

ADOPTED: 18 May 2022

doi: 10.2903/j.efsa.2022.7362

Safety assessment of the process Kunststof Recycling Nederland (KRN), used to recycle high density polyethylene box pallets for use as food contact materials

EFSA Panel on Food Contact Materials, Enzymes and Processing Aids (CEP),
Claude Lambré, José Manuel Barat Baviera, Claudia Bolognesi, Andrew Chesson,
Pier Sandro Cocconcelli, Riccardo Crebelli, David Michael Gott, Konrad Grob,
Marcel Mengelers, Alicja Mortensen, Gilles Rivière, Inger-Lise Steffensen, Christina Tlustos,
Henk Van Loveren, Laurence Vernis, Holger Zorn, Vincent Dudler, Maria Rosaria Milana,
Constantine Papaspyrides, Maria de Fátima Tavares Poças, Alexandros Lioupis and
Evgenia Lampi

Abstract

The EFSA Panel on Food Contact Materials, Enzymes and Processing Aids (CEP) assessed the safety of the recycling process Kunststof Recycling Nederland (KRN) (EU register number RECYC251). The input consists of box pallets made of high-density polyethylene (HDPE) originating from a closed and controlled product loop for packaging of meat. Flakes are used to produce new box pallets for food contact. The Panel considered that the management system put in place to provide full traceability from the input to the final product and to ensure compliance of the origin of the input with Commission Regulation (EC) No 282/2008 is critical. According to the applicant, the input of the process KRN originates from a product loop which is in closed and controlled chain, designed to ensure that only materials and articles that have been intended for food contact are used and that contamination can be ruled out when run under the conditions described by the applicant. The Panel concluded that the recycling process KRN is suitable to produce recycled HDPE box pallets intended to be used in contact with refrigerated or frozen, packed or unpacked meat.

© 2022 European Food Safety Authority. *EFSA Journal* published by Wiley-VCH GmbH on behalf of European Food Safety Authority.

Keywords: closed loop, Kunststof Recycling Nederland, KRN, food contact materials, plastic, high-density polyethylene (HDPE), box pallet, recycling process, safety assessment

Requestor: Competent Authority of The Netherlands: Ministry of Health, Welfare and Sport

Question number: EFSA-Q-2020-00772

Correspondence: fip@efsa.europa.eu

Panel members: José Manuel Barat Baviera, Claudia Bolognesi, Andrew Chesson, Pier Sandro Cocconcelli, Riccardo Crebelli, David Michael Gott, Konrad Grob, Claude Lambré, Evgenia Lampi, Marcel Mengelers, Alicja Mortensen, Gilles Rivière, Vittorio Silano (until 21 December 2020[†]), Inger-Lise Steffensen, Christina Tlustos, Henk Van Loveren, Laurence Vernis, and Holger Zorn.

Declarations of interest: The declarations of interest of all scientific experts active in EFSA's work are available at <https://ess.efsa.europa.eu/doi/doiweb/doisearch>.

Suggested citation: EFSA CEP Panel (EFSA Panel on Food Contact Materials, Enzymes and Processing Aids), Lambré C, Barat Baviera JM, Bolognesi C, Chesson A, Cocconcelli PS, Crebelli R, Gott DM, Grob K, Mengelers M, Mortensen A, Rivière G, Steffensen I-L, Tlustos C, Van Loveren H, Vernis L, Zorn H, Dudler V, Milana MR, Papaspyrides C, Tavares Poças MDF, Lioupis A and Lampi E, 2022. Scientific Opinion on the safety assessment of the process Kunststof Recycling Nederland (KRN), used to recycle high density polyethylene box pallets for use as food contact materials. *EFSA Journal* 2022;20(6):7362, 7 pp. <https://doi.org/10.2903/j.efsa.2022.7362>

ISSN: 1831-4732

© 2022 European Food Safety Authority. *EFSA Journal* published by Wiley-VCH GmbH on behalf of European Food Safety Authority.

This is an open access article under the terms of the [Creative Commons Attribution-NoDerivs](https://creativecommons.org/licenses/by/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited and no modifications or adaptations are made.



The EFSA Journal is a publication of the European Food Safety Authority, a European agency funded by the European Union.



[†] Deceased.

Table of contents

Abstract.....	1
1. Introduction.....	4
1.1. Background and Terms of Reference as provided by the requestor.....	4
2. Data and methodologies.....	4
2.1. Data.....	4
2.2. Methodologies.....	5
3. Assessment.....	5
3.1. General information.....	5
3.2. Description of the process.....	5
3.2.1. General description.....	5
3.2.2. Characterisation of the input.....	6
3.2.3. Characterisation of the output.....	6
3.3. Compliance with the relevant provisions on food contact materials and articles.....	6
3.4. Process analysis and evaluation by the applicant.....	6
3.5. Discussion.....	6
4. Conclusions.....	7
5. Recommendations.....	7
6. Documentation provided to EFSA.....	7
References.....	7
Abbreviations.....	7

1. Introduction

1.1. Background and Terms of Reference as provided by the requestor

Recycled plastic materials and articles shall only be placed on the market if they contain recycled plastic obtained from an authorised recycling process. Before a recycling process is authorised, EFSA's opinion on its safety is required. This procedure has been established in Article 5 of Regulation (EC) No 282/2008¹ of the Commission of 27 March 2008 on recycled plastic materials intended to come into contact with foods and Articles 8 and 9 of Regulation (EC) No 1935/2004² of the European Parliament and of the Council of 27 October 2004 on materials and articles intended to come into contact with food.

According to this procedure, the industry submits applications to the Member States Competent Authorities, which transmit the applications to the European Food Safety Authority (EFSA) for evaluation.

In this case, EFSA received an application, from the Competent Authority of The Netherlands: Ministry of Health, Welfare and Sport, for evaluation of the recycling process KRN, European Union (EU) register No RECYC251. The request has been registered in EFSA's register of received questions under the number EFSA-Q-2020-00772. The dossier was submitted on behalf of Kunststof Recycling Nederland, the Netherlands.

According to Article 5 of Regulation (EC) No 282/2008 on recycled plastic materials intended to come into contact with foods, EFSA is required to carry out risk assessments on the risks originating from the migration of substances from recycled food contact plastic materials and articles into food and deliver a scientific opinion on the recycling process examined.

According to Article 4 of Regulation (EC) No 282/2008, EFSA will evaluate whether it has been demonstrated that the plastic input of the recycling process originates from a product loop which is in a closed and controlled chain ensuring that only materials and articles which have been intended for food contact are used and any contamination can be ruled out.

2. Data and methodologies

2.1. Data

The applicant has submitted a dossier following the 'EFSA guidelines for the submission of an application for the safety evaluation of a recycling process to produce recycled plastics intended to be used for the manufacture of materials and articles in contact with food, prior to its authorisation' (EFSA, 2008).

Additional information was provided by the applicant during the assessment process in response to a request from EFSA sent on 29 October 2021 (see '[Documentation provided to EFSA](#)').

The following information on the recycling process was provided by the applicant and used for the evaluation:

- General information:
 - general description,
 - existing authorisations.
- Specific information:
 - recycling process,
 - characterisation of the input,
 - characterisation of the recycled plastic,
 - intended application in contact with food,
 - compliance with the relevant provisions on food contact materials and articles,
 - process analysis and evaluation,
 - operating parameters.

¹ Regulation (EC) No 282/2008 of the European parliament and of the council of 27 March 2008 on recycled plastic materials and articles intended to come into contact with foods and amending Regulation (EC) No 2023/2006. OJ L 86, 28.3.2008, p. 9–18.

² Regulation (EC) No 1935/2004 of the European parliament and of the council of 27 October 2004 on materials and articles intended to come into contact with food and repealing Directives 80/590/EEC and 89/109/EEC. OJ L 338, 13.11.2004, p. 4–17.

2.2. Methodologies

The risks associated with the use of recycled plastic materials and articles in contact with food come from the possible migration of chemicals into the food in amounts that would endanger human health. The assessment was conducted in line with the principles described in the guidelines on recycling plastics (EFSA, 2008), in the EFSA Guidance on transparency in the scientific aspects of risk assessment (EFSA, 2009) and considering the relevant guidance from the EFSA Scientific Committee.

3. Assessment

3.1. General information³

According to the applicant, the recycling process KRN is intended to recycle pre-cleaned box pallets of food grade high-density polyethylene (HDPE) to produce HDPE flakes. The recyclate may be blended with virgin HDPE or used at up to 100% to manufacture new HDPE box pallets for repeated use in the same loops, for storage of packed and unpacked frozen and refrigerated meat.

3.2. Description of the process

3.2.1. General description⁴

According to the applicant, the input of the recycling process consists of pre-cleaned box pallets that have been used in food contact. Box pallets are produced by Dolav and are owned by the pooling organisation HSF Logistics (HSF), which cleans them for re-use and delivers the damaged ones to the recycler KRN (Figure 1).

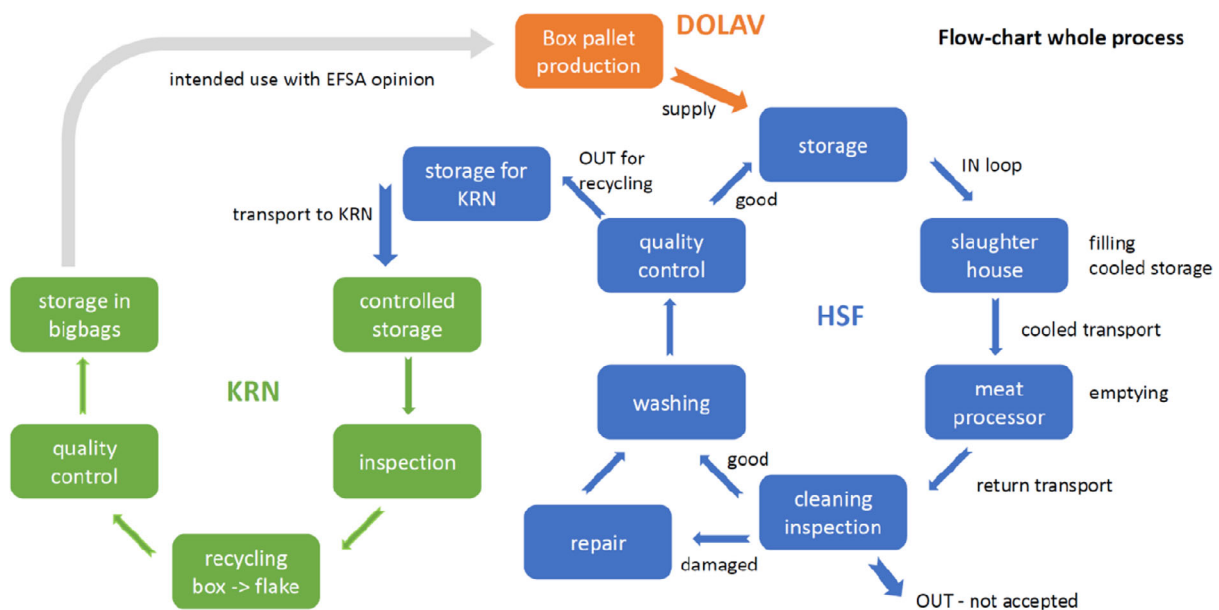


Figure 1: Flowchart of the KRN product loop as provided by the applicant

The process includes the following steps:

- Used box pallets are collected at the sites of the meat wholesalers and transferred by the pooling organisation HSF to its washing installation. Misused box pallets, e.g. box pallets contaminated with grease or oil, are visually identified and sorted out before entering the washing line. Cleaned box pallets at the end of the service life (e.g. because of damages) are sorted out for recycling and stored separately. The identity of the box pallets is controlled by the engraved logos of the pooling organisation HSF and the box pallet producer (Dolav) as well as by their colour. All trucks of the HSF fleet have an on-board track and trace system.

³ Technical dossier, Section 3.1.

⁴ Technical dossier, Sections 3.1 and C.3.2.

- Upon reception by the recycler, there is a visual check to ensure that all box pallets belong to the loop (HSF logo). The box pallets are stored separately from other materials. They are shredded, metals are removed and the shredded parts ground, dedusted, packed in big bags and labelled.
- The flakes are delivered to the producer of new box pallets (Dolav Plastic Products). They are used to produce new box pallets with or without blending with virgin HDPE. The box pallets are delivered to HSF and the user (slaughterhouses) to be filled with meat packed in shrink films or in plastic bags. Less than 10% of the meat is placed in the box pallets without packaging. Subsequently, they are transported to meat wholesalers by the pooling organisation under controlled temperature conditions (between -2°C and -22°C). Storage of empty box pallets is under control.

3.2.2. Characterisation of the input⁵

According to the applicant, the input material for the recycling process KRN consists of used and cleaned HDPE box pallets that have been made for and used in closed re-use loops for packaging and transport of packed or unpacked meat. The box pallets are originally made of HDPE in compliance with Regulation (EU) No. 10/2011 using the engraved logos to confirm this.

The box pallets are used in a product loop which is in a closed and controlled chain by slaughterhouses and wholesalers for packaging, transport and storage of meat at temperatures between -2°C and -22°C .

According to the applicant, the existing internal QAS ensures that the input originates exclusively from this closed and controlled loop and provides full traceability of the material.

3.2.3. Characterisation of the output⁶

Technical specifications on colour and regrind particle size for the HDPE flakes have been established by the applicant. Up to 100% recycled HDPE flakes may be used to manufacture new recycled HDPE box pallets.

3.3. Compliance with the relevant provisions on food contact materials and articles⁷

According to the applicant, the prewashed reusable HDPE box pallets used as input material for the recycling process are made of plastic that complies with Commission Regulation (EU) No. 10/2011. Scientific literature on comparative testing showing only minor differences between virgin and five times reprocessed HDPE material (Coulier et al., 2007) was provided in support of compliance.

3.4. Process analysis and evaluation by the applicant⁸

The applicant presented a process analysis in which the following points are made: The recycling process is managed by a quality assurance scheme in which continuous control is performed, ensuring that contamination and the involved risks are avoided. The potential risks are identified and the control measures are described.

3.5. Discussion

The data presented by the applicant allow identifying the process, its input, output and the intended uses of the box pallets. Based on the description of the process, the Panel considers that this process is within the scope of Art. 4 c(i) of the Regulation (EC) No 282/2008¹, when the plastic input is supplied by pooling organisations belonging to a product loop in a closed and controlled chain. The recycling process KRN uses input material supplied by a pooling organisation belonging to a product loop of a producer, slaughterhouses and meat wholesalers.

Within the loop, the box pallets are used for storage and transport of meat. At the end of their service life (e.g. because of damages), pre-cleaned box pallets (input) are recycled. In the recycling

⁵ Technical dossier, Sections 3.2.1 and 3.2.2.

⁶ Technical dossier, Sections C.3.2.1 and 3.2.4.

⁷ Technical dossier, Section 3.2.6.

⁸ Technical dossier, Section 3.2.7.

process, the box pallets are processed to flakes. These flakes can be used at up to 100% to manufacture new pallets.

Considering the high temperature during processing, the possibility of contamination by microorganisms can be discounted. Therefore, this evaluation focuses on the chemical safety of the final product.

The Panel considered the management of the loop as critical, i.e. that the whole process (collection, sorting, recycling, distribution) is operated under a QAS that includes the use of specific identifiers to ensure traceability and control of the input.

The washing and grinding of the box pallets under the conditions described by the applicant are not of safety concern. Taking into account the conditions during use with potential food contact, between -2°C and -22°C , as well as the low ratio of contact surface to packed food, negligible migration of substances into food is expected.

4. Conclusion

The Panel concluded that the process Kunststof Recycling Nederland (KRN) ensures that only HDPE box pallets suitable for food contact are used and that contamination by misuse can be ruled out, since the input originates from product loops managed in a closed and controlled chain. Therefore, the recycled material obtained from this process and used within this loop is not of safety concern, when used at up to 100% for the manufacture of box pallets for contact with meat at refrigerated or frozen conditions.

5. Recommendations

The Panel recommends that it should be verified periodically, as part of the good manufacturing practice (GMP) in the meaning of the Regulation (EC) No. 2023/2006, that the input originates from materials and articles that have been manufactured in accordance with the EU legislation on food contact materials and articles (Regulation (EC) No 282/2008, Art. 4b). Specifications for input (cleaned box pallets from a product loop which is in a closed and controlled chain) should be kept under control. Supporting documentation recording the control should be available.

6. Documentation provided to EFSA

Dossier 'Kunststof Recycling Nederland (KRN)'. October 2021. Submitted on behalf of Kunststof Recycling Nederland, The Netherlands.

Additional information, November 2021. Submitted on behalf of Kunststof Recycling Nederland, The Netherlands.

References

- Coulier L, Hub H and Rijk R, 2007. Analytical protocol to study the food safety of (multiple-) recycled L. high-density polyethylene (HDPE) and polypropylene (PP) pallets: influence of recycling on the migration and formation of degradation products. *Polymer Degradation and Stability*, 92, 2016–2025.
- EFSA (European Food Safety Authority), 2008. Guidelines for the submission of an application for safety evaluation by the EFSA of a recycling process to produce recycled plastics intended to be used for manufacture of materials and articles in contact with food, prior to its authorisation. *EFSA Journal* 2008;6(7):717, 12 pp. <https://doi.org/10.2903/j.efsa.2008.717>
- EFSA (European Food Safety Authority), 2009. Guidance of the Scientific Committee on transparency in the scientific aspects of risk assessments carried out by EFSA. Part2: general principles. *EFSA Journal* 2009;7(5):1051, 22 pp. <https://doi.org/10.2903/j.efsa.2009.1051>

Abbreviations

CEP	Panel on Food Contact Materials, Enzymes and Processing Aids
HDPE	high-density polyethylene
QAS	Quality Assurance System