information regarding this GM soybean.<sup>37</sup> Neither publications indicate an environmental risk for MON 87708.

Overall, no adverse effects on human and animal health, or the environment were identified in the literature searches of the applicant.

**Conclusion:** The systematic literature search does not provide any indications that import, and processing of soybean MON 87708 poses an environmental risk.

### **3.6 Annual monitoring reports**

The applicant supplied annual reports of the post-market monitoring (PMEM) conducted between October 2015 and November 2023. These reports contain, amongst other things, information on the monitoring that is conducted by operators involved in import, handling, and processing of viable GM soybean. These operators are members of the European trade associations COCERAL, UNISTOCK or FEDIOL, and have agreed to participate in the PMEM. They are expected to report any occurrence of unanticipated adverse effects arising from soybean MON 87708, including adventitious populations resisting routine eradication procedures. No adverse health or environmental effects were reported by the trade associations involved in the monitoring of import and processing of MON 87708 soybean.

**Conclusion:** The information in the annual monitoring reports gives no indication of adverse effects or incidents resulting from import and/or processing of MON 87708.

## **4. Food/feed assessment**

This application is submitted under Regulation (EC) 1829/2003<sup>38</sup>, therefore a food/feed assessment is conducted by European Food Safety Authority (EFSA) and national organisations involved in the assessment of food safety. In the Netherlands, Wageningen Food Safety Research (WFSR) conducts a food and/or feed assessment for Regulation (EC) 1829/2003 applications. The outcome of the assessment by other organisations (EFSA, WFSR) was not known when this advice was completed.

## 5. Post-market environmental monitoring

The applicant did not propose any changes to the existing post-market environmental monitoring (PMEM) plan for soybean MON 87708. COGEM has published several recommendations for further improvement of the general surveillance (GS) plan<sup>39,40</sup> – which is part of a PMEM plan – but considers the current GS plan adequate for import and processing of soybean MON 87708.

**Conclusion:** The current PMEM plan is sufficient for the import and processing of GM soybean MON 87708.

## 6. Overall conclusion

Overall, COGEM is of the opinion that import, and processing of soybean MON 87708 poses a negligible risk to the environment in the Netherlands. COGEM abstains from giving advice on the potential risks of incidental consumption since other organisations conduct a food/feed assessment.

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