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Chlorpyrifos residues in fruits

The case for a Europe-wide ban to protect consumers

Chlorpyrifos is one of the most widely used pesticides in Europe. Exposure to this pesticide, even in small doses, can harm children's brain development and function of their hormonal system.

As European regulators are deciding whether or not to re-approve the use of this harmful pesticide, this briefing brings together the data available on the contamination of fruit with chlorpyrifos, highlighting the need to put the health of our children first and remove this toxic chemical from the market.

Based on official EU data from 2016, chlorpyrifos is one of the top 15 pesticides most frequently found as residues in food produced and consumed in Europe (out of 791 different pesticide residues analysed) [1]. Chlorpyrifos is also the most often found pesticide with endocrine disrupting properties in fruit and vegetables [2].

Residues are most prominently present in citrus fruit but also in bananas, apples, pears and peaches – all of which are popular among children of all ages. Southern European countries – with Spain in particular – are among the countries of origin with highest frequency of detection of chlorpyrifos residues.

Consumers across all of Europe are also at risk of being potentially exposed to chlorpyrifos residues by consuming contaminated fruit. These elements make the ban of chlorpyrifos a European-wide health issue.

0 1 What is chlorpyrifos & how does it impact our health?

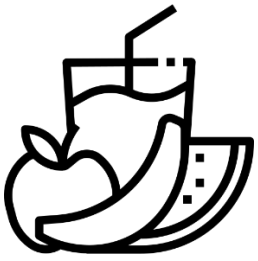
Chlorpyrifos is a developmental neurotoxic pesticide, which kills insects (insecticide) by blocking an enzyme in their nervous system that is also present in nerve cells of humans and other animals. This means the neurotoxicity of chlorpyrifos is not limited to insects [3, 4].

Farmers and their families are the first group experiencing the negative health impacts of the use of chlorpyrifos. The larger population is also indirectly exposed: people living near or in agricultural areas, and consumers eating products with chlorpyrifos residues.

Children are at greatest risk, because their brains are still under development and any neurological alteration may lead to serious adverse health effects.

Exposure to chlorpyrifos may lead to several neurodevelopmental disorders. It has been linked to a decrease in IQ, working memory loss, autism, and Parkinson's disease. Furthermore, there is a significant body of scientific evidence illustrating the ways in which chlorpyrifos disrupts the normal function of the hormonal system in our bodies [5].

Since its last approval in European Union in 2006, new scientific evidence has emerged on the brain toxicity of chlorpyrifos. In 2013, the European Commission requested the European Food Safety Authority (EFSA) to review the human toxicity of chlorpyrifos in light of new scientific evidence from US Environmental Protection Agency. As a result, due to evidence of brain toxicity at lower exposures, the amount considered acceptable for human daily intake was reduced ten times [6]. The use of chlorpyrifos was however not banned.

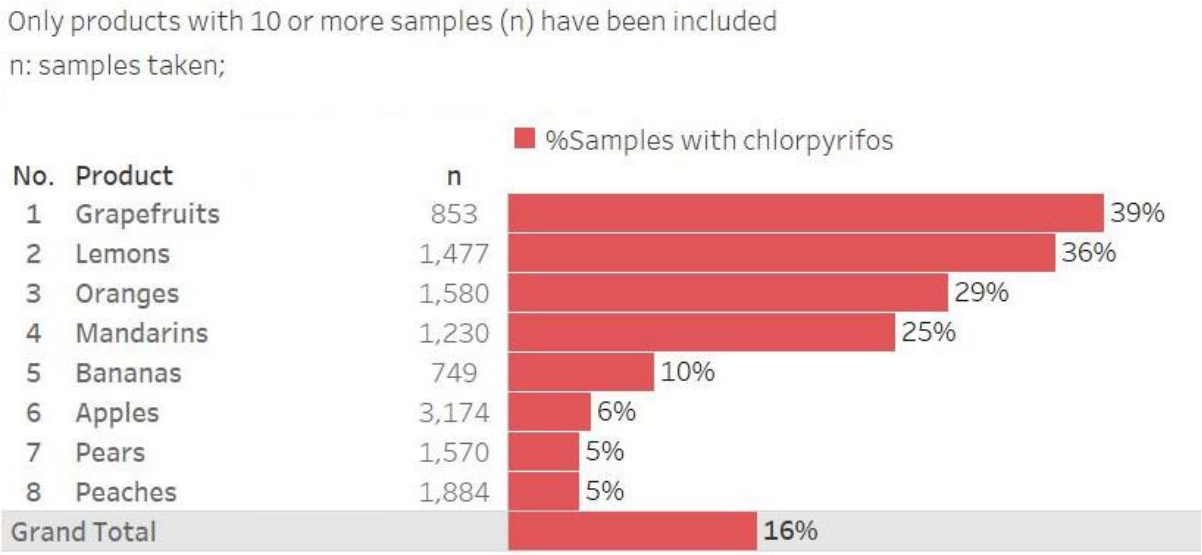


0 2 Contamination in citrus fruit, bananas, apples, peaches & pears

Chlorpyrifos can be most detected in citrus fruit (see figure 1): more than 1 out of 3 sampled grapefruits (39%) and lemons (36%), and 1 out of 4 sampled oranges (29%) and mandarins (25%) contained chlorpyrifos residues. Exposure occurs when holding or peeling the fruit, while contamination of the juice or the pulp cannot be excluded.

One out of 10 bananas is contaminated by chlorpyrifos residues. This is also the case for around 1 out of 20 apples, peaches and pears, which is of higher concern as these fruits are likely to be eaten without peeling.

Figure 1: Chlorpyrifos residues - Fruits sold in the EU market with the highest frequency of detection



0 3 A toxic dossier?

The current authorisation of chlorpyrifos in the European Union is set to expire on 31 January 2020. Countries in charge of the safety assessment of the pesticide are among the countries where it was most frequently detected, suggesting a significant use of chlorpyrifos. **Spain, where 1 in 5 sampled fruit is contaminated with chlorpyrifos, is the rapporteur Member State assigned to oversee the chlorpyrifos assessment and re-authorisation dossier (see figure 2)**. For some Spanish fruit contamination seems even higher, as 40% of oranges and 35% of mandarins contain chlorpyrifos residues (see figure 3).

Meanwhile, Poland, the co-rapporteur Member State, tops the charts as the country with the highest contamination in apples, with chlorpyrifos residues detected in 1 out of 10 apples (see figure 3).

Figure 2: Chlorpyrifos residues – Countries of origin with the highest frequency of detection

Only countries with 10 or more samples (n) have been included

No.	Country of orig..	n	
1	United States	53	60%
2	Malta	17	53%
3	China	268	51%
4	Cyprus	12	50%
5	Turkey	1,336	46%
6	Egypt	197	44%
7	Serbia	10	40%
8	Morocco	130	35%
9	Brazil	37	35%
10	Tunisia	13	31%
11	Ecuador	186	24%
12	Former Yugosl..	17	24%
13	Spain	2,064	21%
14	Israel	92	18%
15	Portugal	130	16%
Grand Total			16%

Figure 3: Chlorpyrifos residues - Highest frequency of detection with countries of origin for selected fruits (% of fruit samples)

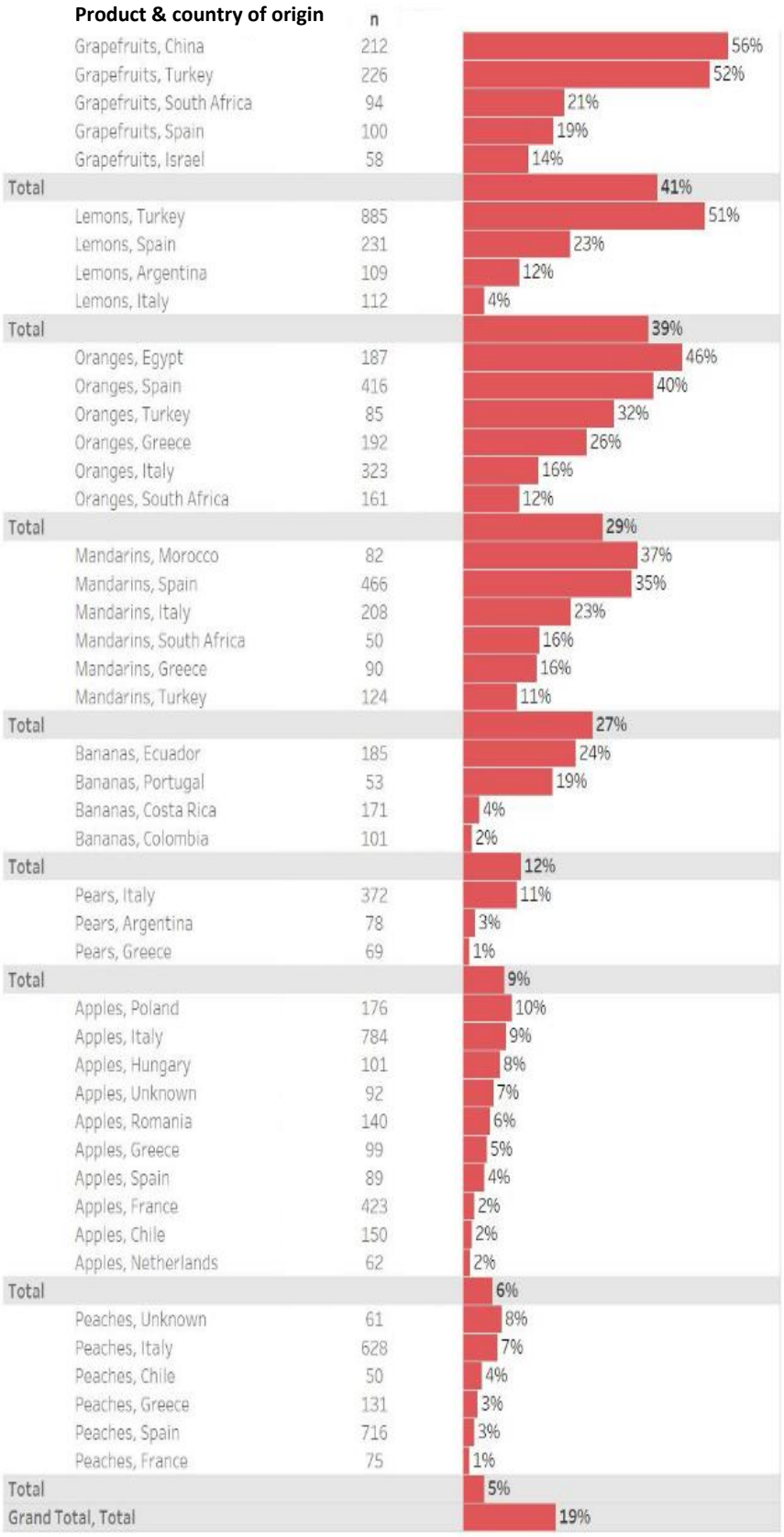
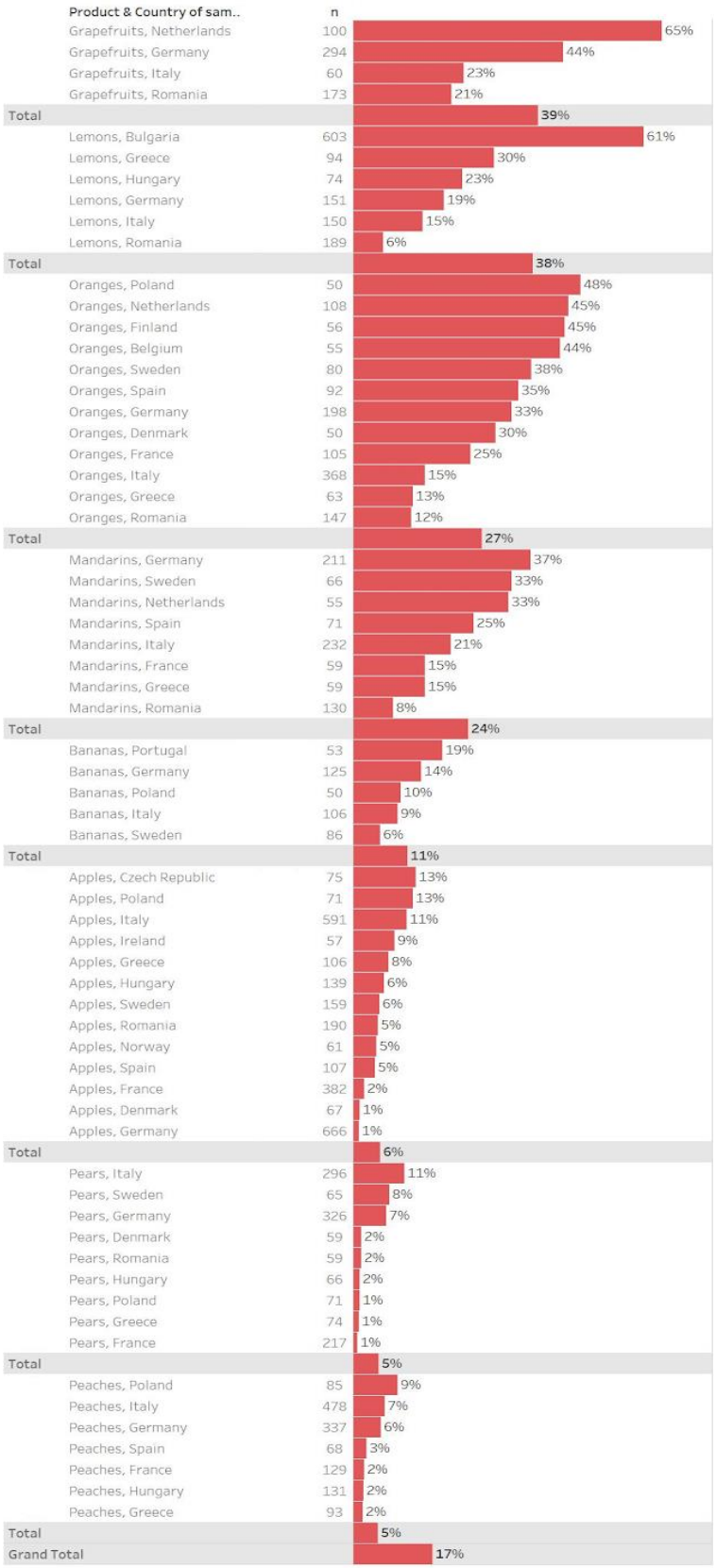


Figure 4: Chlorpyrifos residues - Highest frequency of detection with countries of consumption for selected fruits (% of fruit samples)



0 4 Consumer protection requires an EU-wide ban

At present, chlorpyrifos is authorised in 20 out of the 28 European Member States. In some cases, its use is limited. France, for example, only allows chlorpyrifos to be applied on spinach. Eight European Member States have not granted any authorisation to the substance for use in agriculture within their borders.

Contamination from chlorpyrifos can however still be detected in fruit sold all around Europe, including countries where it is not used in agriculture (Denmark, Finland, Germany, Sweden – see figure 4). How? Because the European Union is a single market, consumers living in a country where chlorpyrifos is not allowed can still buy fruits produced from countries where the use of the substance is authorised. **This means that while national measures are good to protect farmers and the local environment, only a European-wide ban will protect the health of all European consumers.**

0 5 No double standards for imported fruit

Fruit available on the European market is not entirely produced on the continent (fig 2). There is a high frequency of chlorpyrifos residues in fruit from countries of origin outside the EU, for example from the United States, China and Turkey. This means once a ban on the use of chlorpyrifos is in place in the EU, legislative steps will need to be taken to avoid double standards and prevent contaminated fruit from entering the EU market.

Conclusion: Ban chlorpyrifos from our plates

In line with scientific evidence and the precautionary principle, the European Commission and Member States must put an end to the exposure to chlorpyrifos and not propose any renewal or extension for use of this pesticide. Zero tolerance for toxic residues in our food is the only way to protect the health of citizens.

For further reading, please visit the factsheet ‘EU should ban brain-harming chlorpyrifos to protect health’ (published August 2018 by the Health and Environment Alliance - HEAL, Pesticide Action Network Europe, Générations Futures and Pesticide Action Network Germany)

Contact details:

Yannick Vicaire,
Chemicals and Health Policy Campaigner
Health and Environment Alliance (HEAL)
yannick@env-health.org
Tel.: +33 608 755 015

Angeliki Lyssimachou,
Science Policy Officer
Pesticide Action Network (PAN) Europe
angeliki@pan-europe.org
Tel.: +32 496 39 29 30

Methodology:

The data presented have been extracted from the latest update (2018) of the European Food Safety Authority (EFSA) database on pesticide residues in food collected from European Union Member States in the year 2016 according to EU coordinated and national control programmes. From this set of data, we have selected the most representative unprocessed fruit (50 samples minimum) for which chlorpyrifos residues were analysed. Because samples were obtained under different protocols (randomised or not) and were of uneven size, our analysis provides a qualitative "snapshot" of the status of chlorpyrifos contamination in fruit produced and/or sold on the European market, rather than a comprehensive scientific analysis.

The **Health and Environment Alliance (HEAL)** is the leading not-for-profit organisation addressing how the environment affects human health in the European Union (EU) and beyond. HEAL works to shape laws and policies that promote planetary and human health and protect those most affected by pollution, and raise awareness on the benefits of environmental action for health. EU transparency register number: 00723343929-96. www.env-health.org

Pesticide Action Network (PAN) Europe is the European regional office of an international network of NGOs working together to reduce the use of hazardous pesticides and have them replaced with ecologically sound alternatives. We work to eliminate dependency on synthetic pesticides and to support safe sustainable pest control methods. PAN Europe brings together 40 consumer, public health, and environmental organisations, and women's groups across Europe. EU transparency 15913213485-46. www.pan-europe.info

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Notes:

[1] The 2016 European Union report on pesticide residues in food. EFSA Journal 2018;16(7):5348, 139 pp. EFSA (European Food Safety Authority), 2018. https://efsa.onlinelibrary.wiley.com/doi/full/10.2903/j.efsa.2018.5348

[2] Endocrine disrupting pesticides in European food. Pesticide Action Network Europe, 2017. https://www.pan-europe.info/sites/pan-europe.info/files/public/resources/reports/Report_ED%20pesticides%20in%20EU%20food_PAN%20Europe.pdf

[3] California's leading independent scientific bodies unanimously declared that the insecticide chlorpyrifos a developmental toxicant in November 2017 after the Developmental and Reproductive Toxicant Identification Committee reviewed more than eighty-one new studies since 2008, and over 300 in total.

[4] OPs were first developed during World War II as nerve gas agents and later adapted to target pests as they were also effective in exterminating insects, only at a much lower exposure concentration. See Trasande, Leonardo. "When enough data are not enough to enact policy: the failure to ban chlorpyrifos". PLoS Biology, December 2017. Online available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5739382/

[5] Factsheet 'EU should ban brain-harming chlorpyrifos to protect health' (published August 2018 by the HEAL, PAN Europe, Générations Futures and PAN Germany).

Infographic 'Ban the toxic pesticide chlorpyrifos from our plates' (published June 2019 by HEAL) https://www.env-health.org/wp-content/uploads/2019/06/Ban-Chlorpyrifos-Infographic-v2.png

[6] Conclusion on the peer review of the pesticide human health risk assessment of the active substance chlorpyrifos. EFSA Journal 2014;12(4):3640, 34 pp. EFSA (European Food Safety Authority), 2014. https://doi.org/10.2903/j.efsa.2014.3640