Title

Summary of the Literature Review for T45 *Brassica napus*
October 1, 2019 – September 30, 2020

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

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SUMMARY

T45 *Brassica napus* (*B. napus*) was produced by means of *Agrobacterium*-mediated transformation using vector pHOE4/Ac(II). T45 *B. napus* contains the *pat* gene (origin *Streptomyces viridochromogenes*), coding for the phosphinothricin acetyltransferase (PAT) protein which confers tolerance to glufosinate-ammonium. The *pat* gene is driven by the 35S promoter that allows a high level of constitutive expression. The OECD identifier of T45 *B. napus* is ACS-BNØØ8-2.

A scoping review was performed for the T45 *B. napus* and its newly expressed protein, PAT/*pat*. The objective of this scoping review was to determine if there were studies about the molecular characterization of T45 *B. napus*, its effect on food and feed safety, or on 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 204 unique publications, which were subject to rapid assessment to exclude obviously irrelevant publications. A total of 5 publications were progressed for detailed assessment. Three of the five were previously included in the 2019 Post-Market Environmental Monitoring literature review report and were excluded from further consideration in this report. Neither of the remaining two publications were relevant after detailed review.

No new publications were found that contained new data on the molecular characterization of the T45 *B. napus* and its newly expressed protein, PAT/*pat*. Similarly, no new publications were found that suggested any potential adverse effects of this event on human health, animal health, or the environment.

In summary, these literature searches and review of the retrieved publications identified no relevant publication that would contradict the existing safety assessment of the T45 *B. napus* or its newly expressed protein Pat/*pat*.

1. INTRODUCTION

T45 *Brassica napus* (*B. napus*) was produced by means of *Agrobacterium*-mediated transformation using vector pHOE4/Ac(II). T45 *B. napus* contains the *pat* gene (origin *Streptomyces viridochromogenes*), coding for the phosphinothricin acetyltransferase (PAT) protein which confers tolerance to glufosinate-ammonium. The *pat* gene is driven by the 35S promoter that allows a high level of constitutive expression. The OECD identifier of T45 *B. napus* is ACS-BNØØ8-2.

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 T45 *B. napus*, and/or any adverse effect of T45 *B. napus* 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 T45 *B. napus* and its newly expressed protein PAT/*pat*. 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 T45 *B. napus* and its newly expressed protein PAT/*pat*, 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 T45 *B. napus* and its newly expressed protein PAT/*pat*?

Key elements:

Population: Human health; animal health; environmental safety
Exposure: T45 *B. napus*, derived food/feed products, newly expressed protein in T45 *B. napus*
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 T45 *B. napus* and its newly expressed protein PAT/*pat*?

Key elements:

Population: T45 *B. napus* and newly expressed protein in T45 *B. napus*

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

Concepts	**Criteria**	**Comment**
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

Concepts	Criteria	Comment
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 trait products obtained by conventional crosses/subcombinations	The publication addresses the higher stacked trait product and/or a subcombination or subcombinations of the single events of the higher stacked trait product, independently of its/their origin	This permits the selection of publications on the higher stacked trait product and/or subcombinations of the single events of the higher stacked trait product 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 trait product, because the risk assessment of GMO applications for stacked trait products covers only the products in the scope of the GMO application – i.e., the higher stacked trait product 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

Concepts	Criteria	Comment
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.	This permits the exclusion of publications that do not present original/primary data (e.g., editorials, position papers). 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 refers to T45 *B. napus* was previously identified and was used to test and validate the search strategy:

- Naegeli, H.; Bresson, J. L.; Dalmay, T.; Dewhurst, I. C.; Epstein, M. M.; Firbank, L. G.; Guerche, P.; Hejatko, J.; Moreno, F. J.; Mullins, E.; Nogue, F.; Rostoks, N.; Serrano, J. J. S.; Savoini, G.; Veromann, E.; Veronesi, F.; Alvarez, F.; Ardizzone, M.; Papadopoulou, N.; Paraskevopoulos, K. (2019). Assessment of genetically modified oilseed rape T45 for renewal of authorisation under Regulation (EC) No 1829/2003 (application EFSA-GMO-RX-012). EFSA Journal (2019), Volume 17, Number 2, e05597 p.

This article was selected because it is relevant to the search and its title and abstract include the event name (T45), the plant species (oilseed rape) and the intended trait (herbicide tolerance). Since this article was published outside the search period, the search profiles were tested without applying the time limitation used in the final search 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 6, 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 all these profile elements retrieved a high number of irrelevant results when used on their own, they were combined with additional profiles for ‘plant species’ profile AND/OR ‘general GMO’ profile as described:

- Event name profile AND (‘Plant species’ profile OR ‘General GMO’ profile)
- Trade name profile AND ‘Plant species’ profile
- Newly expressed protein profile AND (‘Plant species’ profile OR ‘General GMO’ profile)
- Intended trait profile AND ‘Plant species’ profile AND ‘General GMO’ 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	T45 or t(w)45 or HCN28 or HCN(w)28 or ACS-BNØØ8-2 or ACS-BN008-2 or ACS-BNOO8-2 or ACS(w)BNØØ8(w)2 or ACS(w)BN008(w)2 or ACS(w)BNOO8(w)2 or ACSBNØØ8(w)2 or ACSBN008(w)2 or ACSBNOO8(w)2	Event name
2	libertylink or libertylinktm or libertylinkrtm or liberty-link or liberty(w)link or liberty(w)linktm or liberty(w)linkrtm or LL or LLTM or LLRTM or invigor or in(w)vigor or invigortm or in(w)vigortm or invigorrtm or in(w)vigorrtm	Trade name
3	((bar or pat)(2a)(gene# or protein# or enzyme#)) or ppt(2w)acetyltransferase or ppt(2w)acetyl(w)transferase or pt(w)n(2w)acetyltransferase or pt(w)n(2w)acetyl(w)transferase or phosphinothricin(w)n(w)acetyltransferase or phosphinothricin(2w)acetyltransferase or	Newly expressed protein

	phosphinothricin(2w)acetyl(w)transferase or phosphinothricinacetyl(w)transferase	
4	(herbicid? or bialaphos or basta or glufosinate or phosphinothricin or liberty?)(5a)(resist? OR protect? OR toleran?)	Intended trait
5	((BRASSICA or B)(w)napus) or CANOLA# or colza OR OILSEED(w)RAPE# OR oil(w)seed(w)rape# OR RAPESEED# OR RAPE(w)SEED#	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	(1 or 3) and (5 or 6)	(Event name OR Newly expressed protein) AND (Plant species or GMO general)
8	2 and 5	Trade name AND Plant Species
9	4 and 5 and 6	Intended trait AND Plant species AND GMO general
10	7 or 8 or 9	((Event name OR Newly expressed protein) AND (Plant species or GMO general)) or (trade name 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	6 Oct 2020	6 Oct 2020	6 Oct 2020	6 Oct 2020	6 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	30 Sept 2020	30 Sept 2020	5 Oct 2020	5 Oct 2020
Number of records retrieved	14	39	42	79	65
Number of records after duplicate removal	12	36	27	64	65
Number of *relevant* records after rapid assessment	0	0	2	1	2

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 was 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 Protectants (PIPs). Argentina (CONABIA and SENASA), Brazil (CTNBio), and India (GEAC) do not require submissions for GM canola. Therefore, the internet search focused on only seven key organisation 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 and they were summarized in Table 4. All web pages searched were justified by

their recommendation in the EFSA 2019 explanatory note[1]. Search terms consisted of T45 CANOLA OR T45 OILSEED OR T45 BRASSICA OR ACS-BNØØ8-2; or PAT/*pat*, Phosphinothricin in T45 canola. (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/	October 30, 2020	November 2, 2020	0
US Food and Drug Administration (FDA)	https://www.fda.gov/	October 30, 2020	November 2, 2020	0
Health Canada	https://www.canada.ca/en/health-canada.html	October 30, 2020	November 2, 2020	0
Canadian Food Inspection Agency (CFIA)	https://www.canada.ca/en/food-inspection-agency.html	October 31, 2020	November 2, 2020	0
Food Standards Australia New Zealand (FSANZ)	http://www.foodstandards.gov.au/Pages/default.aspx	October 30, 2020	November 2, 2020	0
Office of the Gene Technology Regulator (OGTR)	http://www.ogtr.gov.au/	October 15, 2020	November 2, 2020	0
Ministry of Agriculture, Forestry and Fisheries (MAFF)	http://www.maff.go.jp/	October 26, 2020	October 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 and September 30, 2020. The resulting number of relevant studies found within the bibliographies of these review articles is given in Table 5.

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
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,	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

	Mishra AK, Kumar P. 2020			
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. 2019	[Environmental regulations impede cancer research and treatment]	Ned Tijdschr Geneeskd. 2019 Dec 5;163:D4267.	0
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-	Analysis of Scientific Research Driving Microalgae Market Opportunities in Europe	Mar Drugs. 2020 May 18;18(5):264. doi: 10.3390/md18050264.	0

	Grünewald C, Picot L. 2020			
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 239 references, which were reduced to 204 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 discussion was transferred to Stage 2 for detailed evaluation by the experts. In this search, both evaluators had a 100% agreement in stage 1.

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)	204
Number of publications excluded from the search results after rapid assessment for relevance (Stage 1)	199
Total number of full-text documents assessed in detail	5*
Number of publications excluded from further consideration after detailed assessment for relevance (Stage 2)	5*
Total number of unobtainable/unclear publications	0
Total number of relevant publications	0

*A total of five publications were progressed for detailed assessment. Three of the five were previously included in the 2019 Post-Market Environmental Monitoring literature review report and are not included in Table 8.

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
No publications in this category.			

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
Mao Deqian; Hu Yichun; Li Min; Yang Xiaoguang; Yang Lichen; Wang Yanping; Wang Qian; Du Kehe	Digestive stability in simulated gastric fluid of EPSPS protein and PAT protein.	Wei sheng yan jiu = Journal of hygiene research, (2020 May) Vol. 49, No. 3, pp. 453-457. Journal code: 9426367. ISSN: 1000-8020. L-ISSN: 1000-8020.	Study does not evaluate the safety of T45 Canola.
Naegeli, Hanspeter; Bresson, Jean-Louis; Dalmay, Tamas; Dewhurst, Ian Crawford; Epstein, Michelle M.; Firbank, Leslie George; Guerche, Philippe; Hejatko, Jan; Moreno, Francisco Javier; Mullins, Ewen; Nogue, Fabien; Rostoks, Nils; Sanchez Serrano, Jose Juan; Savoini, Giovanni; Veromann, Eve; Veronesi, Fabio; Alvarez, Fernando; Ardizzone, Michele; De Sanctis, Giacomo; Devos, Yann; Fernandez-Dumont, Antonio; Gennaro, Andrea; Gomez Ruiz, Jose Angel; Lanzoni, Anna; Neri, Franco Maria; Papadopoulou, Nikoletta; Paraskevopoulos, Konstantinos	Assessment of genetically modified oilseed rape MS11 for food and feed uses, import and processing, under Regulation (EC) No 1829/2003 (application EFSA-GMO -BE-2016-138)	EFSA Journal (2020), 18(5), e06112 CODEN: EJFOA6; ISSN: 1831-4732	Report is not specific to T45 Canola. Report focuses on MS11 Canola.

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 5 publications were selected during Stage 1 evaluation (rapid assessment based on title and abstract). Three of the five were previously included in the 2019 Post-Market Environmental Monitoring literature review report and were excluded from further consideration in this report. After Stage 2 evaluation (detailed review based on full text), it was determined that neither of the remaining two publications were relevant for the safety assessment of T45 *B. napus* and its newly expressed protein PAT/*pat*.

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
No publications in this category.				

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
No publications in this category.			

7. CONCLUSION

The literature searches performed for the T45 *B. napus* and its newly expressed protein PAT/*pat* for the period from October 1, 2019 to September 30, 2020, identified a total of 204 unique publications (after duplicate removal). A total of 5 publications were progressed for detailed assessment after excluding 199 obviously irrelevant publications during Stage 1 evaluation (rapid assessment based on title and abstract). Three of the five were previously included in the 2019 Post-Market Environmental Monitoring literature review report and were excluded from further consideration in this report. The remaining two 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 publications with bearing on molecular characterization, human and animal safety, or environmental safety 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.

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.

Host	File	Description
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.
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 08:38:37 ON 06 OCT 2020
L1          329 SEA T45 OR T(W)45 OR HCN28 OR HCN(W)28 OR ACS-BNØØ8-2 OR
                ACS-BN008-2 OR ACS-BNOO8-2 OR ACS(W)BNØØ8(W)2 OR ACS(W)BN008(W)
                2 OR ACS(W)BNOO8(W)2 OR ACSBNØØ8(W)2 OR ACSBN008(W)2 OR
                ACSBNOO8(W)2
L2        12913 SEA LIBERTYLINK OR LIBERTYLINKTM OR LIBERTYLINKRTM OR LIBERTY-L
                INK OR LIBERTY(W)LINK OR LIBERTY(W)LINKTM OR LIBERTY(W)LINKRTM
                OR LL OR LLTM OR LLRTM
L3          149 SEA INVIGOR OR IN(W)VIGOR OR INVIGORTM OR IN(W)VIGORTM OR
                INVIGORRTM OR IN(W)VIGORRTM
L4        13062 SEA (L2 OR L3)
L5         1389 SEA ((BAR OR PAT)(2A)(GENE# OR PROTEIN# OR ENZYME#)) OR
                PPT(2W)ACETYLTRANSFERASE OR PPT(2W)ACETYL(W)TRANSFERASE OR
                PT(W)N(2W)ACETYLTRANSFERASE OR PT(W)N(2W)ACETYL(W)TRANSFERASE
L6          202 SEA PHOSPHINOTHRICIN(W)N(W)ACETYLTRANSFERASE OR PHOSPHINOTHRICI
                N(2W)ACETYLTRANSFERASE OR PHOSPHINOTHRICIN(2W)ACETYL(W)TRANSFER
                ASE OR PHOSPHINOTHRICINACETYL(W)TRANSFERASE
L7         1463 SEA (L5 OR L6)
L8         3073 SEA (HERBICID? OR BIALAPHOS OR BASTA OR GLUFOSINATE OR
                PHOSPHINOTHRICIN OR LIBERTY?)(5A)(RESIST? OR PROTECT? OR
                TOLERAN?)
L9        11005 SEA ((BRASSICA OR B)(W)NAPUS) OR CANOLA# OR COLZA OR OILSEED(W)
                RAPE# OR OIL(W)SEED(W)RAPE# OR RAPESEED# OR RAPE(W)SEED#
L10     3599661 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?))
L11        1087 SEA (L1 OR L7) AND (L9 OR L10)
L12          17 SEA L4 AND L9
L13         176 SEA L8 AND L9 AND L10
L14        1260 SEA L11 OR L12 OR L13
L15         123 SEA L14 AND PY>=2018
L16          65 SEA L15 AND UP>=20191001 AND UP<=20200930

     FILE 'BIOSIS' ENTERED AT 08:39:20 ON 06 OCT 2020
L17         335 SEA T45 OR T(W)45 OR HCN28 OR HCN(W)28 OR ACS-BNØØ8-2 OR
                ACS-BN008-2 OR ACS-BNOO8-2 OR ACS(W)BNØØ8(W)2 OR ACS(W)BN008(W)
                2 OR ACS(W)BNOO8(W)2 OR ACSBNØØ8(W)2 OR ACSBN008(W)2 OR
                ACSBNOO8(W)2
L18       14005 SEA LIBERTYLINK OR LIBERTYLINKTM OR LIBERTYLINKRTM OR LIBERTY-L
                INK OR LIBERTY(W)LINK OR LIBERTY(W)LINKTM OR LIBERTY(W)LINKRTM
                OR LL OR LLTM OR LLRTM
L19          58 SEA INVIGOR OR IN(W)VIGOR OR INVIGORTM OR IN(W)VIGORTM OR
                INVIGORRTM OR IN(W)VIGORRTM
L20       14062 SEA (L18 OR L19)
L21        2746 SEA ((BAR OR PAT)(2A)(GENE# OR PROTEIN# OR ENZYME#)) OR
                PPT(2W)ACETYLTRANSFERASE OR PPT(2W)ACETYL(W)TRANSFERASE OR
                PT(W)N(2W)ACETYLTRANSFERASE OR PT(W)N(2W)ACETYL(W)TRANSFERASE
L22         326 SEA PHOSPHINOTHRICIN(W)N(W)ACETYLTRANSFERASE OR PHOSPHINOTHRICI
                N(2W)ACETYLTRANSFERASE OR PHOSPHINOTHRICIN(2W)ACETYL(W)TRANSFER
                ASE OR PHOSPHINOTHRICINACETYL(W)TRANSFERASE
L23        2846 SEA (L21 OR L22)
L24        9411 SEA (HERBICID? OR BIALAPHOS OR BASTA OR GLUFOSINATE OR
                PHOSPHINOTHRICIN OR LIBERTY?)(5A)(RESIST? OR PROTECT? OR
                TOLERAN?)
L25       34067 SEA ((BRASSICA OR B)(W)NAPUS) OR CANOLA# OR COLZA OR OILSEED(W)
                RAPE# OR OIL(W)SEED(W)RAPE# OR RAPESEED# OR RAPE(W)SEED#
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L26      446451 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?))
L27        1234 SEA (L17 OR L23) AND (L25 OR L26)
L28          88 SEA L20 AND L25
L29         348 SEA L24 AND L25 AND L26
L30        1621 SEA L27 OR L28 OR L29
L31          83 SEA L30 AND PY>=2018
L32          39 SEA L31 AND UP>=20191001 AND UP<=20200930

     FILE 'AGRICOLA' ENTERED AT 08:39:54 ON 06 OCT 2020
L33          79 SEA T45 OR T(W)45 OR HCN28 OR HCN(W)28 OR ACS-BNØØ8-2 OR
                ACS-BN008-2 OR ACS-BNOO8-2 OR ACS(W)BNØØ8(W)2 OR ACS(W)BN008(W)
                2 OR ACS(W)BNOO8(W)2 OR ACSBNØØ8(W)2 OR ACSBN008(W)2 OR
                ACSBNOO8(W)2
L34        2864 SEA LIBERTYLINK OR LIBERTYLINKTM OR LIBERTYLINKRTM OR LIBERTY-L
                INK OR LIBERTY(W)LINK OR LIBERTY(W)LINKTM OR LIBERTY(W)LINKRTM
                OR LL OR LLTM OR LLRTM
L35         113 SEA INVIGOR OR IN(W)VIGOR OR INVIGORTM OR IN(W)VIGORTM OR
                INVIGORRTM OR IN(W)VIGORRTM
L36        2977 SEA (L34 OR L35)
L37         723 SEA ((BAR OR PAT)(2A)(GENE# OR PROTEIN# OR ENZYME#)) OR
                PPT(2W)ACETYLTRANSFERASE OR PPT(2W)ACETYL(W)TRANSFERASE OR
                PT(W)N(2W)ACETYLTRANSFERASE OR PT(W)N(2W)ACETYL(W)TRANSFERASE
L38         240 SEA PHOSPHINOTHRICIN(W)N(W)ACETYLTRANSFERASE OR PHOSPHINOTHRICI
                N(2W)ACETYLTRANSFERASE OR PHOSPHINOTHRICIN(2W)ACETYL(W)TRANSFER
                ASE OR PHOSPHINOTHRICINACETYL(W)TRANSFERASE
L39         798 SEA (L37 OR L38)
L40        7656 SEA (HERBICID? OR BIALAPHOS OR BASTA OR GLUFOSINATE OR
                PHOSPHINOTHRICIN OR LIBERTY?)(5A)(RESIST? OR PROTECT? OR
                TOLERAN?)
L41       20797 SEA ((BRASSICA OR B)(W)NAPUS) OR CANOLA# OR COLZA OR OILSEED(W)
                RAPE# OR OIL(W)SEED(W)RAPE# OR RAPESEED# OR RAPE(W)SEED#
L42       93951 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?))
L43         635 SEA (L33 OR L39) AND (L41 OR L42)
L44          29 SEA L36 AND L41
L45         224 SEA L40 AND L41 AND L42
L46         854 SEA L43 OR L44 OR L45
L47          35 SEA L46 AND PY>=2018
L48          14 SEA L47 AND UP>=20191001 AND UP<=20200930

     FILE 'CABA' ENTERED AT 08:40:34 ON 06 OCT 2020
L49         183 SEA T45 OR T(W)45 OR HCN28 OR HCN(W)28 OR ACS-BNØØ8-2 OR
                ACS-BN008-2 OR ACS-BNOO8-2 OR ACS(W)BNØØ8(W)2 OR ACS(W)BN008(W)
                2 OR ACS(W)BNOO8(W)2 OR ACSBNØØ8(W)2 OR ACSBN008(W)2 OR
                ACSBNOO8(W)2
L50        4863 SEA LIBERTYLINK OR LIBERTYLINKTM OR LIBERTYLINKRTM OR LIBERTY-L
                INK OR LIBERTY(W)LINK OR LIBERTY(W)LINKTM OR LIBERTY(W)LINKRTM
                OR LL OR LLTM OR LLRTM
L51         230 SEA INVIGOR OR IN(W)VIGOR OR INVIGORTM OR IN(W)VIGORTM OR
                INVIGORRTM OR IN(W)VIGORRTM
L52        5091 SEA (L50 OR L51)
L53        1482 SEA ((BAR OR PAT)(2A)(GENE# OR PROTEIN# OR ENZYME#)) OR
                PPT(2W)ACETYLTRANSFERASE OR PPT(2W)ACETYL(W)TRANSFERASE OR
                PT(W)N(2W)ACETYLTRANSFERASE OR PT(W)N(2W)ACETYL(W)TRANSFERASE
L54         368 SEA PHOSPHINOTHRICIN(W)N(W)ACETYLTRANSFERASE OR PHOSPHINOTHRICI
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                N(2W)ACETYLTRANSFERASE OR PHOSPHINOTHRICIN(2W)ACETYL(W)TRANSFER
                ASE OR PHOSPHINOTHRICINACETYL(W)TRANSFERASE
L55         1582 SEA (L53 OR L54)
L56        17308 SEA (HERBICID? OR BIALAPHOS OR BASTA OR GLUFOSINATE OR
                PHOSPHINOTHRICIN OR LIBERTY?)(5A)(RESIST? OR PROTECT? OR
                TOLERAN?)
L57        54917 SEA ((BRASSICA OR B)(W)NAPUS) OR CANOLA# OR COLZA OR OILSEED(W)
                RAPE# OR OIL(W)SEED(W)RAPE# OR RAPESEED# OR RAPE(W)SEED#
L58       173590 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?))
L59         1322 SEA (L49 OR L55) AND (L57 OR L58)
L60           62 SEA L52 AND L57
L61          575 SEA L56 AND L57 AND L58
L62         1887 SEA L59 OR L60 OR L61
L63           89 SEA L62 AND PY>=2018
L64           42 SEA L63 AND UP>=20191001 AND UP<=20200930
L65           42 SEA L64 NOT P/DT
L66            0 SEA L64 AND (P/DT AND J/DT)
L67           42 SEA (L65 OR L66)

     FILE 'HCAPLUS' ENTERED AT 08:41:19 ON 06 OCT 2020
L68          732 SEA T45 OR T(W)45 OR HCN28 OR HCN(W)28 OR ACS-BNØØ8-2 OR
                ACS-BN008-2 OR ACS-BNOO8-2 OR ACS(W)BNØØ8(W)2 OR ACS(W)BN008(W)
                2 OR ACS(W)BNOO8(W)2 OR ACSBNØØ8(W)2 OR ACSBN008(W)2 OR
                ACSBNOO8(W)2
L69        18860 SEA LIBERTYLINK OR LIBERTYLINKTM OR LIBERTYLINKRTM OR LIBERTY-L
                INK OR LIBERTY(W)LINK OR LIBERTY(W)LINKTM OR LIBERTY(W)LINKRTM
                OR LL OR LLTM OR LLRTM
L70             9 SEA INVIGOR OR IN(W)VIGOR OR INVIGORTM OR IN(W)VIGORTM OR
                INVIGORRTM OR IN(W)VIGORRTM
L71        18869 SEA (L69 OR L70)
L72         6871 SEA ((BAR OR PAT)(2A)(GENE# OR PROTEIN# OR ENZYME#)) OR
                PPT(2W)ACETYLTRANSFERASE OR PPT(2W)ACETYL(W)TRANSFERASE OR
                PT(W)N(2W)ACETYLTRANSFERASE OR PT(W)N(2W)ACETYL(W)TRANSFERASE
L73          761 SEA PHOSPHINOTHRICIN(W)N(W)ACETYLTRANSFERASE OR PHOSPHINOTHRICI
                N(2W)ACETYLTRANSFERASE OR PHOSPHINOTHRICIN(2W)ACETYL(W)TRANSFER
                ASE OR PHOSPHINOTHRICINACETYL(W)TRANSFERASE
L74         7160 SEA (L72 OR L73)
L75        26401 SEA (HERBICID? OR BIALAPHOS OR BASTA OR GLUFOSINATE OR
                PHOSPHINOTHRICIN OR LIBERTY?)(5A)(RESIST? OR PROTECT? OR
                TOLERAN?)
L76        69750 SEA ((BRASSICA OR B)(W)NAPUS) OR CANOLA# OR COLZA OR OILSEED(W)
                RAPE# OR OIL(W)SEED(W)RAPE# OR RAPESEED# OR RAPE(W)SEED#
L77       663403 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?))
L78         2510 SEA (L68 OR L74) AND (L76 OR L77)
L79           41 SEA L71 AND L76
L80         1020 SEA L75 AND L76 AND L77
L81         3437 SEA L78 OR L79 OR L80
L82          605 SEA L81 AND PY>=2018
L83          148 SEA L82 AND UP>=20191001 AND UP<=20200930
L84           79 SEA L83 NOT P/DT
L85            0 SEA L83 AND (P/DT AND J/DT)
L86           79 SEA (L84 OR L85)

     FILE 'MEDLINE, BIOSIS, AGRICOLA, CABA, HCAPLUS' ENTERED AT 08:41:57 ON 06
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     OCT 2020
L87         204 DUP REM L16 L32 L48 L67 L86 (35 DUPLICATES REMOVED)
                ANSWERS '1-65' FROM FILE MEDLINE
                ANSWERS '66-101' FROM FILE BIOSIS
                ANSWERS '102-113' FROM FILE AGRICOLA
                ANSWERS '114-140' FROM FILE CABA
                ANSWERS '141-204' FROM FILE HCAPLUS
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