



The Consumer Voice in Europe

TOWARDS SAFE AND SUSTAINABLE FOOD PACKAGING

European consumer organisations call for action on single-use tableware made of alternatives to plastic



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Going green on packaging: good for the environment, safe for consumers?

Single-use straws, cutlery, and plates made of plastics will soon be things of the past as the EU is set to ban many everyday single-use plastic (SUP) items in an effort to avert the ever-growing spread of plastics in our environment. Consumers meanwhile are already turning away from these unsustainable products: 45% of consumers have for example avoided single-use plastic goods or bought reusable plastic products within in the past six months, according to a March 2020 Eurobarometer survey.¹

Food businesses are responding to consumer concerns about the environmental impact of plastic by increasingly switching to alternatives, made either of paper and board or 'natural' packaging materials, such as bamboo, straw, or palm leaves. While these plant-based food packaging materials and items help reduce our reliance on single-use plastics, they may however also expose consumers – and the environment – to chemicals of concern. Previous tests by European consumer groups have already shown that paper straws and coffee cups can contain suspected cancer-causing chemicals, as well as substances that have not been risk assessed by the European Food Safety Agency (EFSA).²

New findings by consumer organisations now demonstrate that chemicals of concern are also prevalent in other popular SUP alternatives, such as disposable bowls made of moulded plant fibres or palm leaf tableware. In total, 53% of sampled products contained one or more chemicals of concern above recommended levels, while a further 21% contained these chemicals close to the limits. Several products were also found to mislead consumers with unsubstantiated green claims.

Unlike plastic materials, no detailed EU rules govern the chemicals present in such food packaging materials. As such, these new results highlight that the EU must act now to prevent consumer exposure to harmful chemicals. Doing so would also help consumers trust that SUP alternatives are safe, thus contributing to continued public support for the fight to end the plastic pollution crisis.

Single-use plastics and EU food packaging laws

SUP goods are used once, or for a short period of time, before being thrown away. The impacts of this plastic waste on the environment and on health are global and can be drastic. The COVID-19 pandemic has sadly caused a sudden surge in demand for single-use plastic packaging and products. Due to lockdown measures across most of Europe, coupled with stringent hygiene requirements, many restaurants for example shifted to offering takeaway and delivery services using single-use plastic containers. Meanwhile, online shopping has increased dramatically, with many products packed in single-use plastic.³

In 2018, the European Commission launched⁴ an ambitious plan to prevent and reduce plastic waste in Europe. This plan includes targeted measures, such as bans, against the 10 most commonly found single-use plastic items on European beaches; including several items used in contact with food, such as plastic cutlery, plates, and straws. As a result,

¹ European Commission. [Attitudes of European citizens towards the Environment](#). Special Eurobarometer 501. March 2020.

² BEUC. [The EU needs rules on chemicals in coffee cups, straws and other paper food packaging, consumer test shows](#). Press Release. July 2019.

³ European Environmental Agency. [Plastics, the circular economy and Europe's environment – A priority for action](#). January 2021.

⁴ European Commission. [Plastic Waste: a European strategy to protect the planet, defend our citizens and empower our industries](#). Press Release. January 2018.

food businesses are switching to alternatives, made either of paper or other plant-based materials, such as bamboo or palm leaves. Unlike plastics, however, specific EU rules governing the safety of these materials do not exist.

Chemicals present in food contact materials – whether made from plastics, paper, or other materials – are known to migrate into, and thus contaminate foodstuff, thereby creating risks for consumer health. Existing EU legislation⁵ is meant to safeguard consumers against such risks; however, the legal framework is deficient and provides insufficient protection of consumers, among others, because specific rules do not exist for most food packaging materials.⁶ Consequently, it is often impossible to ensure that plastic alternatives – such as paper or bamboo – are safe, as the European Parliament highlighted in 2016.⁷ Parliament concluded that the lack of EU rules is detrimental to public health and consumer trust. The EU Plastics Strategy and the decision to ban certain single use plastics are set to further exacerbate these concerns, as EU adequate rules are not in place for the alternatives, such as moulded plant fibres, palm leaves or paper and board.

- **Paper and board** is the second most used food packaging material in Europe, superseded only by plastics. Given the lack of specific EU rules, Member States can adopt their own national measures; nonetheless, only nine countries have rules for paper and board in place. Of the estimated 1,710 substances covered by these measures, only nine per cent are regulated by three or more Member States, according to a 2017 review by the Joint Research Centre.⁸
- **Other plant-based materials which are** replacing SUP food contact items include bamboo, palm leaves, and moulded plant fibres, such as wheat straws or 'bagasse' (the dry fibrous material that remains after crushing sugarcane stalks to extract their juice). Data on the market uptake of these materials – and the chemicals used in their production – is scant at present. In February 2020, UK NGO, Fidra found⁹ that takeaway boxes made of bagasse can contain disturbingly high concentrations of fluorinated compounds; a group of extremely persistent chemicals that scientists link to adverse health effects, such as reduced immune response, liver toxicity and impacts on reproduction.

Safe and sustainable? Chemicals of concern in SUP alternatives

In Europe, over 8,000 chemicals are estimated to be used to produce and treat paper wraps, plastic packaging, glass and metal containers, bamboo kitchenware and other materials intended for food contact.¹⁰ Food contact materials (FCM) and items however also contain and release chemicals that the manufacturer did not use intentionally. These are counted in the tens of thousands, only a fraction of which are known or studied. Chemicals leaching from FCMs may thus be the largest and least controlled source of food contamination.¹¹

⁵ Regulation (EC) No 1935/2004 on materials and articles intended to come into contact with food.

⁶ See BEUC. [Time is ripe to Repackage Food Safely](#). December 2019.

⁷ European Parliament. [Report on the implementation of the Food Contact Materials Regulation \(\(EC\) No 1935/2004\)](#). 2015/2259(INI). July 2016.

⁸ Joint Research Centre. [Non-harmonised food contact materials in the EU: regulatory and market situation. Baseline study](#). January 2017.

⁹ Fidra. [Forever chemicals in the food aisle](#). February 2020.

¹⁰ J. Muncke et al. [Impacts of food contact chemicals on human health: a consensus statement](#). Environmental Health 19. March 2020.

¹¹ K. Grob et al. 2006. Food Contamination with Organic Materials in Perspective: Packaging Materials as the Largest and Least Controlled Source? *Critical Reviews in Food Science and Nutrition* 46.

Whereas the presence of chemicals of concern in paper and board food packaging is well documented,¹² relatively little is known about the chemicals used – and potentially present – in other plant-based food contact materials. Recent investigations have however highlighted the troubling presence of per- and polyfluoroalkyl substances (PFAS), chloropropanols, and pesticide residues in such materials.

- **Per- and polyfluoroalkyl substances** are a group of synthetic chemicals that persist in nature and accumulate in food chains, earning them the moniker ‘forever’ chemicals. Scientists have linked PFAS exposure with cancers, developmental toxicity, immunotoxicity, and other severe health effects. PFAS are widely used to make food packaging, clothing, and other consumer products water-, grease- and/or stain-resistant. These chemicals can thus be present in paper and other plant-based materials due either to intentional use – for example as an additive to the pulp material or as a coating agent used in surface treatment of the final food contact item – or as unintended residues resulting e.g. from degradation of precursor compounds or background contamination. Migration of PFAS into food from grease-resistant paper packaging is well-documented.¹³

Global concern about the impacts of PFAS on human health and the environment is mounting.¹⁴ The recent Chemicals Strategy for Sustainability commits the EU to ban all PFAS unless their use is essential to society, and to reduce exposure from food, water, air, and other environmental sources. In 2020, Denmark became the first European country to ban the intentional use of PFAS in paper and other fibrous materials intended for food contact, unless a functional barrier that prevents the migration of PFAS into food is used.¹⁵

- **Chloropropanols** – such as 3-monochloropropane-1,2-diol (3-MCPD) and 1,3-dichloropropan-2-ol (1,3-DCP) – comprise a group of chemical contaminants with carcinogenic properties.¹⁶ Chloropropanols have been found in various processed foods and food ingredients, such as hydrolysed vegetable protein, soy sauce, cereal-based products, and smoked foods.¹⁷ Chloropropanols can however also form as process contaminant during paper and board production. 3-MCPD and 1,3-DCP may for example be present in paper made with epichlorohydrin based wet-strength resins. Previous research has demonstrated the presence of these contaminants in e.g. paper straws.¹⁸ The prevalence of chloropropanols in other fibrous materials such as bagasse is not well-documented.
- **Pesticide residues** may be present in plant-based food contact items either as residues of the pesticides used to grow sugarcane, palm trees and other natural materials – or during subsequent processing of the raw material, e.g. anti-fungal treatment. Pesticides used for crop protection and management include herbicides, fungicides, insecticides, acaricides, plant growth regulators and repellents. Pesticides may help protect plants against pests. However, overreliance on pesticides in modern agriculture also contributes to biodiversity loss; while exposure to certain pesticides is

¹² See e.g. BEUC. [The EU needs rules on chemicals in coffee cups, straws and other paper food packaging, consumer test shows](#). Press Release. July 2019.

¹³ See e.g. TH Begley *et al.* Migration of fluorochemical paper additives from food-contact paper into foods and food simulants. Food Additives & Contaminants 25(3). March 2008.

¹⁴ See A. Blum *et al.* [The Madrid Statement on Poly- and Perfluoroalkyl Substances \(PFASs\)](#). *Environmental Health Perspectives* 123(5). May 2015.

¹⁵ Danish Veterinary and Food Administration. [Danish Order on food contact materials and on provisions for penalties for breaches of related EU legislation](#). Informative translation. 2020.

¹⁶ The EU classifies 1,3-DCP as a carcinogen category 1B (presumed) based on evidence from animal studies, while the International Agency for Research on Cancer has classified 3-MCPD as a possible human carcinogen (group 2B).

¹⁷ European Food Safety Authority. [Analysis of occurrence of 3-monochloropropane-1,2-diol \(3-MCPD\) in food in Europe in the years 2009-2011 and preliminary exposure assessment](#). EFSA Journal 11(9). September 2013.

¹⁸ Food Packaging Forum. [Contamination found in paper straws](#). 30 July 2019.

linked to cancers, birth defects, reproductive harm, neurological and developmental toxicity, immunotoxicity, and endocrine disruption.

While the EU has established strict pesticide registration procedures and maximum residue levels in food, EU legislation does not explicitly regulate their presence in food packaging materials. In June 2018, Öko-Test documented¹⁹ that single-use tableware of palm tree leaves can contain traces of the banned pesticide DDT along with biological contaminants.

A consumer test: chemicals of concern in popular SUP alternatives

To further explore this issue, four consumer organisations, Altroconsumo (Italy), Forbrugerrådet TÆNK (Denmark), OCU (Spain), and UFC-Que Choisir (France) decided to investigate the presence of chemicals of concern in selected SUP alternatives in different European countries. The test sampled 57 different single-use food contact items, such as disposable bowls made from straw or bagasse, paper straws, and palm leaf tableware. Each participating organisation sent samples from their national market to be analysed in laboratories.

In total, three categories of single-use items were sampled: 23 bowls and plates made from moulded natural fibres, mainly bagasse; 18 paper straws; and 16 palm leaf bowls and plates. Building on previous studies,²⁰ the products were analysed for selected chemicals – or groups of chemicals – including fluorinated compounds (PFAS) and chloropropanols (3-MCPD and 1,3-DCP), as well as pesticides that have previously been reported in plant-based materials.

In the absence of official EU guidance values for the sampled products, the results were evaluated against the following reference values (see Annex I for details):

- **Per- and polyfluoroalkyl substances:** the Danish Veterinary and Food Administration recommends²¹ an indicator value based on non-targeted Total Organic Fluorine (TOF) analysis that corresponds to 20 µg organic fluorine/g of paper. Content of organic fluorine above this limit indicates either intentional use of fluorinated compounds to make paper water and grease repellent – or alternatively indirect use e.g. from other sources such as printing inks, from the paper processing or from recycled materials. The test investigated the presence of fluorinated compounds in paper straws and the moulded fibre products (41 total samples).
- **Chloropropanols:** The German Federal Institute for Risk Assessment (BfR) recommends²² that the transfer of 3-MCPD from paper into a water extract must be as low as technically achievable. A limit of 12 µg/l must in any case not be exceeded. Further, 1,3-DCP should not be detectable in the water extract from the finished product, given a detection limit of 2 µg/l. The test investigated the presence of chloropropanols in the sampled paper straws and the moulded fibre products (41 total samples).
- **Pesticides:** Regulation EC 396/2005 sets maximum limits for residues in food of pesticides currently or formerly used in agriculture in or outside the EU (around 1100). A general default maximum residue limit (MRL) of 0.01 mg/kg applies to all pesticides not specifically addressed in the Regulation. The test investigated the presence of

¹⁹ Öko-Test. [Einweggeschirr-Test: Das sind die besten plastikfreien Geschirre](#). 18 October 2018.

²⁰ See e.g. Food Packaging Forum. [Contamination found in paper straws](#). 30 July 2019 and Fidra. [Forever chemicals in the food aisle](#). February 2020.

²¹ Danish Veterinary and Food Administration. [Ban on fluorinated substances in paper and board food contact materials \(FCM\). Fact sheet](#). June 2020

²² Bundesinstitut für Risikobewertung. [Recommendation XXXVI. Paper and board for food contact](#). June 2019.

pesticide residues in the palm leaf and moulded fibre products (39 total samples). For positive samples, worst-case migration was calculated assuming that all measured residues in a product migrate into a food content equal to 0,25 L. The worst-case migration was then compared with the relevant MRL for the specific pesticide.

Results: chemicals of concern are prevalent in SUP alternatives

Of the 57 samples, chemicals of concern were detected above the recommended limits in 53% (30 samples); several samples were found to contain more than one of the analysed chemicals. In a further 12 samples (21%), the analyses detected either pesticide residues or fluorinated compounds and chloropropanols close to the recommended limits (see Annex II for further details).

Fluorinated compounds

Of the 41 products analysed for fluorinated compounds, 27 (66%) exceeded the Danish indicator value. The highest concentration of organic fluorine measured was 2,800 mg/kg – or 140 times above the indicator value. All the moulded fibre products – as well as some paper straws – exceeded the indicator value. These results thus suggests that fluorinated compounds were used, for example to make the products water- and/or fat repellent. Seven paper straws contained organic fluorine close to the reference value; indicating that fluorinated compounds were either used intentionally in printing inks or were present as a contaminant at high levels in e.g. recycled materials.

The present test did not explore the presence of specific PFAS compounds in the sampled SUP alternatives. Previous investigations have however identified specific PFAS compounds in paper and board food packaging through combined use of TOF analysis and targeted methods. In 2017, five consumer organisations detected²³ the presence of PFOA and its six-carbon cousin compounds perfluorohexanoate acid (PFHxA) and perfluorobutanoic acid (PFBA) in 31 paper samples; all exceeding the Danish TOF indicator value. Recent U.S. research²⁴ measured both short- and long-chain PFAS compounds in 36 out of 38 paper and other plant-based straws. Among the most frequently detected compounds in that study were also PFOA, PFBA, and PFHxA. Migration analysis showed that approximately two-thirds of the total extractable PFAS leached from the paper straws into cold water.

Targeted analysis is only able to detect those PFAS compounds for which analytical standards are available; thousands of PFAS are in commercial use, however, implying that targeted analyses are prone to 'overlook' many compounds present in the food packaging material. For example, a recent European wide investigation²⁵ by eight civil society organisations found that targeted analysis could assign less than 1% of the total organic fluorine present in sampled disposable food packaging and tableware to the investigated 55 PFAS compounds. TOF analyses in contrast can detect all PFAS, including unknown precursor compounds, and typically also operates with lower limits of detection. Researchers at the Danish Technological University have thus concluded that these methods are suitable for non-targeted detection of PFAS in paper and board material.²⁶

Chloropropanols

Out of the 41 samples analysed for their content of chloropropanols, 11 products (27%) exceeded the BfR recommendation for 3-MCPD, with results ranging from 13 to 78 µg/L – or up to 6,5 times above the recommended value (12 µg/L). One sample also

²³ BEUC. [Harmful substances found in fast food packages across Europe](#). Press Release. March 2017. See also UFC-Que Choisir. [Fast-food – Des emballages qui font tache](#). March 2018.

²⁴ A. Timshina et al. [The last straw: Characterization of per- and polyfluoroalkyl substances in commercially-available plant-based drinking straws](#). *Chemosphere* 277. Forthcoming.

²⁵ J. Straková et al. [Throwaway Packaging, Forever Chemicals](#). May 2021.

²⁶ K. Granby and G. Pedersen. [Vurdering af metode til bestemmelse af total organisk fluor \(TOF\) i fødevarekontaktmaterialer og bestemmelse af baggrunds niveau for TOF i pap og papir](#). 2018.

contained 1,3-DCP at 5 µg/L – or 2,5 times above the recommended value (2 µg/L). The results were similar across paper straws (28% exceeded the limit) and moulded fibre products (26% exceeded the limit). Further, three samples were found to contain 3-MCPD close to the recommended limit. Due to the uncertainty interval associated with the applied method these samples may however also exceed the limit.

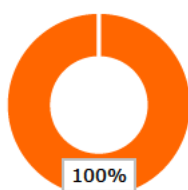
Pesticide residues

Pesticide residues were detected in 11 products (28%). In most samples, only one active substance was detected; although one moulded fibre product contained residues of three different pesticides. Among the pesticides found²⁷ in the analysis, several are either classified as Carcinogenic, Mutagenic or Reprotoxic (CMR), are suspected endocrine disruptors, are not approved for use in the EU or both, such as bifenthrin. Some are candidates for substitution under EU pesticide legislation.

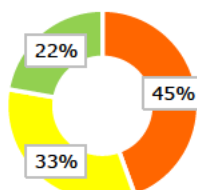
For all 11 products, the worst-case migration calculations were below the reference values for food, with results ranging from 6 to 32% of the relevant MRL. Compliance with MRLs should ensure that food is safe for consumers *and* that residue amounts are kept as low as possible to reduce the overall impact of pesticides on health and the environment. Such obligations do not however exist for food packaging materials; yet the test results illustrate that there is technical room for manufacturers to reduce residue amounts: no pesticide residues were for example found in 72% of the analysed palm leaf and moulded fibre products. These findings thus highlight what appears to be an overlooked source of consumers' cumulative exposure to pesticide residues, including active substances that are potential endocrine disruptors, are classified as CMRs and/or are not approved for use in the EU.

Results are summarised for each product category in the graph below; the prevalence of chemicals of concern in the samples submitted for each participating country were largely similar.

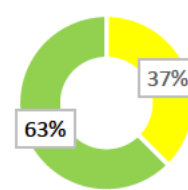
Molded fibre tableware



Paper straw



Palm leaf tableware



Legend: **Green:** Chemicals of concern not detected or content clearly below the recommended limits
Yellow: Either pesticide residues or fluorinated compounds and chloropropanols detected close to the recommended limits German/Danish recommendations
Orange: Fluorinated compounds and chloropropanols detected above the recommended limits

²⁷ The analysis detected the following pesticides:

- **Bifenthrin**, an insecticide and acaricide, [not approved for use in the EU](#). [CMR cat. 2](#), [suspected ED](#).
- **Tebuconazole**, a fungicide, [approved for use in the EU until August 2021](#). [CMR cat. 2](#), [suspected ED](#). Candidate for substitution according to Regulation (EC) No 1107/2009.
- **Anthraquinone**, an insect repellent, [not approved for use in the EU](#). [CMR cat. 1B](#).
- **Lambda cyhalothrin**, an insecticide, [approved for use in the EU until 2023](#). [Suspected ED](#). Candidate for substitution according to Regulation (EC) No 1107/2009.
- **Diphenylamine**, a growth stimulant, [not approved for use in the EU](#).
- **O-phenylphenol**, a fungicide, [approved for use in the EU until December 2021](#).
- **Glyphosate**, a herbicide, [approved for use in the EU until December 2022](#). Identified as a [probably carcinogenic to humans \(Group 2A\)](#) by the International Agency for Research on Cancer (IARC).

Overall, the results demonstrate that single-use tableware made of alternatives to plastic can contain chemicals of concern, including some that are suspected to cause cancer, harm reproductive health, or disrupt the endocrine system. While none of the tested products in isolation may endanger human health, they nonetheless contribute to overall consumer exposure to problematic chemicals. Also, the substances included in this test are not an exclusive list, as there are other substances that could be relevant to investigate both from a use and a safety perspective. Further analysis is likewise needed to determine the specific PFAS compounds present in paper straws and moulded fibre tableware.

SUP alternatives: misleadingly green?

German consumer group, Stiftung Warentest has previously warned²⁸ that many bamboo-based, re-useable cups mislead consumers with claims advertising the recyclability and biodegradability of cups that neither degrade in the environment nor within industrial composting facilities. The present test casts further doubt on the green credentials of many popular SUP alternatives.

Several of the sampled products make green claims in one way or the other. Brand or product names like 'Eco-Friendly', 'Ecotable', 'Bioplates', and 'Naturesse' are common across all four countries, and many products feature claims such as 'biodegradable' and 'compostable'. This includes almost all the moulded natural fibre items that either in their name, logos, and labelling claim to be compostable. While the test did not investigate the veracity of these claims, the ubiquitous presence of fluorinated or 'forever' chemicals in these products makes such claims dubious at best. Whether discarded in garden compost heaps or processed by commercial composting facilities, any PFAS present in these products may not fully degrade for hundreds of years, eventually migrating into the environment and accumulating in soil, water and living organisms.

Some sampled products carried specific logos from various third-party certification schemes: products featuring these logos are 'guaranteed' biodegradable, either in industrial composting plants or in garden compost heaps, depending on the label in question. For industrial composting, the reference point for certification is often European standard EN 13432. This standard sets a limit of 100 ppm total fluorine in the material and is generally said to guarantee PFAS-free products. The test results nonetheless seem to contradict this claim as the findings clearly indicate intentional use of PFAS in all moulded fibre products – including those carrying a third-party certificate. The results thus suggest a need to both strengthen the criteria for – and the control by – third-party certification schemes to ensure that consumers are not mislead by unsubstantiated green claims.

The prevalence of pesticide residues in many moulded fibre and palm leaf products will likewise deceive consumers. Many consumers for example prefer organic over conventionally produced foods to reduce their potential intake of pesticide residues, without realising that plant-based or 'natural' packaging materials may also contaminate their food. While the worst-case migration values were below the relevant MRLs for food, the results nonetheless illustrate that it is possible for manufacturers to source plant-based materials without pesticide residues: no pesticide residues were thus found in 72% of the analysed palm leaf and moulded fibre products.

²⁸ Stiftung Warentest. Die Bambuslüge. *Test 8/2019*. July 2019.

Towards safe and sustainable food packaging: the EU must ensure that SUP alternatives are safe and do not mislead consumers

The EU is rightly committed to take further action against plastics items, including through the 2020 Circular Economy Action Plan.²⁹ BEUC and our members fully support these efforts.³⁰ This new evidence however highlights the urgent need to develop in parallel strict rules on chemicals in SUP alternatives both to safeguard consumer health and the environment, as well as to ensure continued public support for the fight to end the plastic pollution crisis. This fact is also recognized in the 2020 Farm to Fork Strategy³¹ which commits the Commission to revise EU FCM legislation to ensure food safety and public health, while supporting the use of sustainable packaging solutions made from environmentally-friendly materials.

BEUC welcomes the announced revision of EU FCM legislation as a long overdue opportunity to build a comprehensive, future proof and enforceable FCM regime that fully protects consumers against harmful chemicals and promotes sustainability. In view of the test results, BEUC recommends³² that:

- **New strict rules for all food contact materials are developed without delay**, including for those made from 'natural' materials, such as bamboo, bagasse, straw, or palm leaves. Doing so will also greatly facilitate efforts to control imported food packaging materials and items, as correctly observed by the Commission.³³ New rules to control and minimise food contamination from FCMs including pesticide residues and other contaminants must likewise be introduced, while existing legal limits should be revisited to better protect consumers. In support, the rules on Good Manufacturing Practices needs to be further developed and rigorously enforced, in particular with respect to imports, to ensure that manufacturers only source materials where the presence of chemicals of concern is kept as low as technically achievable.
- **Use of PFAS in food packaging are banned** while support for the development of safer non-fluorinated alternatives is increased. The prevalence of fluorinated or 'forever' chemicals in many SUP alternatives illustrate a sad fact: namely that one ubiquitous, persistent, and bioaccumulative pollutant is being replaced with another. Given the mounting global concern for these harmful substances, their use in food packaging materials as well as all other consumer products must cease. In parallel, the EU must act swiftly to significantly reduce PFAS contamination in food, water, and soils.
- **Risk assessment and management methods are modernised** to tackle the cumulative impact of different chemicals. Consumers are simultaneously exposed to chemicals from multiple sources, a fact sadly ignored by most EU laws. The EU urgently needs to introduce provisions addressing this combined exposure in legislation on water, food, and consumer products, such as food contact materials. Testing requirements should further be updated to fully assess the impact of total chemicals exposures and of cumulative impacts, corresponding to the reality of our exposure.
- **Sustainable packaging alternatives are promoted**, including use of safe, toxic-free plant-based and recycled materials. Although disposable plastic products have played an important role in preventing the spread of COVID-19, the upsurge in demand for these items also challenges EU efforts in the shorter term to curb plastic pollution and move towards a more sustainable and circular plastics system.³⁴ Consequently, the EU needs to encourage use of sustainable packaging solutions based on

²⁹ European Commission. [A new Circular Economy Action Plan](#). March 2020.

³⁰ See BEUC. [How to Bring Down the Use of Single-Use Plastics? A consumer perspective](#). October 2018.

³¹ European Commission. [Farm to Fork Strategy](#). May 2020.

³² See further BEUC. [Time is ripe to Repackage Food Safely](#). December 2019.

³³ European Commission. Revision of EU rules on food contact materials (FCMs). Inception Impact Assessment. January 2021.

³⁴ European Environmental Agency. [Plastics, the circular economy and Europe's environment – A priority for action](#). January 2021.

environmentally friendly, re-usable and recyclable materials. This requires new, stringent controls on recycled and 'natural' materials to incentivise their use and promote consumer trust. A scandal, such as a toxic substance recycled into food packaging, could both create unacceptable health risks and do tremendous damage to consumer confidence in the safety of sustainable, recirculated materials, as well as endanger public support for the EU's fight to break free from plastics.

- **The EU cleans up the market from all misleading green claims and labels.**³⁵ Too many unsubstantiated and misleading claims are being used on the market; this creates confusion among consumers and makes it difficult for them to identify the products that are more environmentally friendly than others. Compostable claims should in particular not appear on products where fluorinated compounds have been used or are present in high levels. Furthermore, the criteria for and the control of third-party compost-certifications needs efficiently to prevent that chemicals which persist in nature are used or present in FCM products.

ENDS

³⁵ See further BEUC. [Getting rid of green washing](#). December 2020.

Annex I – Methods and reference values

All 57 samples were analysed in laboratories to verify the presence of the selected chemicals. The results were evaluated against the following reference values:

- **Per- and polyfluoroalkyl substances:** the Danish Veterinary and Food Administration recommends³⁶ an indicator value to assess whether fluorinated compounds have been added to paper and other fibrous materials. The indicator value is based on non-targeted Total Organic Fluorine (TOF) analysis and corresponds to 20 µg organic fluorine/g of paper. Content of organic fluorine above this limit indicates either intentional use of fluorinated compounds to make paper water and grease repellent – or alternatively indirect use e.g. from other sources such as printing inks, from the paper processing or from recycled materials. Content below the indicator value suggests unintentional background contamination.

The test investigated the presence of fluorinated compounds in paper straws and the moulded fibre products (41 total samples). The TOF analysis was performed through a modified version of European standard DIN EN ISO 10304-1 (D20). In the analysis the material is burned, and the organic fluorine converted to hydrogen fluoride which is then collected in a liquid that removes inorganic fluoride and thereafter analysed with ion chromatography.

- **Chloropropanols:** The German Federal Institute for Risk Assessment (BfR) recommends³⁷ that the transfer of 3-MCPD from paper into a water extract must be as low as technically achievable. A limit of 12 µg/l must in any case not be exceeded. Further, 1,3-DCP should not be detectable in the water extract from the finished product, given a detection limit of 2 µg/l.

The test investigated the presence of chloropropanols in the sampled paper straws and the moulded fibre products (41 total samples). Substances were extracted with cold water as recommended by BfR. Whilst this is not a full migration analysis, substances found in cold water extracts are nonetheless likely to also migrate into food. The subsequent analysis was performed through gas chromatography combined with electron capture detection with a detection level of 2 µg/L.

- **Pesticides:** Regulation EC 396/2005 sets maximum limits for residues in food of pesticides currently or formerly used in agriculture in or outside the EU (around 1100). A general default maximum residue limit (MRL) of 0.01 mg/kg applies to all pesticides not specifically addressed in the Regulation.

The test investigated the presence of pesticide residues in the palm leaf and moulded fibre products (39 total samples). Substances were extracted with an n-hexane/acetone mixture. The subsequent analysis was either performed by liquid chromatography with tandem mass spectrometry or by gas chromatography-mass spectrometry followed by flame ionization detection. For positive samples, worst-case migration was calculated assuming that all measured residues in a product migrate into a food content equal to 0,25 L. The worst-case migration was then compared with the relevant MRL for the specific pesticide.

³⁶ Danish Veterinary and Food Administration. [Ban on fluorinated substances in paper and board food contact materials \(FCM\). Fact sheet](#). June 2020

³⁷ Bundesinstitut für Risikobewertung. [Recommendation XXXVI. Paper and board for food contact](#). June 2019.

Annex II – Results per product category

Moulded fibres items (bagasse/wheat straw)

Country	Product	Fluorinated compounds	Chloropropanols	Pesticide residues
Denmark	Plate	+	-	-
Denmark	Plate	+	-	-
Denmark	Plate	+	-	-
Denmark	Plate	+	-	-
Denmark	Plate	+	+	(+)
France	Plate	+	(+)	-
France	Plate	+	-	-
France	Bowl	+	-	-
France	Plate	+	(+)	-
France	Bowl	+	+	-
France	Plate*	+	-	(+)
Italy	Plate	+	-	-
Italy	Plate	+	-	-
Italy	Plate	+	-	-
Italy	Plate	+	-	-
Italy	Plate	+	-	-
Spain	Plate	+	+	-
Spain	Plate	+	-	-
Spain	Plate	+	-	(+)
Spain	Plate*	+	+	(+)
Spain	Plate	+	+	(+)
Spain	Burger box	+	-	-
Spain	Bowl	+	+	-

* Wheat straw

Legend: - results negative or clearly below the recommended limits
 (+) results close to the recommended limits
 + results above the recommended limit

Paper straws

Country	Product	Fluorinated compounds	Chloropropanols	Pesticide residues
Denmark	Straw	-	-	n/a
Denmark	Straw	-	-	n/a
Denmark	Straw	-	+	n/a
Denmark	Straw	(+)	-	n/a
Denmark	Straw	-	+	n/a
France	Straw	+	+	n/a
France	Straw	-	-	n/a
France	Straw	+	-	n/a
France	Straw	(+)	-	n/a
France	Straw	(+)	+	n/a
Italy	Straw	(+)	-	n/a
Italy	Straw	+	-	n/a
Italy	Straw	-	-	n/a
Italy	Straw	-	-	n/a
Spain	Straw	(+)	-	n/a
Spain	Straw	(+)	-	n/a
Spain	Straw	(+)	(+)	n/a
Spain	Straw	+	+	n/a

Legend: - results negative or clearly below the recommended limits
 (+) results close to the recommended limits
 + results above the recommended limit

Palm leaf items

Country	Product	Fluorinated compounds	Chloropropanols	Pesticide residues
Denmark	Plate	n/a	n/a	(+)
Denmark	Plate	n/a	n/a	(+)
Denmark	Bowl	n/a	n/a	-
Denmark	Plate	n/a	n/a	-
Denmark	Plate	n/a	n/a	-
France	Plate	n/a	n/a	-
France	Plate	n/a	n/a	(+)
France	Plate	n/a	n/a	(+)
France	Plate	n/a	n/a	(+)
France	Plate	n/a	n/a	-
Italy	Plate	n/a	n/a	(+)
Italy	Plate	n/a	n/a	-
Italy	Plate	n/a	n/a	-
Spain	Plate	n/a	n/a	-
Spain	Bowl	n/a	n/a	-
Spain	Plate	n/a	n/a	-

Legend: - results negative or clearly below the recommended limits
 (+) results close to the recommended limits
 + results above the recommended limit



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