

Title

**Summary of the Literature Review for CV127 soybean  
October 1, 2021 – June 30, 2022**

**Final Report**

Data or guideline requirement

Explanatory note on literature searching  
conducted in the context of GMO applications for (renewed) market authorization  
and annual post-market environmental monitoring reports on GMOs authorised in the EU market.  
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## SUMMARY

CV127 soybean was produced by introduction of the imidazolinone-tolerant acetohydroxyacid synthase large subunit (*ahasI*) gene *csr1-2* with its native promoter from *Arabidopsis thaliana* into the soybean plant genome via biolistics transformation technology. The *csr1-2* gene from *A. thaliana* encodes an acetohydroxyacid synthase (AHAS, also known as acetolactate synthase (ALS)) large subunit enzyme that is tolerant to imidazolinone herbicides due to a point mutation that results in a single amino acid substitution in which the serine residue at position 653 is replaced by asparagine (S653N). The OECD unique identifier is BPS-CV127-9.

A scoping review was performed for the CV127 soybean and its newly expressed protein, AHAS. The objective of this scoping review was to determine if there were studies about the molecular characterization of CV127 soybean, or its effect on food and feed safety or environmental safety, that might require in-depth examination. A set of broad literature searches was performed using several bibliographic databases covering scientific literature from October 1, 2021 to June 30, 2022. Additional sources of information, such as web pages of food safety, agriculture, and biotechnology-related authorities were searched for the same time window, along with the bibliographies of relevant reviews. The references identified were evaluated for potential relevance to the scoping review questions according to pre-defined criteria.

These literature searches identified a total of 374 unique publications, which were subject to rapid assessment to exclude obviously irrelevant publications. A total of 3 publications were progressed for detailed assessment.

The 3 publications were determined to be not relevant after detailed review. No evidence was identified that would warrant conducting a systematic review.

In summary, these literature searches and review of the retrieved articles identified no relevant publications that supports the existing safety assessment of CV127 soybean.

## 1. INTRODUCTION

CV127 soybean plants were produced by introduction of the imidazolinone-tolerant acetohydroxyacid synthase large subunit (*ahas*) gene *csr1-2* with its native promoter from *Arabidopsis thaliana* into the soybean plant genome via biolistics transformation technology. The *csr1-2* gene from *A. thaliana* encodes an acetohydroxyacid synthase (AHAS, also known as acetolactate synthase (ALS)) large subunit enzyme that is tolerant to imidazolinone herbicides due to a point mutation that results in a single amino acid substitution in which the serine residue at position 653 is replaced by asparagine (S653N). The OECD unique identifier is BPS-CV127-9.

The objective of the literature searches described here was to determine if there were studies published between October 1, 2021 and June 30, 2022 that mention the molecular characterization of the CV127 soybean, and/or any adverse effect of CV127 soybean in food, feed or the environment. In that context, a broad and inclusive literature search was performed, and the articles retrieved were reviewed in a comprehensive and transparent manner. This was intended as a scoping review. The literature review was performed as recommended in the European Food Safety Authority (EFSA) explanatory note on literature searching conducted in the context of Genetically Modified Organisms (GMO)<sup>1</sup> applications and post-market environmental monitoring activities (2019)<sup>1</sup>.

The literature searches were performed for the CV127 soybean and its newly expressed protein, AHAS. The search terms also included relevant synonyms, trade name and intended trait, plant species and general GMO terms.

## 2. OVERALL METHODS

### 2.1. Objective of the scoping review

The objective of the scoping review was to survey the evidence base for the CV127 soybean and its newly expressed protein, AHAS, in order to identify any specific issues related to food or feed safety, molecular characterization or environmental safety that might require in-depth examination.

### 2.2. Review questions

Review questions were formulated to conform to PE(I)CO structure (Population, Exposure (Intervention), Comparators, Outcome) if possible, and to address data requirements. They were modeled after the review question examples provided in the EFSA 2019 explanatory note<sup>1</sup>.

**Question 1:** Were any studies published during the reporting period that describe adverse effects on human or animal health or the environment of the CV127 soybean and its newly expressed protein AHAS?

**Key elements:**

**Population:** Human health; animal health; environmental safety

**Exposure:** CV127 soybean, derived food/feed products, newly expressed protein in CV127 soybean

**Comparators:** When applicable, comparable populations or subjects exposed to appropriate controls (e.g., vehicle only, innocuous control protein, non-GM comparator) or conventional counterpart used for comparative analysis of plant material

**Outcome:** Adverse effects

**Question 2:** Were any studies published during the reporting period that focus on molecular characterization of the CV127 soybean and its newly expressed protein AHAS in soybean?



**Key elements:**

Population: CV127 soybean and newly expressed protein in CV127 soybean

Outcome: Molecular characterization (which would indicate the information/data requirement for molecular characteristics)

**2.3. Criteria for relevance**

Criteria for establishing the relevance of retrieved publications were defined prior to conduct of the search. These criteria were modeled after those given in the EFSA 2019 explanatory note<sup>1</sup> and are described in [Table 1](#).

**Table 1: Eligibility/inclusion criteria to establish the relevance of retrieved publications**

Concepts	Criteria	Comment
Key elements of review questions with PECO structure		
Population	The publication addresses human and animal health, and/or the environment (including biodiversity, ecosystem services, service providing units, and endangered species) as general protection goals	From the publications that address the GMO under consideration, those that address protection goals relevant to the risk assessment of the GMO are eligible
Exposure (Intervention)	The publication addresses the GMO, derived food/feed products, and/or the intended trait(s) (e.g., newly expressed protein(s)) that are identical or like those under regulatory review	This enables the selection of publications that address the GMO, derived food/feed products, and/or the intended trait(s) under consideration
Comparator	If the publication reports a comparative study that uses plant material as test material, eligible publications must report a non-GM variety as comparator	In those cases where the publication addresses the GMO under consideration, reports a comparative analysis study and uses plant material as test material, eligible publications also need to include an appropriate non-GM line as comparator
Outcome	The publication addresses effects/impacts on human and animal health, and/or the environment	Publications that address the GMO under consideration also need to address effects/impacts on entities of concern, and potential determinants of exposure that place these entities at risk, in order to be relevant to the risk assessment of the GMO

Concepts	Criteria	Comment
Additional concepts		
Information/data requirements	The publication reports information pertaining to one or more information/data requirement(s) outlined in Appendix A for the GMO and derived food/feed products under consideration, including the intended trait(s)	Publications that potentially contribute to the knowledge informing the risk assessment of the GMO under consideration, and thus the risk hypotheses addressed, taking account of both hazard and exposure, can be considered relevant according to this eligibility/inclusion criterion. Publications addressing other issues such as benefits, socio-economics, ethics, crop protection, detection methods, efficacy, public perception and risk communication can be excluded, as they are not necessarily relevant to the risk assessment of GMOs
Plant species	The publication addresses the same plant species as the GMO under consideration	This eligibility/inclusion criterion permits the exclusion of publications on GMOs that contain the same intended trait(s) as the GMO under consideration, but which are introduced in another plant species
Scope of GMO application	The publication addresses pathways and levels of exposure to the GMO, derived food/feed products, and the intended trait(s) that are relevant for the intended uses of the GMO and derived food/feed products under regulatory review	From the publications that address the GMO under consideration, those that consider pathways and levels of exposure relevant to the scope of the GMO application (i.e., import and processing for food/feed uses, cultivation) are eligible
Target pests/organisms	The publication addresses target pests/organisms that are established in the EU	This permits the exclusion of publications that address interactions between the GMO and target pests/organisms that do not occur in the EU



Concepts	Criteria	Comment
Stacked events obtained by conventional crosses/ subcombinations	The publication addresses the higher stacked event and/or a subcombination or subcombinations of the single events of the higher stacked event, independently of its/their origin	This permits the selection of publications on the higher stacked event and/or subcombinations of the single events of the higher stacked event that are in the scope of the GMO application(s), independently of their origin. This permits the exclusion of publications on the single events of the higher stacked event, because the risk assessment of GMO applications for stacked events covers only the products in the scope of the GMO application – i.e., the higher stacked event and subcombinations of the singles involved, independently of their origin
Molecular stacks	The publication addresses: the molecular stack; all newly expressed proteins in the molecular stack; and/or one or several of the newly expressed proteins in the molecular stack that has/have not been previously risk assessed by EFSA and/or its GMO Panel and for which no safe use has been determined yet by EFSA and/or its GMO Panel	This permits the exclusion of publications that address one or several (not all) of the newly expressed proteins in the molecular stack that has/have been previously risk assessed by EFSA and/or its GMO Panel and for which the safe use has been determined by EFSA and/or its GMO Panel
Previously risk assessed publications	The publication has not been previously risk assessed by EFSA and/or its GMO Panel and is not cited/referenced in an EFSA/GMO Panel output	This permits the exclusion of publications that have been previously risk assessed by EFSA and/or its GMO Panel and cited/referenced in an EFSA/GMO Panel output
Access	Full-text document is accessible	If potentially relevant full-text documents cannot be obtained, they should be listed in a table with a description of the (unsuccessful) methods that have been used to try to obtain a copy



Concepts	Criteria	Comment
Reporting format	The publication presents original/primary data, or it is a risk assessment from a relevant key organisation (such as regulatory agencies and risk assessment bodies involved in the risk assessment of GMOs)	This permits the exclusion of publications that do not present original/primary data (e.g., editorials, position papers), and the inclusion of relevant risk assessments performed and reported by relevant key organisations. Reviews should only be included if they present data that are not available from a primary research study
Reporting format	A study in a publication should only be presented once, but if it is presented in more than one publication, all publications should be listed and grouped	Duplicate publications should be excluded at the screening stage. Only one copy of a study is required even if it is reported in different publications, and identified in more than one database

Table adapted from EFSA, 2019: Explanatory note on literature searching conducted in the context of GMO applications for (renewed) market authorisation and annual post-market environmental monitoring reports on GMOs authorised in the EU market.

#### 2.4. Reference publication

One publication that is relevant for CV127 soybean was previously identified and was used to test and validate the search strategy:

- Papadopoulou N; Ramon M. (2018). Risk assessment of new sequencing information for genetically modified soybean BPS-CV127-9. EFSA Journal (2018), Volume 16, Number 9, e05425 p.

This article was selected as reference publication because it mentions the event name (CV127), the introduced gene (*csr1-2*), the newly expressed protein (AHAS) and the crop (soybean). Since this article was published outside the search period of this report, the search profile was tested without applying the time filters used in the final profile (UP>=20211001 and UP<=20220630).

### 3. SEARCH METHODS AND OUTCOMES

The search strategies used here followed the 2019 EFSA explanatory note on literature searching conducted in the context of GMO applications and post-market environmental monitoring activities<sup>1</sup>. The search strategies were designed to be broad and sensitive enough to capture any relevant publications, if available.

An information specialist with background in plant biotechnology selected the databases, identified relevant search terms, developed search profiles, designed search strategies, and conducted the searches.

### 3.1. Time window and date of the literature search

The database searches were performed on July 7, 2022. Only documents updated between October 1, 2021 and June 30, 2022, were considered in the search. The dates of most recent database updates are provided in [Table 3](#).

### 3.2. Databases used in the literature search

All searches were performed in the host STN (Scientific and Technical Information Network), an online database service operated jointly by CAS and FIZ Karlsruhe. STN provides access to a broad range of databases from the most renowned database producers worldwide.

The searches described here were performed in five databases: three multidisciplinary/large databases (Biosis, Medline and CA-Plus) and two subject-specific databases focused on agriculture-related topics (Agricola and CABA).

See [Appendix 1](#) for detailed database descriptions.

### 3.3. Search strategy

The search profiles were designed to cover event name, newly expressed proteins and intended traits. The reference publication ([Section 2.4](#)) was identified by the search profiles confirming the validity of the applied search strategy. Since the 'newly expressed proteins' profiles and the 'intended trait' profiles produced too many results when used on their own, they were combined with additional profiles: the 'newly expressed proteins' profiles were combined with a 'plant species' profile while the 'intended trait' profiles were combined with a 'general GMO' profile as well as with the 'plant species' profile. See [Table 2](#) for a detailed search profile.

**Table 2: Search profile for database search**

Set	Search string	Concepts
1	CV(w)soy or CVsoy or BPS(w)CV127(w)9 or BPSCV127(w)9 or CV127?	Event name
2	cultivance or cultivancetm or cultivancertm	Trade name
3	CSR1(w)2 or CSR(w)12 or CRS(w)1(w)2 or ((acetohydroxy acid synthase) or (aceto(w)hydroxy acid synthase) or (acetohydroxy acid synthetase) or (aceto(w)hydroxy acid synthetase) or (acetohydroxyacid synthase) or (aceto(w)hydroxyacid synthase) or (acetolactate pyruvate(w)lyase)) or ((acetolactate synthase) or (acetolactate synthetase) or (aceto(w)lactate synthase) or (aceto(w)lactate synthetase) or (acetolactic synthetase) or (aceto(w)lactic synthetase) or (alpha(w)acetohydroxy acid synthetase)) or ((alpha(w)acetohydroxyacid synthase) or (alpha(w)acetolactate synthase) or (alpha(w)acetolactate synthetase) or (alpha(w)ALS) or (GST(w)mALS) or (GST(w)wALS) or (synthase, acetolactate) or AHAS or ALS or AtAHAS or AHASL or (EC(w)2216) or (EC(w)2(w)2(w)1(w)6)) or ((pyruvate(w)pyruvate acetaldehydetransferase) or (pyruvate(w)pyruvate acetaldehyde(w)transferase))	Newly expressed protein
4	(herbicid? or IMI or Imidazoline or Imidazolinone or imidazolone or Imazaquin or imazamethabenz(w)methyl	Intended trait



	or imazapyr or imazapic or imazethapyr or imazamox or 9027-45-6/BI) (5a) (resist? OR protect?) OR toleran?	
5	soy or soya or soja or soybean# or soyabean# or sojabean# or glycine(w)max or g(w)max	Plant species
6	GMO OR GMOs OR LMO OR LMOs OR GM OR GE OR transgen? OR (genetic?(3a) (modif? OR transform? OR manipulat? OR improv? OR engineer?))	GMO general
7	3 and 5	Newly expressed protein AND Plant species
8	4 and 5 and 6	Intended trait AND Plant species AND GMO general
9	1 or 2 or 7 or 8	Event name OR (Trade name AND plant species) OR (Newly expressed protein AND Plant species) OR (Intended trait AND Plant species AND GMO general)

All searches were performed in the Basic Index (BI) field, which includes the following subject headings/field names:

- **Agricola:** title (TI), controlled term (CT), supplementary term (ST), abstract (AB), named person (NA), corporate name (CO), note (NTE), geographic term, CABA and other fields (GT)
- **Biosis:** title (TI), abstract (AB), biosystematic codes (BC), chemical name (CN), controlled term (CT), gene name (GEN), geographic term (GT), organism (ORGN) and supplementary term (ST); as well as CAS Registry Numbers (RN)
- **CA-Plus:** title (TI), supplementary term (ST), index term (IT) and abstract (AB); as well as CAS Registry Numbers
- **CABA:** title (TI), controlled term (CT), supplementary term (ST), broader term (BT), abstract (AB), organism name (ORGN) and geographic term (GT); as well as CAS Registry Numbers
- **Medline:** title (TI), chemical name (CN), gene name (GEN), controlled term (excluding MeSH numbers) (CT), supplementary term (ST), named person (NA), other source (OS), and abstract (AB), as well as CAS Registry Numbers and GenBank Numbers

Relevant controlled terms ([Table 3](#)) were not searched separately because they are included in the Basic Index and were captured by the free-text searches.



**Table 3: Relevant controlled terms (CT) and index terms (IT) in each database**

Database	Event	New proteins	Intended traits	Plant species	GM plants
Agricola	None	None	"HERBICIDE RESISTANCE"	"GLYCINE MAX"	"TRANSGENIC PLANTS"
Biosis	None	None	No terms for herbicide resistance	none	None
CABA	None	None	"HERBICIDE RESISTANCE"	SOYABEANS	"TRANSGENIC PLANTS"
CAS	None	None	"HERBICIDE RESISTANCE"	"GLYCINE MAX"	"GENETICALLY MODIFIED PLANTS"
Medline	None	None	"HERBICIDE RESISTANCE"	SOYABEANS/CT	"PLANTS, GENETICALLY MODIFIED"

The search results were limited to documents updated between October 1, 2021 and June 30, 2022 (UP>=20211001 and UP<=20220630), and to non-patent documents (not P/DT). To ensure that documents with indexing errors where two document types (DTs) (one eligible and one ineligible) were attached to a single record were not missed, documents with both 'journal' and 'patent' as document type were also kept. These putative documents would be identified with (P/DT AND J/DT) in CABA and CAPLus.

[Table 4](#) summarizes the number of results obtained from each of the databases searched.

See [Appendix 2](#) for a complete search history.

**Table 4: Overview of the selected databases and summary of search results from each database**

Database	AGRICOLA	BIOSIS	CAB Abstracts	CAPLUS	MEDLINE
Database Provider	STN International	STN International	STN International	STN International	STN International
Coverage	1970-present	1926-present	1973-present	1907-present	1946-present
Date of search	7 July 2022	7 July 2022	7 July 2022	7 July 2022	7 July 2022
Datespan of the search	1 Oct 2021 – 30 Jun 2022	1 Oct 2021 – 30 Jun 2022	1 Oct 2021 – 30 Jun 2022	1 Oct 2021 – 30 Jun 2022	1 Oct 2021 – 30 Jun 2022
Latest database update	13 June 2022	6 July 2022	6 July 2022	6 July 2022	6 July 2022

Database	AGRICOLA	BIOSIS	CAB Abstracts	CAPLUS	MEDLINE
Number of records retrieved	50	91	119	121	115
Number of records after duplicate removal	40	72	71	76	115
Number of relevant records after rapid assessment	0	3	0	0	0

#### 4. INTERNET and MANUAL SEARCHES

##### 4.1. Internet Searches of food safety, agriculture, and biotechnology-related authority webpages

A search of the web pages of food safety, agriculture, and biotechnology-related authorities was conducted. Search results were manually examined for relevant records that were either published during the time period under consideration (date span of search: October 1, 2021 to June 30, 2022) or refer to relevant records published during this time frame. Relevance of results were determined based on the criteria listed in [Table 1](#) and they were summarized in [Table 5](#). All web pages searched were justified by their recommendation in the EFSA 2019 explanatory note<sup>1</sup>. Of the 13 key organisations cited in the EFSA 2019 explanatory note<sup>1</sup>, Environment and Climate Change Canada and Intersecretarial Commission on Biosafety of GMOs (CIBIOGEM) were excluded, since they are not involved in the risk assessment of GM plants. The US-EPA website was excluded, since the CV127 soybean does not contain an insect-resistant trait. The GEAC website was excluded, since this agency has only regulated GM cotton products. Therefore, the internet search was limited to 10 key organisations relevant for CV127 soybean. Search terms consisted of CV127 or cultivance or BPS-CV127-9 or AtAHASL OR ALS or modified acetohydroxyacid synthase or acetolactate synthetase (all searched singly, with no search limits applied).

**Table 5: Results of search of food safety, agriculture, and biotechnology-related authority websites**

Source Site Name	Website URL	Date of Most Recent Site Update	Date of Search	No. of Relevant Records
US Department of Agriculture (USDA)	<a href="https://www.usda.gov/">https://www.usda.gov/</a>	Sept 5 2022	Sept 5 2022	0
US Food and Drug Administration (FDA)	<a href="https://www.fda.gov/">https://www.fda.gov/</a>	Sept 7 2022	Sept 7 2022	0
Health Canada	<a href="https://www.canada.ca/en/health-canada.html">https://www.canada.ca/en/health-canada.html</a>	Aug 1 2022	Aug 31 2022 – Sept 1, 2022	0



Source Site Name	Website URL	Date of Most Recent Site Update	Date of Search	No. of Relevant Records
Canadian Food Inspection Agency (CFIA)	<a href="https://www.canada.ca/en/food-inspection-agency.html">https://www.canada.ca/en/food-inspection-agency.html</a>	Aug 1 2022	Sept 2-7 2022	0
Food Standards Australia New Zealand (FSANZ)	<a href="http://www.foodstandards.gov.au/Pages/default.aspx">http://www.foodstandards.gov.au/Pages/default.aspx</a>	Aug 12, 2022	Aug 24, 2022	0
Office of the Gene Technology Regulator (OGTR) Australia	<a href="http://www.ogtr.gov.au/">http://www.ogtr.gov.au/</a>	Aug 1, 2022	Aug 29, 2022	0
National Technical Commission on Biosafety (CTNBio) Brazil	<a href="http://ctnbio.mcti.gov.br/en">http://ctnbio.mcti.gov.br/en</a>	Aug 1, 2022	Aug 29, 2022	0
National Advisory Commission on Agricultural Biotechnology (CONABIA) Argentina	<a href="https://www.argentina.gob.ar/agroindustria/bioeconomia/biotecnologia">https://www.argentina.gob.ar/agroindustria/bioeconomia/biotecnologia</a>	Aug 9, 2022	Aug 9, 2022	0
Ministry of Agriculture, Forestry and Fisheries (MAFF) Japan	<a href="http://www.maff.go.jp/">http://www.maff.go.jp/</a>	Sept 6, 2022	Sept 6, 2022	0

#### 4.2. Manual searches of reference lists of recent review articles

Recent review articles as sources of reference lists to search for potentially relevant studies were identified via searches of PubMed.gov for general terms such as “GMO” or “GM crops” in the titles and abstracts. The search of PubMed.gov was also restricted to recent reviews published between October 1, 2021 and June 30, 2022. The resulting number of relevant studies found within the bibliographies of these review articles is given in [Table 6](#).

**Table 6: Documents for which reference lists were scanned for relevant studies**

No	Author(s) and Year	Title	Source	Number of relevant bibliographic references retrieved
1	Ahmad A, Munawar N, Khan Z, Qusmani AT, Khan SH, Jamil A, Ashraf S, Ghouri MZ, Aslam S, Mubarik MS, Munir A, Sultan Q, Abd-Elsalam KA, Qari SH. 2021	An Outlook on Global Regulatory Landscape for Genome-Edited Crops	Int J Mol Sci. 2021 Oct 29;22(21):11753.	0



No	Author(s) and Year	Title	Source	Number of relevant bibliographic references retrieved
2	Halder K, Chaudhuri A, Abdin MZ, Majee M, Datta A. 2022	RNA Interference for Improving Disease Resistance in Plants and Its Relevance in This Clustered Regularly Interspaced Short Palindromic Repeats-Dominated Era in Terms of dsRNA-Based Biopesticides	Front Plant Sci. 2022 May 13;13:885128.	0
3	Kawall K. 2021	The Generic Risks and the Potential of SDN-1 Applications in Crop Plants	Plants (Basel). 2021 Oct 22;10(11):2259.	0
4	Lafiandra D, Sestili F, Sissons M, Kiszonas A, Morris CF. 2022	Increasing the Versatility of Durum Wheat through Modifications of Protein and Starch Composition and Grain Hardness	Foods. 2022 May 24;11(11):1532.	0
5	Nagamine A, Ezura H. 2022	Genome Editing for Improving Crop Nutrition	Front Genome Ed. 2022 Feb 9;4:850104.	0
6	Niraula PM, Fondong VN. 2021	Development and Adoption of Genetically Engineered Plants for Virus Resistance: Advances, Opportunities and Challenges	Plants (Basel). 2021 Oct 29;10(11):2339.	0
7	Okoli AS, Blix T, Myhr AI, Xu W, Xu X. 2022	Sustainable use of CRISPR/Cas in fish aquaculture: the biosafety perspective	Transgenic Res. 2022 Feb;31(1):1-21.	0
8	Then C. 2022	Deficiencies in the Risk Assessment of Genetically Engineered Bt Cowpea Approved for Cultivation in Nigeria: A Critical Review	Plants (Basel). 2022 Jan 29;11(3):380.	0
9	Van Vu T. 2022	Genome editing and beyond: what does it mean for the future of plant breeding?	Planta. 2022 May 19;255(6):130.	0

## 5. RESULTS OF THE STUDY IDENTIFICATION AND SELECTION PROCESS

The database searches ([Section 3](#)) identified a total of 496 references, which were reduced to 374 after removal of duplicates ([Table 4](#)). No additional studies were identified in the manual searches ([Section 4](#)).

### 5.1. Screening of titles and abstracts to exclude obviously irrelevant references (Stage 1)

All references identified in the database searches described in [Section 3](#) were assessed for relevance based on information in their title and abstract by two reviewers independently. If opinions of relevance differed, the discrepancies were discussed between the reviewers and if a disagreement persisted, the publication under the discussion was transferred to Stage 2 for detailed evaluation by the experts. In this search, both evaluators were in 100 % agreement.

Clearly irrelevant records were tagged as “Not Relevant”. These included:

- Duplicated entries
- Secondary literature (reviews), other than assessments from regulatory agencies
- Articles on non-relevant topics like detection methods, socio-economic implications of GM crops, GM policy, agronomical performance, other herbicide resistant GM crops, other insect resistant GM crops, unrelated topics, etc.

Publications which appeared to be relevant and those of unclear relevance were tagged as “Relevant” and progressed to Stage 2 (detailed assessment; see [Section 5.2](#)).

The number of publications excluded after rapid assessment for relevance is presented in [Table 7](#) documenting the selection process.

### 5.2. Detailed assessment of eligible references (Stage 2)

Publications tagged as “Relevant” in Stage 1 were assessed in detail independently by two scientific experts in each of three corresponding areas (i.e., Molecular Biology, Food and Feed Safety, Environmental Safety), based on the full text of the publications. If opinions of relevance differed between reviewers within each area, the initial reviewers discussed the discrepancy as necessary and consulted additional reviewers to resolve the discrepancy if needed.

[Table 7](#) gives an overview of the reference selection process and results of the detailed assessment.

**Table 7: Results of the publication selection process**

Total number of publications retrieved after all searches of the scientific literature (excluding duplicates)	374
Number of publications excluded from the search results after rapid assessment for relevance (Stage 1)	371
Total number of full-text documents assessed in detail	3
Number of publications excluded from further consideration after detailed assessment for relevance (Stage 2)	3
Total number of unobtainable/unclear publications	0
Total number of relevant publications	0

[Table 8](#) lists the publications determined to be relevant along with their potential impact on the safety assessment based on detailed evaluation. Publications that were clearly not relevant after a detailed assessment are listed in [Table 9](#). [Table 10](#) lists the publications for which full-text documents were unobtainable for detailed assessment or for which relevance was unclear after detailed assessment.



## 6. NARRATIVE SYNTHESIS/SUMMARY OF RELEVANT STUDIES

A total of 3 publications were selected during Stage 1 evaluation (rapid assessment based on title and abstract). After Stage 2 evaluation (detailed review based on full text), it was determined that no publications were relevant for the safety assessment of the CV127 soybean and its newly expressed protein AHAS.

[Table 11](#) lists the relevant publication along with a summary of any adverse effects reported and the reliability of the publications.

## 7. CONCLUSION

The literature searches performed for the CV127 soybean and its newly expressed protein, AHAS, for the period from October 1, 2021 to June 30, 2022, identified a total of 374 unique publications (after duplicate removal). A total of 3 publications were progressed for detailed assessment after excluding 371 obviously irrelevant publications during Stage 1 evaluation (rapid assessment based on title and abstract).

The 3 publications that progressed to Stage 2 were evaluated in detail, based on full text, for potential relevance, following the pre-established criteria listed in [Table 1](#). No relevant reference with bearing on molecular characterization were identified. No issues or topics were identified that would trigger or warrant more specific question formulation.

## 8. REFERENCES

No.	Author(s), title, source, edition, year, pages
-----	--

- |    |   |
|----|---|
| 1. | Devos Y, Guajardo IM, Alvarez F and Glanville J. Explanatory note on literature searching conducted in the context of GMO applications for (renewed) market authorisation and annual post-market environmental monitoring reports on GMOs authorised in the EU market. EFSA supporting publications 2019:EN-1614. 62 pages. doi:10.2903/sp.efsa.2019.EN-1614. |
|----|---|



**Table 8: Report of all relevant publications retrieved after detailed assessment of full-text documents for relevance: ordered by category of information/data requirement(s)**

Main category of information/data requirement	Study (Author(s) and year)	Title	Source
No publications in this category			

**Table 9: Report of publications excluded from the risk assessment after detailed assessment of full-text documents**

Study (Author(s) and year)	Title	Source	Reason(s) for exclusion based on eligibility/inclusion criteria listed in <a href="#">Table 1</a>
Fast, Brandon J. Shan, Guomin Gampala, Satyalinga Srinivas Herman, Rod A. 2020	Transgene expression in sprayed and non-sprayed herbicide-tolerant genetically engineered crops is equivalent.	<a href="http://www.journals.elsevier.com/regulatory-toxicology-and-pharmacology/#description">Regulatory Toxicology and Pharmacology</a> , (MAR 2020 ) Vol. 111, pp. Article No.: 104572. <a href="http://www.journals.elsevier.com/regulatory-toxicology-and-pharmacology/#description">http://www.journals.elsevier.com/regulatory-toxicology-and-pharmacology/#description</a> . CODEN: RTOPDW. ISSN: 0273-2300. E-ISSN: 1096-0295.	CV127 soybean was not considered in this paper.
Sharkey, Stephen M. Williams, Brent J. Parker, Kimberly M. 2021	Herbicide Drift from Genetically Engineered Herbicide-Tolerant Crops.	<a href="https://pubs.acs.org/loi/esthag">Environmental Science + Technology</a> , (DEC 7 2021 ) Vol. 55, No. 23, pp. 15559-15568. <a href="https://pubs.acs.org/loi/esthag">https://pubs.acs.org/loi/esthag</a> . CODEN: ESTHAG. ISSN: 0013-936X. E-ISSN: 1520-5851.	The authors explore concepts surrounding the physiochemical phenomena of herbicide drift from GM HT crops. Not original data. Not related to CV127 soybean.
Chen Yan-Jun Liu Lai-Pan Guan Xiao Liu Biao 2020	Impact of transgenic herbicide-resistant soybean on the diversity of arthropods and weeds in soybean fields.	<a href="http://www.insect.org.cn/EN/article/showOldVolumn.do">Acta Entomologica Sinica</a> , (NOV 20 2020 ) Vol. 63, No. 11, pp. 1366-1376. <a href="http://www.insect.org.cn/EN/article/showOldVolumn.do">http://www.insect.org.cn/EN/article/showOldVolumn.do</a> . CODEN: KCHPA2. ISSN: 0454-6296.	Arthropod and weed diversity was evaluated on the GM HT soybean variety ZUTS-33 in China. No significant effect on the diversity of arthropods and weeds was observed. Not related to CV127 soybean.

**Table 10: Report of unobtainable/unclear publications**

Study (Author(s) and year)	Title	Source	Description of (unsuccessful) methods used to try and obtain a copy of the publication
No publications in this category.			

**Table 11: Summary report for all relevant publications retrieved after detailed assessment of full-text documents for relevance and implications for the risk assessment: ordered by category of information/data requirement(s)**

Main category of information/data requirement	Study (Author(s) and year)	Intervention/ test materials used	Adverse effects reported	Which adverse effect reported	Implications for risk assessment
No publication in this category.					



## 9. APPENDICES

### Appendix 1 Database descriptions

Host	File	Description
STN	AGRICOLA	<p>Agriculture Online Access is a bibliographic database containing selected worldwide literature of agriculture and related fields. AGRICOLA is the locator and bibliographic access and control system of the National Agricultural Library (NAL) collections and also includes records from other cooperating institutions. Coverage of the database includes agricultural economics and rural sociology, agricultural production, animal sciences, chemistry, entomology, food and human nutrition, forestry, natural resources, pesticides, plant science, soils and fertilizers, and water resources. Also covered are related areas such as biology and biotechnology, botany, ecology, and natural history.</p> <p>The database draws on bibliographies, serial articles, book chapters, monographs, computer files, serials, maps, audiovisuals, and reports. Bibliographic information, abstracts, geographic terms, controlled terms, and supplementary terms are searchable.</p>
STN	BIOSIS	<p>BIOSIS Previews® is the largest and most comprehensive life science database in the world. Amongst others subject coverage includes Agriculture, Biochemistry, Biophysics, Botany, Environmental Biology, Physiology, Toxicology.</p> <p>Sources include periodicals, journals, conference proceedings, reviews, reports, patents, and short communications. Nearly 6,000 life source journals, 1,500 international meetings as well as review articles, books, and monographs are reviewed for inclusion.</p> <p>Bibliographic information, indexing terms, abstracts, and CAS Registry Numbers are all searchable.</p>
STN	CABA/CAB	<p>The CAB Abstracts database covers worldwide literature from all areas of agriculture and related sciences including Agriculture, Agricultural chemicals, Animal sciences and production, Crop protection, Crop sciences and production, Environment, Soils and fertilizers.</p> <p>Sources for CABA include journals, books, reports, published theses, conference proceedings, and patents.</p> <p>Bibliographic information, indexing terms, abstracts, and CAS Registry Numbers are searchable.</p>
STN	CAS-CA/CAPLUS	<p>The Chemical Abstracts (CA) database covers all areas of Biochemistry, Chemistry and Chemical engineering, and related sciences.</p> <p>Sources include over 8,000 journals, patents from 38 national patent offices and two international patent organizations, technical reports, books, conference proceedings, and dissertations. Electronic only journals and Web preprints are also covered.</p> <p>Bibliographic terms, indexing terms, roles, CAS Registry Numbers, International Patent Classification, and abstracts are searchable.</p>

Host	File	Description
STN	MEDLINE	<p>MEDLINE contains information on every area of medicine. The MEDLINE database corresponds to Index Medicus, Index to Dental Literature, and International Nursing Index; OLDMEDLINE, with data from NLM's from the Cumulated Index Medicus (1960-1965) and Current List of Medical Literature (1958-1959); and, since August 2001, IN-PROCESS records, the latest documents before they have been completely indexed for inclusion on MEDLINE.</p> <p>Sources include journals and chapters in books or symposia. Bibliographic information, indexing terms, abstracts, chemical names, and CAS Registry Numbers are all searchable.</p> <p>Online thesauri are available for the Medical Subject Headings (/MN), Controlled Terms (/CT) and Chemical Name (/CN) fields.</p>



## Appendix 2 Search history

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FILE 'MEDLINE' ENTERED AT 08:53:26 ON 07 JUL 2022
L1      7 SEA CV(W)SOY OR CVSOY OR BPS(W)CV127(W)9 OR BPSCV127(W)9 OR
      CV127?
L2      2 SEA CULTIVANCE OR CULTIVANCETM OR CULTIVANCERTM
L3      18 SEA CSR1(W)2 OR CSR(W)12 OR CRS(W)1(W)2
L4      494 SEA ((ACETOHYDROXY ACID SYNTHASE) OR (ACETO(W)HYDROXY ACID
      SYNTHASE) OR (ACETOHYDROXY ACID SYNTHETASE) OR (ACETO(W)HYDROXY
      ACID SYNTHETASE) OR (ACETOHYDROXYACID SYNTHASE) OR (ACETO(W)HY
      DROXYACID SYNTHASE) OR (ACETOLACTATE PYRUVATE(W)LYASE))
L5      1132 SEA ((ACETOLACTATE SYNTHASE) OR (ACETOLACTATE SYNTHETASE) OR
      (ACETO(W)LACTATE SYNTHASE) OR (ACETO(W)LACTATE SYNTHETASE) OR
      (ACETOLACTIC SYNTHETASE) OR (ACETO(W)LACTIC SYNTHETASE) OR
      (ALPHA(W)ACETOHYDROXY ACID SYNTHETASE))
L6      53998 SEA ((ALPHA(W)ACETOHYDROXYACID SYNTHASE) OR (ALPHA(W)ACETOLACTA
      TE SYNTHASE) OR (ALPHA(W)ACETOLACTATE SYNTHETASE) OR (ALPHA(W)A
      LS) OR (GST(W)MALS) OR (GST(W)WALS) OR (SYNTHASE, ACETOLACTATE)
      OR AHAS OR ALS OR ATAHAS OR AHASL OR (EC(W)2216) OR (EC(W)2(W)
      2(W)1(W)6))
L7      0 SEA ((PYRUVATE(W)PYRUVATE ACETALDEHYDETRANSFERASE) OR (PYRUVATE
      (W)PYRUVATE ACETALDEHYDE(W)TRANSFERASE))
L8      54237 SEA (L3 OR L4 OR L5 OR L6 OR L7)
L9      375666 SEA (HERBICID? OR IMI OR IMIDAZOLINE OR IMIDAZOLINONE OR
      IMIDAZOLONE OR IMAZAQUIN OR IMAZAMETHABENZ(W)METHYL OR
      IMAZAPYR OR IMAZAPIC OR IMAZETHAPYR OR IMAZAMOX OR 9027-45-6/BI
      ) (5A) (RESIST? OR PROTECT?) OR TOLERAN?
L10     69973 SEA SOY OR SOYA OR SOJA OR SOYBEAN# OR SOYABEAN# OR SOJABEAN#
      OR GLYCINE(W)MAX OR G(W)MAX
L11     4008800 SEA GMO OR GMOS OR LMO OR LMOS OR GM OR GE OR TRANSGEN? OR
      (GENETIC?(3A) (MODIF? OR TRANSFORM? OR MANIPULAT? OR IMPROV? OR
      ENGINEER?))
L12     79 SEA L8 AND L10
L13     1271 SEA L9 AND L10 AND L11
L14     1333 SEA L1 OR L2 OR L12 OR L13
L15     299 SEA L14 AND PY>=2020
L16     115 SEA L15 AND UP>=20211001 AND UP<=20220630

FILE 'BIOSIS' ENTERED AT 08:53:33 ON 07 JUL 2022
L17     9 SEA CV(W)SOY OR CVSOY OR BPS(W)CV127(W)9 OR BPSCV127(W)9 OR
      CV127?
L18     3 SEA CULTIVANCE OR CULTIVANCETM OR CULTIVANCERTM
L19     11 SEA CSR1(W)2 OR CSR(W)12 OR CRS(W)1(W)2
L20     893 SEA ((ACETOHYDROXY ACID SYNTHASE) OR (ACETO(W)HYDROXY ACID
      SYNTHASE) OR (ACETOHYDROXY ACID SYNTHETASE) OR (ACETO(W)HYDROXY
      ACID SYNTHETASE) OR (ACETOHYDROXYACID SYNTHASE) OR (ACETO(W)HY
      DROXYACID SYNTHASE) OR (ACETOLACTATE PYRUVATE(W)LYASE))
L21     1862 SEA ((ACETOLACTATE SYNTHASE) OR (ACETOLACTATE SYNTHETASE) OR
      (ACETO(W)LACTATE SYNTHASE) OR (ACETO(W)LACTATE SYNTHETASE) OR
      (ACETOLACTIC SYNTHETASE) OR (ACETO(W)LACTIC SYNTHETASE) OR
      (ALPHA(W)ACETOHYDROXY ACID SYNTHETASE))
L22     32472 SEA ((ALPHA(W)ACETOHYDROXYACID SYNTHASE) OR (ALPHA(W)ACETOLACTA
      TE SYNTHASE) OR (ALPHA(W)ACETOLACTATE SYNTHETASE) OR (ALPHA(W)A
      LS) OR (GST(W)MALS) OR (GST(W)WALS) OR (SYNTHASE, ACETOLACTATE)
      OR AHAS OR ALS OR ATAHAS OR AHASL OR (EC(W)2216) OR (EC(W)2(W)
      2(W)1(W)6))
L23     0 SEA ((PYRUVATE(W)PYRUVATE ACETALDEHYDETRANSFERASE) OR (PYRUVATE
      (W)PYRUVATE ACETALDEHYDE(W)TRANSFERASE))
L24     33374 SEA (L19 OR L20 OR L21 OR L22 OR L23)
L25     381286 SEA (HERBICID? OR IMI OR IMIDAZOLINE OR IMIDAZOLINONE OR
      IMIDAZOLONE OR IMAZAQUIN OR IMAZAMETHABENZ(W)METHYL OR
      IMAZAPYR OR IMAZAPIC OR IMAZETHAPYR OR IMAZAMOX OR 9027-45-6/BI
      ) (5A) (RESIST? OR PROTECT?) OR TOLERAN?

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L26 172788 SEA SOY OR SOYA OR SOJA OR SOYBEAN# OR SOYABEAN# OR SOJABEAN#  
OR GLYCINE(W)MAX OR G(W)MAX

L27 478392 SEA GMO OR GMOS OR LMO OR LMOS OR GM OR GE OR TRANSGEN? OR  
(GENETIC?(3A) (MODIF? OR TRANSFORM? OR MANIPULAT? OR IMPROV? OR  
ENGINEER?))

L28 231 SEA L24 AND L26

L29 1097 SEA L25 AND L26 AND L27

L30 1303 SEA L17 OR L18 OR L28 OR L29

L31 204 SEA L30 AND PY>=2020

L32 91 SEA L31 AND UP>=20211001 AND UP<=20220630

FILE 'AGRICOLA' ENTERED AT 08:53:38 ON 07 JUL 2022

L33 8 SEA CV(W)SOY OR CVSOY OR BPS(W)CV127(W)9 OR BPSCV127(W)9 OR  
CV127?

L34 1 SEA CULTIVANCE OR CULTIVANCETM OR CULTIVANCERTM

L35 8 SEA CSR1(W)2 OR CSR(W)12 OR CRS(W)1(W)2

L36 276 SEA ((ACETOHYDROXY ACID SYNTHASE) OR (ACETO(W)HYDROXY ACID  
SYNTHASE) OR (ACETOHYDROXY ACID SYNTHETASE) OR (ACETO(W)HYDROXY  
ACID SYNTHETASE) OR (ACETOHYDROXYACID SYNTHASE) OR (ACETO(W)HY  
DROXYACID SYNTHASE) OR (ACETOLACTATE PYRUVATE(W)LYASE))

L37 1294 SEA ((ACETOLACTATE SYNTHASE) OR (ACETOLACTATE SYNTHETASE) OR  
(ACETO(W)LACTATE SYNTHASE) OR (ACETO(W)LACTATE SYNTHETASE) OR  
(ACETOLACTIC SYNTHETASE) OR (ACETO(W)LACTIC SYNTHETASE) OR  
(ALPHA(W)ACETOHYDROXY ACID SYNTHETASE))

L38 9800 SEA ((ALPHA(W)ACETOHYDROXYACID SYNTHASE) OR (ALPHA(W)ACETOLACTA  
TE SYNTHASE) OR (ALPHA(W)ACETOLACTATE SYNTHETASE) OR (ALPHA(W)A  
LS) OR (GST(W)MALS) OR (GST(W)WALS) OR (SYNTHASE, ACETOLACTATE)  
OR AHAS OR ALS OR ATAHAS OR AHASL OR (EC(W)2216) OR (EC(W)2(W)  
2(W)1(W)6))

L39 0 SEA ((PYRUVATE(W)PYRUVATE ACETALDEHYDETRANSFERASE) OR (PYRUVATE  
(W)PYRUVATE ACETALDEHYDE(W)TRANSFERASE))

L40 10282 SEA (L35 OR L36 OR L37 OR L38 OR L39)

L41 138252 SEA (HERBICID? OR IMI OR IMIDAZOLINE OR IMIDAZOLINONE OR  
IMIDAZOLONE OR IMAZAQUIN OR IMAZAMETHABENZ(W)METHYL OR  
IMAZAPYR OR IMAZAPIC OR IMAZETHAPYR OR IMAZAMOX OR 9027-45-6/BI  
(5A) (RESIST? OR PROTECT?) OR TOLERAN?)

L42 97536 SEA SOY OR SOYA OR SOJA OR SOYBEAN# OR SOYABEAN# OR SOJABEAN#  
OR GLYCINE(W)MAX OR G(W)MAX

L43 109651 SEA GMO OR GMOS OR LMO OR LMOS OR GM OR GE OR TRANSGEN? OR  
(GENETIC?(3A) (MODIF? OR TRANSFORM? OR MANIPULAT? OR IMPROV? OR  
ENGINEER?))

L44 154 SEA L40 AND L42

L45 800 SEA L41 AND L42 AND L43

L46 947 SEA L33 OR L34 OR L44 OR L45

L47 123 SEA L46 AND PY>=2020

L48 50 SEA L47 AND UP>=20211001 AND UP<=20220630

FILE 'CABA' ENTERED AT 08:53:55 ON 07 JUL 2022

L49 17 SEA CV(W)SOY OR CVSOY OR BPS(W)CV127(W)9 OR BPSCV127(W)9 OR  
CV127?

L50 9 SEA CULTIVANCE OR CULTIVANCETM OR CULTIVANCERTM

L51 14 SEA CSR1(W)2 OR CSR(W)12 OR CRS(W)1(W)2

L52 1099 SEA ((ACETOHYDROXY ACID SYNTHASE) OR (ACETO(W)HYDROXY ACID  
SYNTHASE) OR (ACETOHYDROXY ACID SYNTHETASE) OR (ACETO(W)HYDROXY  
ACID SYNTHETASE) OR (ACETOHYDROXYACID SYNTHASE) OR (ACETO(W)HY  
DROXYACID SYNTHASE) OR (ACETOLACTATE PYRUVATE(W)LYASE))

L53 1904 SEA ((ACETOLACTATE SYNTHASE) OR (ACETOLACTATE SYNTHETASE) OR  
(ACETO(W)LACTATE SYNTHASE) OR (ACETO(W)LACTATE SYNTHETASE) OR  
(ACETOLACTIC SYNTHETASE) OR (ACETO(W)LACTIC SYNTHETASE) OR  
(ALPHA(W)ACETOHYDROXY ACID SYNTHETASE))

L54 12870 SEA ((ALPHA(W)ACETOHYDROXYACID SYNTHASE) OR (ALPHA(W)ACETOLACTA  
TE SYNTHASE) OR (ALPHA(W)ACETOLACTATE SYNTHETASE) OR (ALPHA(W)A  
LS) OR (GST(W)MALS) OR (GST(W)WALS) OR (SYNTHASE, ACETOLACTATE)



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OR AHAS OR ALS OR ATAHAS OR AHASL OR (EC(W)2216) OR (EC(W)2(W)
2(W)1(W)6))
L55      0 SEA ((PYRUVATE(W)PYRUVATE ACETALDEHYDETRANSFERASE) OR (PYRUVATE
(W)PYRUVATE ACETALDEHYDE(W)TRANSFERASE))
L56      13406 SEA (L51 OR L52 OR L53 OR L54 OR L55)
L57      275998 SEA (HERBICID? OR IMI OR IMIDAZOLINE OR IMIDAZOLINONE OR
IMIDAZOLONE OR IMAZAQUIN OR IMAZAMETHABENZ(W)METHYL OR
IMAZAPYR OR IMAZAPIC OR IMAZETHAPYR OR IMAZAMOX OR 9027-45-6/BI
)(5A)(RESIST? OR PROTECT?) OR TOLERAN?
L58      200566 SEA SOY OR SOYA OR SOJA OR SOYBEAN# OR SOYABEAN# OR SOJABEAN#
OR GLYCINE(W)MAX OR G(W)MAX
L59      193299 SEA GMO OR GMOS OR LMO OR LMOS OR GM OR GE OR TRANSGEN? OR
(GENETIC?(3A)(MODIF? OR TRANSFORM? OR MANIPULAT? OR IMPROV? OR
ENGINEER?))
L60      356 SEA L56 AND L58
L61      1621 SEA L57 AND L58 AND L59
L62      1960 SEA L49 OR L50 OR L60 OR L61
L63      285 SEA L62 AND PY>=2020
L64      119 SEA L63 AND UP>=20211001 AND UP<=20220630
L65      119 SEA L64 NOT P/DT
L66      0 SEA L64 AND (P/DT AND J/DT)
L67      119 SEA L65 OR L66

FILE 'HCAPLUS' ENTERED AT 08:54:06 ON 07 JUL 2022
L68      23 SEA CV(W)SOY OR CVSOY OR BPS(W)CV127(W)9 OR BPSCV127(W)9 OR
CV127?
L69      3 SEA CULTIVANCE OR CULTIVANCETM OR CULTIVANCERTM
L70      16 SEA CSR1(W)2 OR CSR(W)12 OR CRS(W)1(W)2
L71      1297 SEA ((ACETOHYDROXY ACID SYNTHASE) OR (ACETO(W)HYDROXY ACID
SYNTHASE) OR (ACETOHYDROXY ACID SYNTHETASE) OR (ACETO(W)HYDROXY
ACID SYNTHETASE) OR (ACETOHYDROXYACID SYNTHASE) OR (ACETO(W)HY
DROXYACID SYNTHASE) OR (ACETOLACTATE PYRUVATE(W)LYASE))
L72      4145 SEA ((ACETOLACTATE SYNTHASE) OR (ACETOLACTATE SYNTHETASE) OR
(ACETO(W)LACTATE SYNTHASE) OR (ACETO(W)LACTATE SYNTHETASE) OR
(ACETOLACTIC SYNTHETASE) OR (ACETO(W)LACTIC SYNTHETASE) OR
(ALPHA(W)ACETOHYDROXY ACID SYNTHETASE))
L73      25612 SEA ((ALPHA(W)ACETOHYDROXYACID SYNTHASE) OR (ALPHA(W)ACETOLACTA
TE SYNTHASE) OR (ALPHA(W)ACETOLACTATE SYNTHETASE) OR (ALPHA(W)A
LS) OR (GST(W)MALS) OR (GST(W)WALS) OR (SYNTHASE, ACETOLACTATE)
OR AHAS OR ALS OR ATAHAS OR AHASL OR (EC(W)2216) OR (EC(W)2(W)
2(W)1(W)6))
L74      0 SEA ((PYRUVATE(W)PYRUVATE ACETALDEHYDETRANSFERASE) OR (PYRUVATE
(W)PYRUVATE ACETALDEHYDE(W)TRANSFERASE))
L75      28687 SEA (L70 OR L71 OR L72 OR L73 OR L74)
L76      426859 SEA (HERBICID? OR IMI OR IMIDAZOLINE OR IMIDAZOLINONE OR
IMIDAZOLONE OR IMAZAQUIN OR IMAZAMETHABENZ(W)METHYL OR
IMAZAPYR OR IMAZAPIC OR IMAZETHAPYR OR IMAZAMOX OR 9027-45-6/BI
)(5A)(RESIST? OR PROTECT?) OR TOLERAN?
L77      427226 SEA SOY OR SOYA OR SOJA OR SOYBEAN# OR SOYABEAN# OR SOJABEAN#
OR GLYCINE(W)MAX OR G(W)MAX
L78      716180 SEA GMO OR GMOS OR LMO OR LMOS OR GM OR GE OR TRANSGEN? OR
(GENETIC?(3A)(MODIF? OR TRANSFORM? OR MANIPULAT? OR IMPROV? OR
ENGINEER?))
L79      1093 SEA L75 AND L77
L80      8080 SEA L76 AND L77 AND L78
L81      8543 SEA L68 OR L69 OR L79 OR L80
L82      1953 SEA L81 AND PY>=2020
L83      437 SEA L82 AND UP>=20211001 AND UP<=20220630
L84      121 SEA L83 NOT P/DT
L85      0 SEA L83 AND (P/DT AND J/DT)
L86      121 SEA L84 OR L85

FILE 'MEDLINE, BIOSIS, AGRICOLA, CABA, HCAPLUS' ENTERED AT 02:54:13 ON 07

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JUL 2022  
L87            374 DUP REM L16 L32 L48 L67 L86 (122 DUPLICATES REMOVED)  
                 ANSWERS '1-115' FROM FILE MEDLINE  
                 ANSWERS '116-187' FROM FILE BIOSIS  
                 ANSWERS '188-227' FROM FILE AGRICOLA  
                 ANSWERS '228-298' FROM FILE CABA  
                 ANSWERS '299-374' FROM FILE HCAPLUS