Title

Summary of the Literature Review for CV127 soybean
October 1, 2019 – September 30, 2020

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.
EFSA supporting publications 2019:EN-1614

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Stage 2 assessment	Food and Feed safety [redacted] Molecular characterization [redacted] Environmental safety [redacted]
Report	[redacted]

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CV127 soybean plants were produced by introduction of the imidazolinone-tolerant acetohydroxyacid synthase large subunit (*ahasl*) 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, its effect on food and feed safety, or in 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, 2019 to September 30, 2020. 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 430 unique publications, which were subject to rapid assessment to exclude obviously irrelevant publications. Five publications were progressed for detailed assessment. Four of the publications were determined to be not relevant after detailed review. The relevant publication does not impact the safety assessment of CV127 soybean.

No other new publications were found that contained new data on the molecular characterization of the CV127 soy and its newly expressed protein, AHAS. Similarly, no new publications were found that suggested any potential adverse effects of CV127 soy on human health, animal health, or the environment.

In summary, these literature searches and review of the retrieved publications identified one relevant publication in support of the existing safety assessment, and no other relevant publications to change the existing safety assessment of the CV127 soybean.

1. INTRODUCTION

CV127 soybean plants were produced by introduction of the imidazolinone-tolerant acetohydroxyacid synthase large subunit (*ahasl*) 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 publications published between October 1, 2019 and September 30, 2020 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)[1] applications and post-market environmental monitoring activities (2019).

The literature searches were performed for the CV127 soybean and its newly expressed protein AHAS. The search terms also included relevant synonyms, 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 PECO structure (Population, Exposure, Comparators, Outcome) if possible, and to address data requirements. They were modeled after the review question examples provided in the EFSA 2019 explanatory note[1].

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 the of 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[1] 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		
Intervention/exposure	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
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
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
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

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

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(e), 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

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 (crs1-2), 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>=20191001 and UP<=20200930).

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[1]. 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 October 14, 2020. Only documents updated between October 1, 2019 and September 30, 2020, 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, trade name, newly expressed protein and intended trait. Since the 'newly expressed protein' profile and 'intended trait' profile produced too many results when used on their own, they were combined with additonal profiles: the 'newly expressed protein' profile was combined with a 'plant species' profile, while the 'intended trait' profile was combined with a 'general GMO' profile as well as with the 'plant species' profile. See Table 2 for a detailed search profile.

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

The search results were limited to documents updated between October 1, 2019 and September 30, 2020 (UP>=20191001 and UP<=20200930), and to non-patent documents (not P/DT). To ensure that documents with indexing errors where two 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 3 summarizes the number of results obtained from each of the databases searched.
See Appendix 2 for a complete search history.

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 or imazapyr or imazapic or imazethapyr or imazamox or 9027-45-6/BI)(5a)(resist? OR protect?) OR toleran?	Intended trait
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)

Table 3: 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	14 Oct 2020	14 Oct 2020	14 Oct 2020	14 Oct 2020	14 Oct 2020
Datespan of the search	1 Oct 2019 – 30 Sept 2020	1 Oct 2019 – 30 Sept 2020	1 Oct 2019 – 30 Sept 2020	1 Oct 2019 – 30 Sept 2020	1 Oct 2019 – 30 Sept 2020
Latest database update	24 Aug 2020	7 Oct 2020	7 Oct 2020	13 Oct 2020	13 Oct 2020
Number of records retrieved	49	107	124	166	123
Number of records after duplicate removal	29	93	87	98	123
Number of *relevant* records after rapid assessment	0	0	2	3	0

4. MANUAL SEARCHES

4.1. Manual searches of web pages of food safety, agriculture, and biotechnology-related authority webpages

In accordance with the EFSA 2019 explanatory note[1] the search in electronic bibliographic databases has been complemented with an internet search in webpages of relevant key organisations involved in the risk assessment of GM plants. Of the 13 key organisations cited in the EFSA 2019 explanatory note[1], two (Environment and Climate Change Canada and CIBIOGEM) are not involved in the risk assessment of GM plants, and US-EPA regulates only GM plants with Plant-Incorporated Protectant (PIP), and Genetic Engineering Approval Committee (GAEC) is included only for cotton. Therefore, the internet search focused on nine key organisations as listed below in Table 4. Search results were manually examined for relevant records that were either published during the time period under consideration (date span of search: October 1, 2019 to September 30, 2020) or refer to relevant records published during this time frame. Relevance of results were determined based on the criteria listed in Table 1. Search terms consisted of CV127, cultivance, BPS-CV127-9, AtAHASL, ALS, modified acetohydroxyacid synthase or acetolactate synthetase in CV127 soybean. (All searched singly, with no search limits applied).

Table 4: 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)	https://www.usda.gov/	Oct 30 2020	Nov 2-3 2020	0
US Food and Drug Administration (FDA)	https://www.fda.gov/	Oct 30 2020	Nov 2-3 2020	0
Health Canada	https://www.canada.ca/en/health-canada.html	Oct 30 2020	Nov 2-3 2020	0
Canadian Food Inspection Agency	https://www.canada.ca/en/food-inspection-agency.html	Oct 31 2020	Nov 2-3 2020	0
Food Standards Australia New Zealand (FSANZ)	http://www.foodstandards.gov.au/Pages/default.aspx	Oct 30 2020	Nov 2-3 2020	0
Office of the Gene Technology Regulator (OGTR)	http://www.ogtr.gov.au/	Oct 15 2020	Nov 2-3 2020	0
National Technical Commission on Biosafety (CTNBio)	http://ctnbio.mcti.gov.br/en	Oct-20	Oct 22-28 2020	0
National Advisory Commission on Agricultural Biotechnology (CONABIA)	http://www.agroindustria.gob.ar/sitio/areas/biotecnologia/conabia/	later than Aug 21 2020	Oct 21-22 2020	0
Ministry of Agriculture, Forestry and Fisheries (MAFF)	http://www.maff.go.jp/	Oct 26 2020	Oct 26 2020	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, 2019 to September 30, 2020. The resulting number of relevant studies found within the bibliographies of these review articles is given in Table 5 below.

Table 5: Documents for which reference lists were scanned for relevant studies

No	Author(s) and Year	Title	Source	Number of relevant bibliographic references retrieved
1	Ansari WA, Chandanshive SU, Bhatt V, Nadaf AB, Vats S, Katara JL, Sonah H, Deshmukh R. 2020	Genome Editing in Cereals: Approaches, Applications and Challenges	Int J Mol Sci. 2020 Jun 5;21(11):4040. doi: 10.3390/ijms21114040.	0
2	Arpaia S, Christiaens O, Giddings K, Jones H, Mezzetti B, Moronta-Barrios F, Perry JN, Sweet JB, Taning CNT, Smagghe G, Dietz-Pfeilstetter A. 2020	Biosafety of GM Crop Plants Expressing dsRNA: Data Requirements and EU Regulatory Considerations	Front Plant Sci. 2020 Jun 24;11:940. doi: 10.3389/fpls.2020.00940. eCollection 2020.	0
3	Babar U, Nawaz MA, Arshad U, Azhar MT, Atif RM, Golokhvast KS, Tsatsakis AM, Shcerbakova K, Chung G, Rana IA. 2020	Transgenic crops for the agricultural improvement in Pakistan: a perspective of environmental stresses and the current status of genetically modified crops	GM Crops Food. 2020;11(1):1-29. doi: 10.1080/21645698.2019.1680078. Epub 2019 Nov 3.	0
4	Bachtarzi H, Farries T. 2019	The Genetically Modified Organism Medicinal Framework in Europe, United States, and Japan: Underlying Scientific Principles and Considerations Toward the Development of Gene Therapy and Genetically Modified Cell-Based Products	Hum Gene Ther Clin Dev. 2019 Sep;30(3):114-128. doi: 10.1089/humc.2019.042. Epub 2019 Jun 21.	0
5	Bedair M, Glenn KC. 2020	Evaluation of the use of untargeted metabolomics in the safety assessment of genetically modified crops	Metabolomics. 2020 Oct 9;16(10):111. doi: 10.1007/s11306-020-01733-8.	0
6	Feng XJ, Yi HM, Ren XX, Ren JL, Ge JR, Wang FG. 2020	[Digital PCR and its application in biological detection]	Yi Chuan. 2020 Apr 20;42(4):363-373. doi: 10.16288/j.yczz.19-351.	0

No	Author(s) and Year	Title	Source	Number of relevant bibliographic references retrieved
7	Giraldo PA, Shinozuka H, Spangenberg GC, Cogan NOI, Smith KF. 2019	Safety Assessment of Genetically Modified Feed: Is There Any Difference From Food?	Front Plant Sci. 2019 Dec 11;10:1592. doi: 10.3389/fpls.2019.01592. eCollection 2019.	0
8	Hameed A, Mehmood MA, Shahid M, Fatma S, Khan A, Ali S. 2020	Prospects for potato genome editing to engineer resistance against viruses and cold-induced sweetening	GM Crops Food. 2020 Oct 1;11(4):185-205. doi: 10.1080/21645698.2019.1631115. Epub 2019 Jul 6.	0
9	Holme IB, Gregersen PL, Brinch-Pedersen H. 2019	Induced Genetic Variation in Crop Plants by Random or Targeted Mutagenesis: Convergence and Differences	Front Plant Sci. 2019 Nov 14;10:1468. doi: 10.3389/fpls.2019.01468. eCollection 2019.	0
10	Jyoti A, Kaushik S, Srivastava VK, Datta M, Kumar S, Yugandhar P, Kothari SL, Rai V, Jain A. 2019	The potential application of genome editing by using CRISPR/Cas9, and its engineered and ortholog variants for studying the transcription factors involved in the maintenance of phosphate homeostasis in model plants	Semin Cell Dev Biol. 2019 Dec;96:77-90. doi: 10.1016/j.semcdb.2019.03.010. Epub 2019 Apr 7.	0
11	Kadoić Balaško M, Mikac KM, Bažok R, Lemic D. 2020	Modern Techniques in Colorado Potato Beetle (Leptinotarsa decemlineata Say) Control and Resistance Management: History Review and Future Perspectives	Insects. 2020 Sep 1;11(9):581. doi: 10.3390/insects11090581.	0
12	Kamle M, Mahato DK, Devi S, Soni R, Tripathi V, Mishra AK, Kumar P. 2020	Nanotechnological interventions for plant health improvement and sustainable agriculture	3 Biotech. 2020 Apr;10(4):168. doi: 10.1007/s13205-020-2152-3. Epub 2020 Mar 14.	0
13	Kauffmann F, Van Damme P, Leroux-Roels G, Vandermeulen C, Berthels N, Beuneu C, Mali S. 2019	Clinical trials with GMO-containing vaccines in Europe: Status and regulatory framework	Vaccine. 2019 Sep 30;37(42):6144-6153. doi: 10.1016/j.vaccine.2019.08.018. Epub 2019 Sep 4.	0
14	Kenter MJH, Clevers JC, Cornelissen J, Medema RH.	[Environmental regulations impede cancer research and treatment]	Ned Tijdschr Geneeskd. 2019 Dec 5;163:D4267.	0

No	Author(s) and Year	Title	Source	Number of relevant bibliographic references retrieved
	2019			
15	Keshani P, Sharifi MH, Heydari MR, Joulaei H. 2020	The Effect of Genetically Modified Food on Infertility Indices: A Systematic Review Study	ScientificWorldJournal. 2020 Aug 13;2020:1424789. doi: 10.1155/2020/1424789. eCollection 2020.	0
16	Kumar K, Gambhir G, Dass A, Tripathi AK, Singh A, Jha AK, Yadava P, Choudhary M, Rakshit S. 2020	Genetically modified crops: current status and future prospects	Planta. 2020 Mar 31;251(4):91. doi: 10.1007/s00425-020-03372-8.	0
17	Papadopoulou N, Devos Y, Álvarez-Alfageme F, Lanzoni A, Waigmann E. 2020	Risk Assessment Considerations for Genetically Modified RNAi Plants: EFSA's Activities and Perspective	Front Plant Sci. 2020 Apr 21;11:445. doi: 10.3389/fpls.2020.00445. eCollection 2020.	0
18	Pottinger SE, Innes RW. 2020	RPS5-Mediated Disease Resistance: Fundamental Insights and Translational Applications	Annu Rev Phytopathol. 2020 Aug 25;58:139-160. doi: 10.1146/annurev-phyto-010820-012733. Epub 2020 Apr 13.	0
19	Rumin J, Nicolau E, Junior RGO, Fuentes-Grünewald C, Picot L. 2020	Analysis of Scientific Research Driving Microalgae Market Opportunities in Europe	Mar Drugs. 2020 May 18;18(5):264. doi: 10.3390/md18050264.	0
20	Woźniak E, Waszkowska E, Zimny T, Sowa S, Twardowski T. 2019	The Rapeseed Potential in Poland and Germany in the Context of Production, Legislation, and Intellectual Property Rights	Front Plant Sci. 2019 Nov 5;10:1423. doi: 10.3389/fpls.2019.01423. eCollection 2019.	0

5. RESULTS OF THE STUDY IDENTIFICATION AND SELECTION PROCESS

The database searches (Section 3) identified a total of 569 references, which were reduced to 430 after removal of duplicates (Table 3). 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 reviewers agreed on the evaluation of 100% of the articles.

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, unrelated topics, etc.

Publications which appear 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 6 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. All eligible references were assessed in detail. This detailed assessment included evaluation of the scope of the article and the study quality and reliability. Categorization of reliability (as described in the EFSA 2019 explanatory note[1] and reported in Table 11) was dependent upon the following:

- appropriateness of methodology
- whether the description of methodology would allow independent repetition of the study
- extent of characterization of test materials
- reporting of evidence of reproducibility

Table 6 gives an overview of the reference selection process and results of the detailed assessment.

Table 6: Results of the publication selection process

Total number of publications retrieved after all searches of the scientific literature (excluding duplicates)	430
Number of publications excluded from the search results after rapid assessment for relevance (Stage 1)	425
Total number of full-text documents assessed in detail	5
Number of publications excluded from further consideration after detailed assessment for relevance (Stage 2)	4
Total number of unobtainable/unclear publications	0
Total number of relevant publications	1

Table 7 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 8. Table 9 lists the publications for which full-text documents were unobtainable for detailed assessment or for which relevance was unclear after detailed assessment.

Table 7: 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
Molecular Characterization	Papadopoulou, Nikoletta Ramon, Matthew 2018	Risk assessment of new sequencing information for genetically modified soybean BPS -CV127 -9.	EFSA Journal (2018), 16(9), n/a CODEN: EJFOA6; ISSN: 1831-4732

Table 8: 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 Table 1
Sahin, Olcay Karlik, Elif Meric, Sinan Ari, Sule Gozukirmizi, Nermin 2020	Genome organization changes in GM and non-GM soybean [Glycine max (L.) Merr.] under salinity stress by retro-transposition events	Genetic Resources and Crop Evolution (2020), 67(6), 1551-1566.	The CV127 soybean was not specifically mentioned in the study
Lin, Huan-Yu. Chen, Bo-Chou Chao, Mei-Li Chang, Hui-Wen Lin, Hsin-Tang Chu, Wen-Shen 2019	Comparison of compositions of imported genetically modified and organic soybeans purchased from Taiwan market	Journal of Food and Nutrition Research (Newark, DE, United States) (2019), 7(10).	CV127 soybean included in the study as a reference sample only.

Study (Author(s) and year)	Title	Source	Reason(s) for exclusion based on eligibility/inclusion criteria listed in Table 1
Stenoien, C. Nail, K. R. Zalucki, J. M. Parry, H. Oberhauser, K. S. Zalucki, M. P. Editor(s): Lovei, G. L. 2018	Monarchs in decline: a collateral landscape-level effect of modern agriculture. Special Section: The impact of transgenic crops on protected arthropods.	Insect Science (2018), Volume 25, Number 4, pp. 528-541.	Review article. No ERA related to CV127 soybean.
Ricroch, A. Akkoyunlu, S. Martin-Laffon, J. Kuntz, M. Editor(s): Kuntz, M. 2018	Assessing the environmental safety of transgenic plants: honey bees as a case study. Special Issue: Transgenic plants and beyond.	Advances in Botanical Research (2018), Volume 86, pp. 111-167.	Review article. No ERA related to CV127 soybean.

Table 9: 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.			

6. NARRATIVE SYNTHESIS/SUMMARY OF RELEVANT STUDIES

A total of five 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 four of the publications were not relevant for the safety assessment of the CV127 soybean and its newly expressed protein AHAS. The relevant publication was the EFSA opinion the new sequencing data and bioinformatics assessment. EFSA concludes that the original risk assessment of CV127 soybean remains valid.

Table 10 and Table 11 list the relevant publication along with a summary of any adverse effects reported and the reliability of the publications.

Table 10: Report of the summary 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)	Intervention/ test materials used	Adverse effects reported	Which adverse effect reported
Molecular Characterization	Papadopoulou, Nikoletta Ramon, Matthew 2018	Evaluation of the new sequencing data and bioinformatics assessment for CV127 Soybean.	No adverse effect reported.	Not applicable

Table 11: Report of the reliability and implications for the risk assessment 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)	Summary of reliability appraisal	Implications for risk assessment
Molecular Characterization	Papadopoulou, Nikoletta Ramon, Matthew 2018	The assessment presented reliable methods and findings.	The sequence differences did not change the original safe status of CV127 soybean.

7. CONCLUSION

The literature searches performed for the CV127 soybean and its newly expressed protein AHAS for the period from October 1, 2019 to September 30, 2020, identified a total of 430 unique publications (after duplicate removal). A total of five publications were progressed for detailed assessment after excluding 425 obviously irrelevant publications during Stage 1 evaluation (rapid assessment based on title and abstract).

The five 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. One relevant publication with bearings on the molecular characterisation of CV127 soybean was identified. The findings of this publication support the existing safety assessment of CV127 soybean. No other publications were found that suggested any potential adverse effects of CV127 soy on human health, animal health, or the environment.

In summary, these literature searches and review of the retrieved publications identified one relevant publication in support of the existing safety assessment and no other relevant publications to change the existing safety assessment of the CV127 soybean. 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.

9. APPENDICES

Appendix 1 Database descriptions

Host	File	Description
STN	AGRICOLA	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. 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.
STN	BIOSIS	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. 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. Bibliographic information, indexing terms, abstracts, and CAS Registry Numbers are all searchable.
STN	CABA/CAB	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. Sources for CABA include journals, books, reports, published theses, conference proceedings, and patents. Bibliographic information, indexing terms, abstracts, and CAS Registry Numbers are searchable.
STN	CAS-CA/CAPLUS	The Chemical Abstracts (CA) database covers all areas of Biochemistry, Chemistry and Chemical engineering, and related sciences. 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. Bibliographic terms, indexing terms, roles, CAS Registry Numbers, International Patent Classification, and abstracts are searchable.

Host	File	Description
STN	MEDLINE	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. Sources include journals and chapters in books or symposia. Bibliographic information, indexing terms, abstracts, chemical names, and CAS Registry Numbers are all searchable. Online thesauri are available for the Medical Subject Headings (/MN), Controlled Terms (/CT) and Chemical Name (/CN) fields.

Appendix 2 Search history

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      FILE 'MEDLINE' ENTERED AT 08:52:53 ON 14 OCT 2020
L1            6 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           15 SEA CSR1(W)2 OR CSR(W)12 OR CRS(W)1(W)2
L4          465 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          1031 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         50040 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         50259 SEA (L3 OR L4 OR L5 OR L6 OR L7)
L9        339159 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        63514 SEA SOY OR SOYA OR SOJA OR SOYBEAN# OR SOYABEAN# OR SOJABEAN#
                OR GLYCINE(W)MAX OR G(W)MAX
L11      3602364 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          74 SEA L8 AND L10
L13        1038 SEA L9 AND L10 AND L11
L14        1097 SEA L1 OR L2 OR L12 OR L13
L15         264 SEA L14 AND PY>=2018
L16         123 SEA L15 AND UP>=20191001 AND UP<=20200930

     FILE 'BIOSIS' ENTERED AT 08:53:21 ON 14 OCT 2020
L17           8 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           9 SEA CSR1(W)2 OR CSR(W)12 OR CRS(W)1(W)2
L20         852 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        1724 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        28672 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        29554 SEA (L19 OR L20 OR L21 OR L22 OR L23)
L25       349159 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      162007 SEA SOY OR SOYA OR SOJA OR SOYBEAN# OR SOYABEAN# OR SOJABEAN#
                OR GLYCINE(W)MAX OR G(W)MAX
L27      446752 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         212 SEA L24 AND L26
L29         958 SEA L25 AND L26 AND L27
L30        1146 SEA L17 OR L18 OR L28 OR L29
L31         220 SEA L30 AND PY>=2018
L32         107 SEA L31 AND UP>=20191001 AND UP<=20200930

     FILE 'AGRICOLA' ENTERED AT 08:53:49 ON 14 OCT 2020
L33           7 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         247 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        1137 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        8912 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        9355 SEA (L35 OR L36 OR L37 OR L38 OR L39)
L41      111788 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       85722 SEA SOY OR SOYA OR SOJA OR SOYBEAN# OR SOYABEAN# OR SOJABEAN#
                OR GLYCINE(W)MAX OR G(W)MAX
L43       94680 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         138 SEA L40 AND L42
L45         668 SEA L41 AND L42 AND L43
L46         799 SEA L33 OR L34 OR L44 OR L45
L47         106 SEA L46 AND PY>=2018
L48          49 SEA L47 AND UP>=20191001 AND UP<=20200930

     FILE 'CABA' ENTERED AT 08:54:17 ON 14 OCT 2020
L49          15 SEA CV(W)SOY OR CVSOY OR BPS(W)CV127(W)9 OR BPSCV127(W)9 OR
                CV127?
L50           5 SEA CULTIVANCE OR CULTIVANCETM OR CULTIVANCERTM
L51          13 SEA CSR1(W)2 OR CSR(W)12 OR CRS(W)1(W)2
L52         953 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        1682 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       12164 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       12656 SEA (L51 OR L52 OR L53 OR L54 OR L55)
L57      241334 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      184857 SEA SOY OR SOYA OR SOJA OR SOYBEAN# OR SOYABEAN# OR SOJABEAN#
                 OR GLYCINE(W)MAX OR G(W)MAX
L59      173769 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         323 SEA L56 AND L58
L61        1398 SEA L57 AND L58 AND L59
L62        1705 SEA L49 OR L50 OR L60 OR L61
L63         252 SEA L62 AND PY>=2018
L64         124 SEA L63 AND UP>=20191001 AND UP<=20200930
L65         124 SEA L64 NOT P/DT
L66           0 SEA L64 AND (P/DT AND J/DT)
L67         124 SEA L65 OR L66

     FILE 'HCAPLUS' ENTERED AT 08:54:45 ON 14 OCT 2020
L68          22 SEA CV(W)SOY OR CVSOY OR BPS(W)CV127(W)9 OR BPSCV127(W)9 OR
                 CV127?
L69           2 SEA CULTIVANCE OR CULTIVANCETM OR CULTIVANCERTM
L70          15 SEA CSR1(W)2 OR CSR(W)12 OR CRS(W)1(W)2
L71        1245 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        3555 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       22173 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       24812 SEA (L70 OR L71 OR L72 OR L73 OR L74)
L76      375875 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      391512 SEA SOY OR SOYA OR SOJA OR SOYBEAN# OR SOYABEAN# OR SOJABEAN#
                 OR GLYCINE(W)MAX OR G(W)MAX
L78      664212 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         877 SEA L75 AND L77
L80        7118 SEA L76 AND L77 AND L78
L81        7513 SEA L68 OR L69 OR L79 OR L80
L82        2023 SEA L81 AND PY>=2018
L83         624 SEA L82 AND UP>=20191001 AND UP<=20200930
L84         166 SEA L83 NOT P/DT
L85           0 SEA L83 AND (P/DT AND J/DT)
L86         166 SEA L84 OR L85

     FILE 'MEDLINE, BIOSIS, AGRICOLA, CABA, HCAPLUS' ENTERED AT 08:55:16 ON 14
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     OCT 2020
L87         430 DUP REM L16 L32 L48 L67 L86 (139 DUPLICATES REMOVED)
                    ANSWERS '1-123' FROM FILE MEDLINE
                    ANSWERS '124-216' FROM FILE BIOSIS
                    ANSWERS '217-245' FROM FILE AGRICOLA
                    ANSWERS '246-332' FROM FILE CABA
                    ANSWERS '333-430' FROM FILE HCAPLUS
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