ABOUT THE PRESENCE OF CHEMICALS IN OUR EVERYDAY FRUITS & VEGETABLES

December 2024

A NOTE

When you're aiming at improving your diet and health, comes a moment when you must become aware of the methods of production of the foods you're consuming. Every step from how modified the seed has been, the type of soil it grew in, to what it's been fed or sprayed with will influence the food's nutrient density, quality and levels of toxicity.

While the benefits of consuming fresh fruits and vegetables is seen as worth the risk of exposition, we should do our best to reduce our intakes of harmful substances and reduce the risks related to the cocktail effect. Let's not forget that pesticides *are poisons*, they may not kill us at the first bite but they, for example, directly impact our gut microbiota. Keeping in mind that "what the plant eats, our body will digest", pesticides and fungicides can harm the endocrine (hormone), nervous and digestive systems, increase the risks of cancers, auto-immune diseases and lead to growth and reproduction issues. And while we are all at risk, children, pregnant people and those with chronic conditions are the most vulnerable.

On the sunny side, laws are passed, highly toxic chemicals are being banned and controls are regularly done on products (often *after* they are put on the shelves) to ensure safety for the consumer, defining *safe ranges* on "how dangerous a single product could be if consumed during a lifetime". These steps forward are good but a lot of work and research still need to be done, especially as the discoveries are acknowledge very slowly by our gouvernements and the agrochemical industry.

Now let's be real: the access to quality food is a challenge on many levels. Buying only ecological produce can be expensive. Being part of a cooperative can be both expensive and time consuming. Growing your own fruits and vegetables can be expensive, time consuming and quickly limited by the space and resources available. *This document aims at helping you make educated choices, ideally allowing you to balance between what's best for your health and what you budget can allow.*

CONVENTIONAL & ORGANIC PRODUCTIONS

CONVENTIONAL / MODERN FARMING

- based on modern technologies and synthetic products, the production rate is quick and made efficient,
- grown mostly as monoculture and monocropping,
- use of chemicals, pesticides, fungicides, herbicides and fertilisers that aim at feeding the plant,
- reduce the nutrients in the soil, increasing its acidity and the risks of erosion,
- one of the main causes of ground water pollution,
- largely impacts all biodiversity in and around the fields,
- the seeds/plant can be modified to increase their yields (GMOs) and contaminated by chemicals,

ORGANIC / TRADITIONAL FARMING

- based on the use of traditional, natural and sustainable practices, the production rate is slower and lower,
- grown as integrated or monoculture,
- use of compost, manure, bone powders and other natural fertilisers that aim at feeding the soil,
- aims at preserving the soil fertility, reducing erosion and degradation,
- no or little risks of contaminating ground waters,
- promotes biodiversity (plants, insects and animals) in and around the fields,
- free from genetically modified organisms (GMOs), specifically labelled as organic,

NOTE: organic produce are not free from chemicals: according to the 2018 rapport of the EFSA 6,5% of organic samples analysed contained pesticides residues, 44,5% for conventionally grown produce. This can be due to the fact that some pesticides are allowed, from soil pollution and/or nearby conventional exploitations contamination.

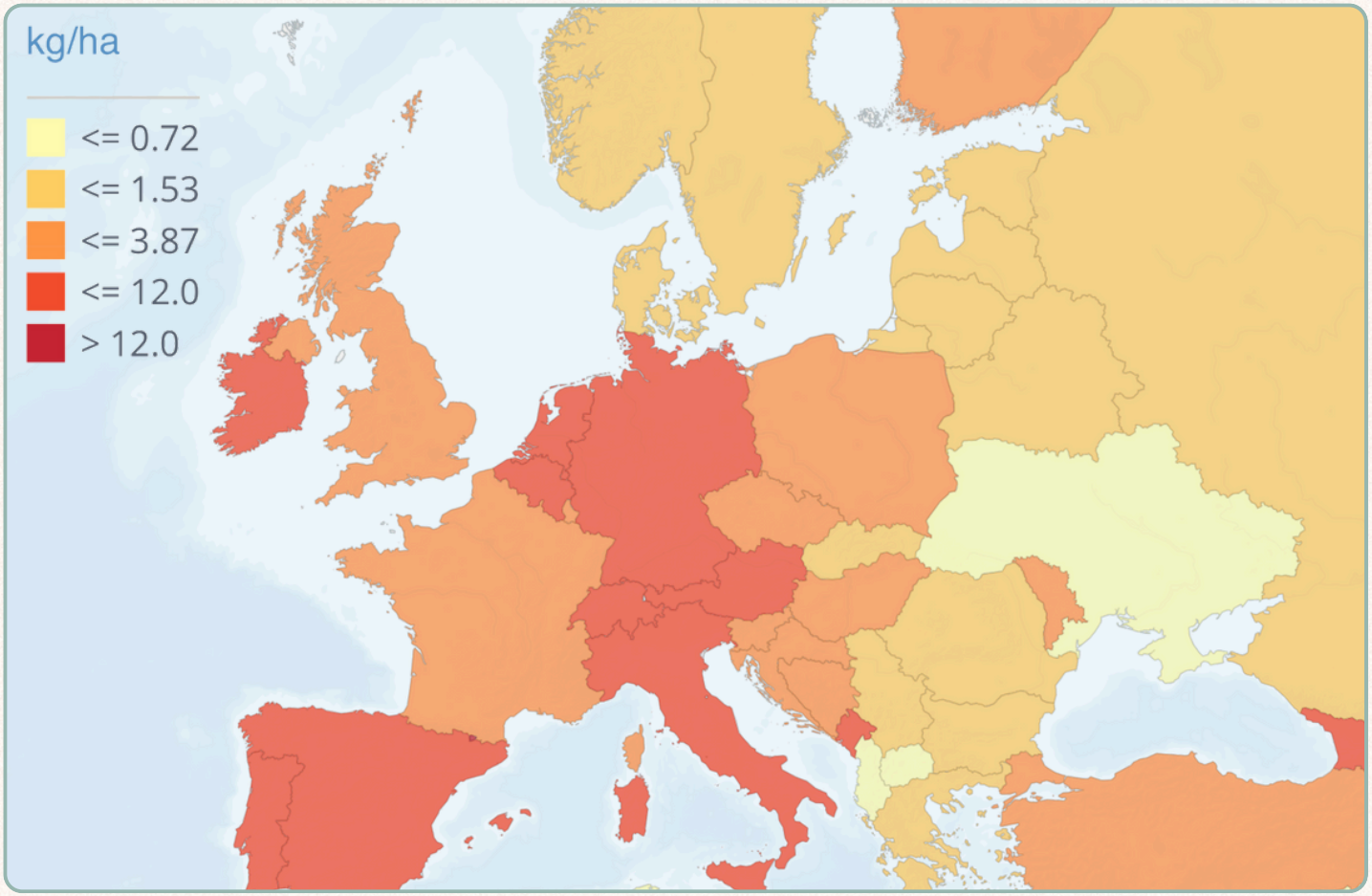
ON THE SPEAD OF PESTICIDES

Since 1990, the worldwide use of pesticides has dramatically increased

In 2021, the top 10 countries were Brazil, USA, Indonesia, Argentina, China, Viet Nam, Canada, Russia, France and Spain.

The 12 European countries with the highest consumption of pesticide relative to their crop area (2021-2022)

1. Malta, 11.59kg/ha
2. Netherlands, 8.38kg/ha
3. Cyprus, 8.36kg/ha
4. Ireland, 6.08kg/ha
5. Belgium, 5.71kg/ha
6. Portugal, 5.02kg/ha
7. Italy, 4.69kg/ha
8. Austria, 4.37kg/ha
9. Germany, 4.06kg/ha
10. Slovenia, 3.55kg/ha
11. France, 3.45kg/ha
12. Spain, 3.36kg/ha



- Europe has almost 500 active substances approved for use, the top pesticides found in soils are herbicides glyphosates and AMPA (Aminomethylphosphonic acid, the primary degradation product of glyphosate) which are highly toxic for our health.
- The type, amount, and shelf life of residues will vary depending on the substance and these don't simply dissolve and desappear, they decompose into smaller chemicals that can stay in the ground and interact with each other for decades.
- Because they take so long to completely dissolve, banned chemicals can still be found in the soils and products of many regions.

WHICH FOODS ARE THE MOST AT RISK?

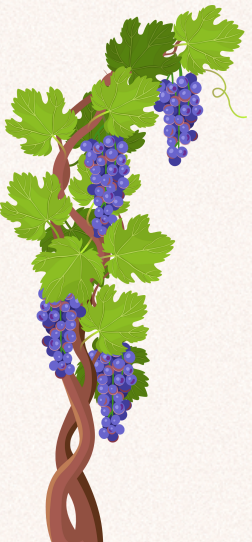
Answering this question is not easy, there isn't a simple answer on the internet. As we can see on the charts on the next pages, it's not because a fruit or veggie has a thick skin (like bananas) that it's safe from contamination. I assumed that growing underground would be salutary but with root vegetables being on the top 5 of produce with the most residues, I was definitely wrong. The difficulty lies in the fact that pesticides are systemic: they are absorbed into the plant. So there seems to be no easy answer, no simple rule, instead we'll have to look at the type of chemical used, the level of pollution of the soil and deduce for ourselves.

So, here's what I found on the chemicals:

- 23% of the total use of agrochemical substances is dedicated to arable crops (grains, pulses, oil seeds, forage crops, fibre crops and root crops)
- Fungicides are mostly used in viticulture (wine) and in root crops,
- Herbicides are mostly used in arable crops,
- Insecticides are mostly used in horticulture (fruits, vegetables and flowers) and arboriculture (woody plants),
- Plant growth regulators are mostly used in arable crops.

And here's what the soil composition has to say:

- Soils from permanent crops (like fruit trees) have the highest frequency of contaminated soils and highest pesticide content.
- Soils from root crops (carrots, potatoes, etc) have the highest average of pesticide content.
- Soils from dry pulses, flowers and fodder crops (plants grown to feed animals) have the lowest average pesticide content and lowest maximum content.



What we could conclude:

- Permanent crops/arable crops might be treated in higher quantities and diversity, in higher frequency and the cocktail of chemicals used sticks longer into the soil.
- Root crops might be, on average, treated with the highest volume of chemicals and/or the products used sticks in higher quantities and for longer in the soil (which would be logical due to the nature of the crops).

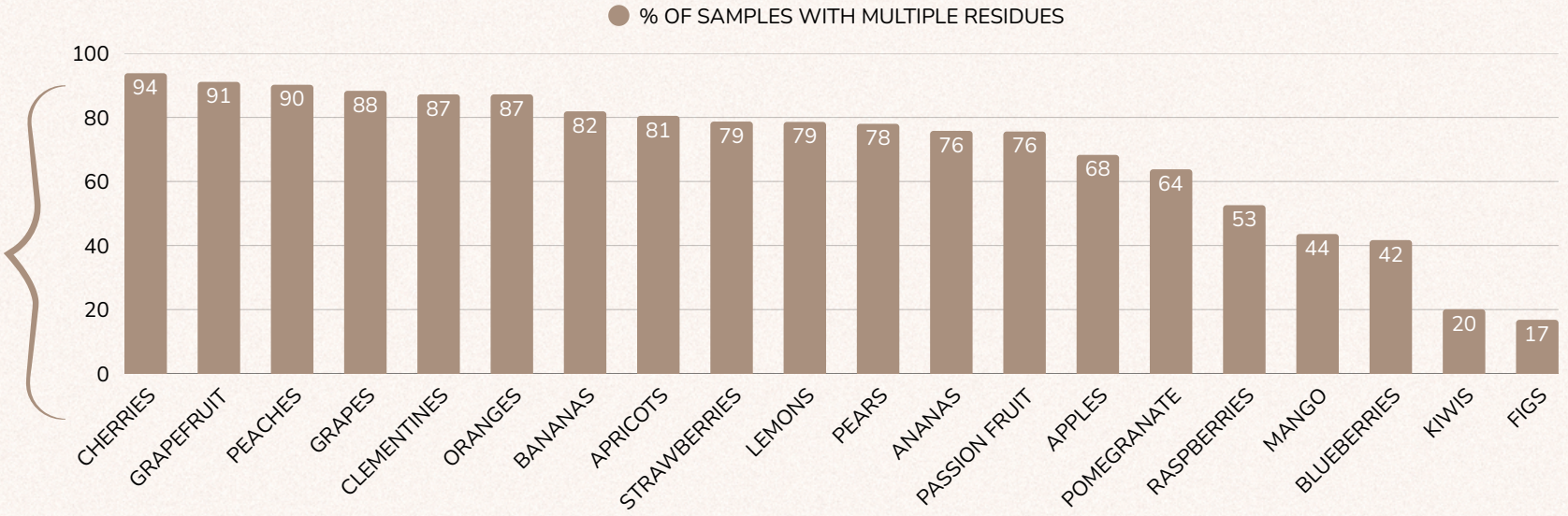
DIRTY TWENTY - FRANCE

FRUITS

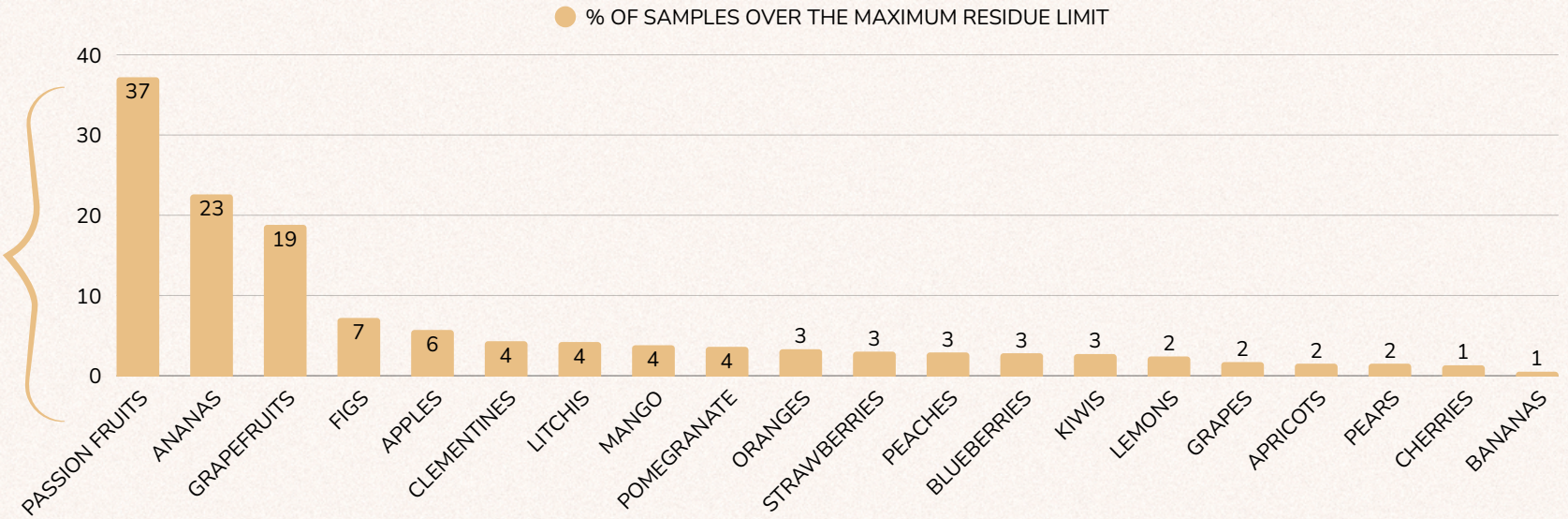
BASED ON *GENERATION FUTURES'S ETAT DES LIEUX*

Are listed only the first 20 fruits and vegetables that have been tested over a minimum of 4 years (2017-2021) on at least 30 samples. In 2021 3,9% of fruits and 3,7% of vegetables tested were over the maximum residue limit.

how many samples were polluted by more than one chemical residue

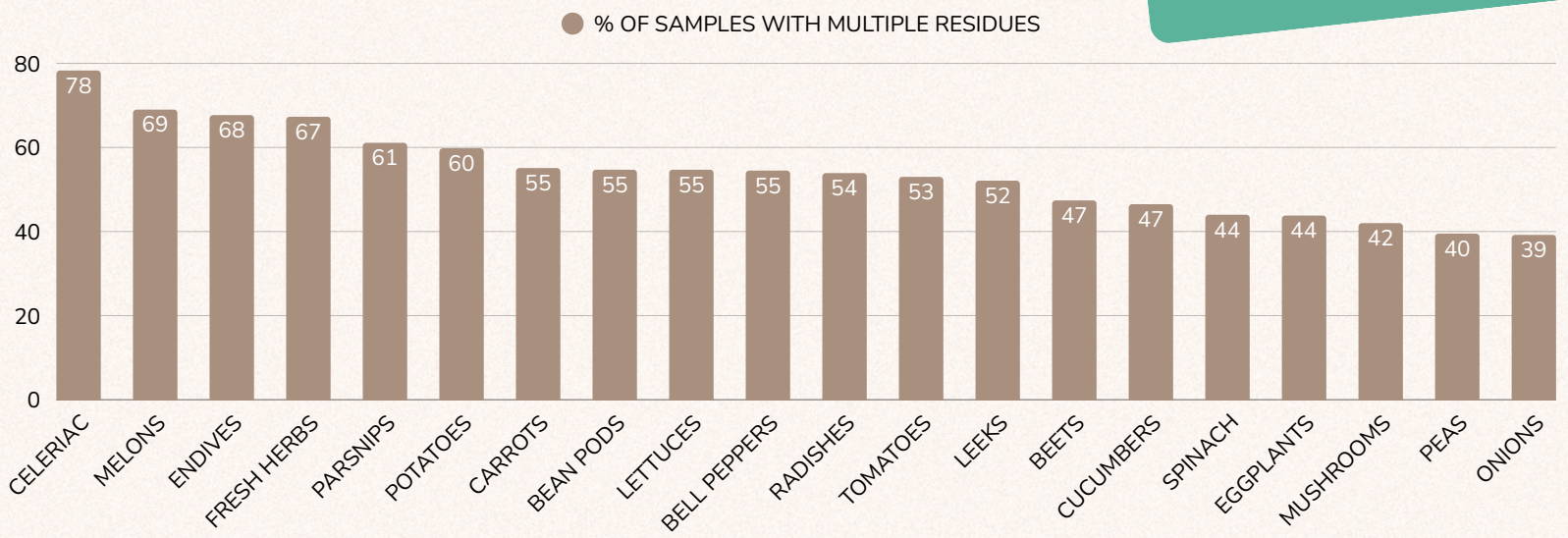


how many samples were beyond the maximum limit for residual chemicals



VEGGIES

how many samples were polluted by more than one chemical residue



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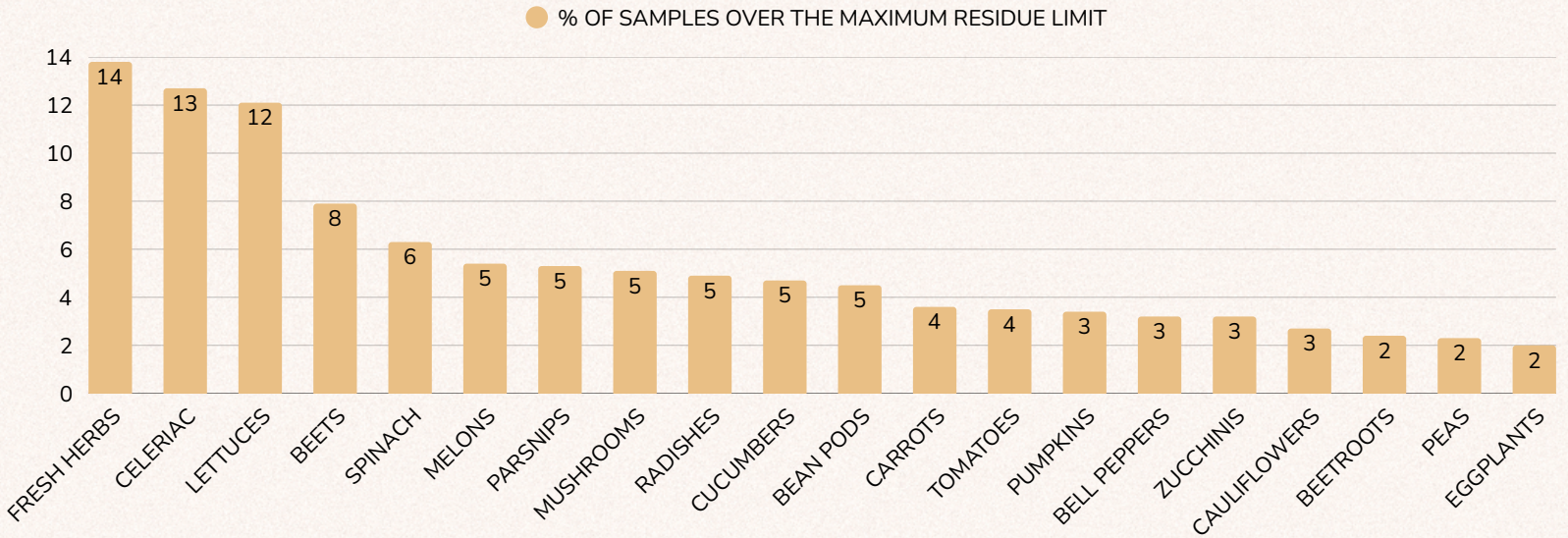
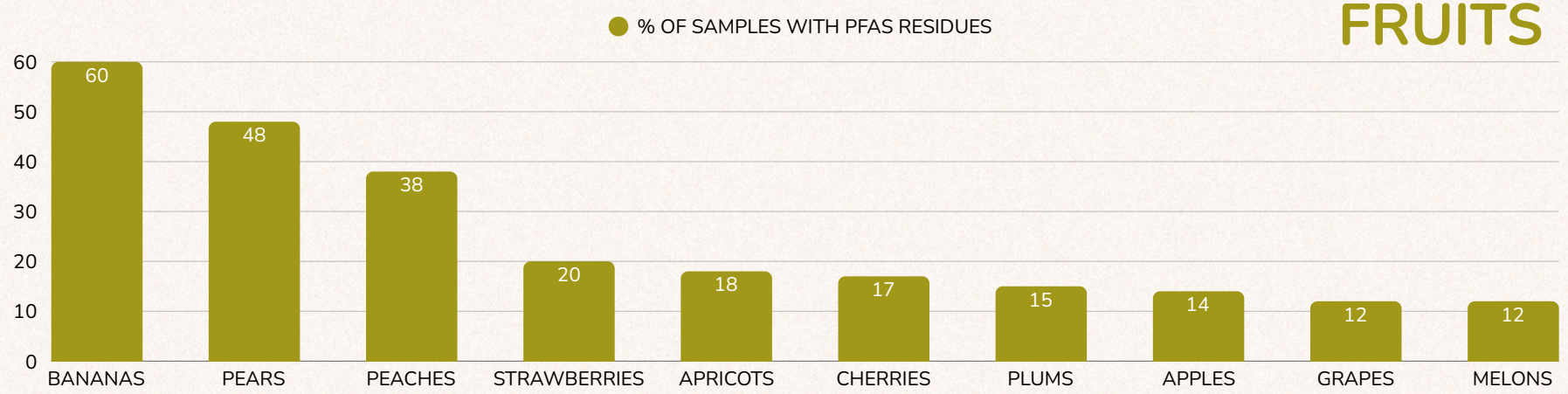


PFA PESTICIDES CONTAMINATION - ITALY

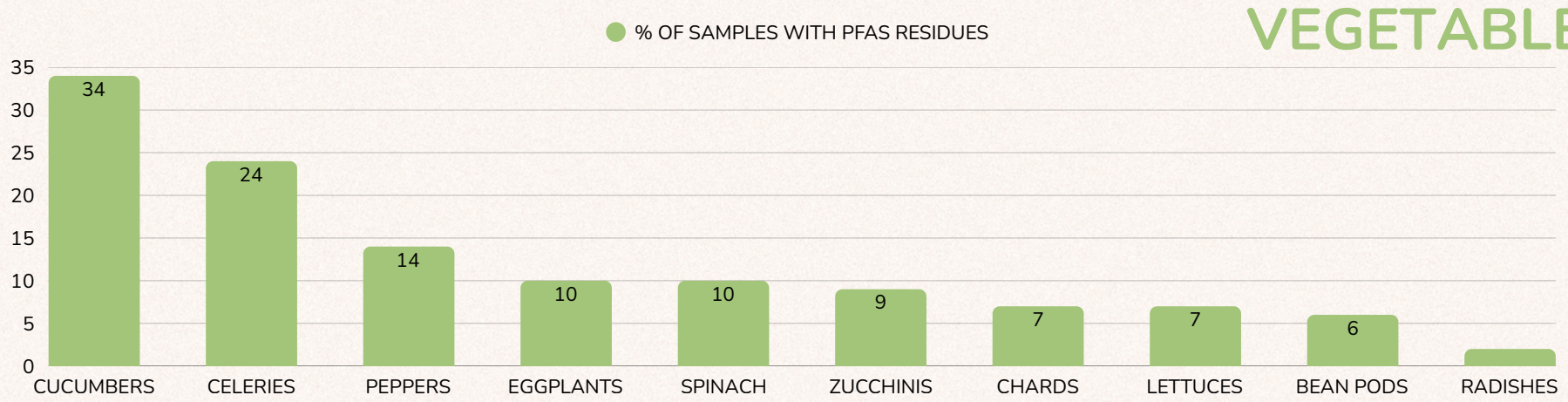
BASED ON *THE PESTICIDE ACTION NETWORK (PAN) RAPPORT (2021)*

These charts are based on a total of 46,455 fruits and vegetables samples testes between 2011 and 2021. An average of 8,2% of the 28,138 fruits was contaminated with at least one PFAS pesticide, 3,2% for the 18,317 vegetables. In total, 23 different types of PFAS have been detected and the use of pesticide increased x10 in 10 years.

FRUITS



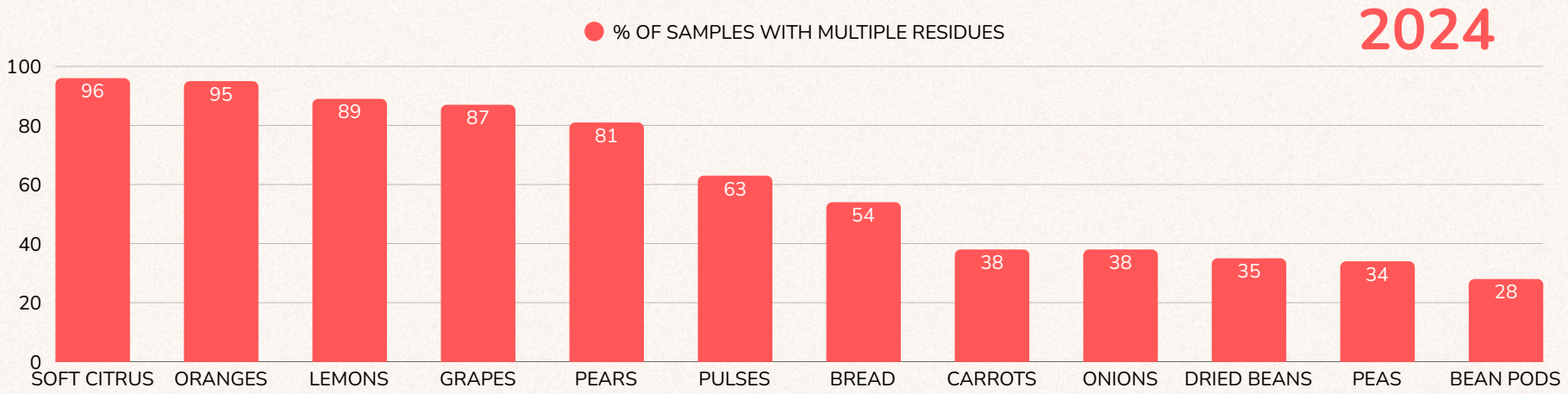
VEGETABLES

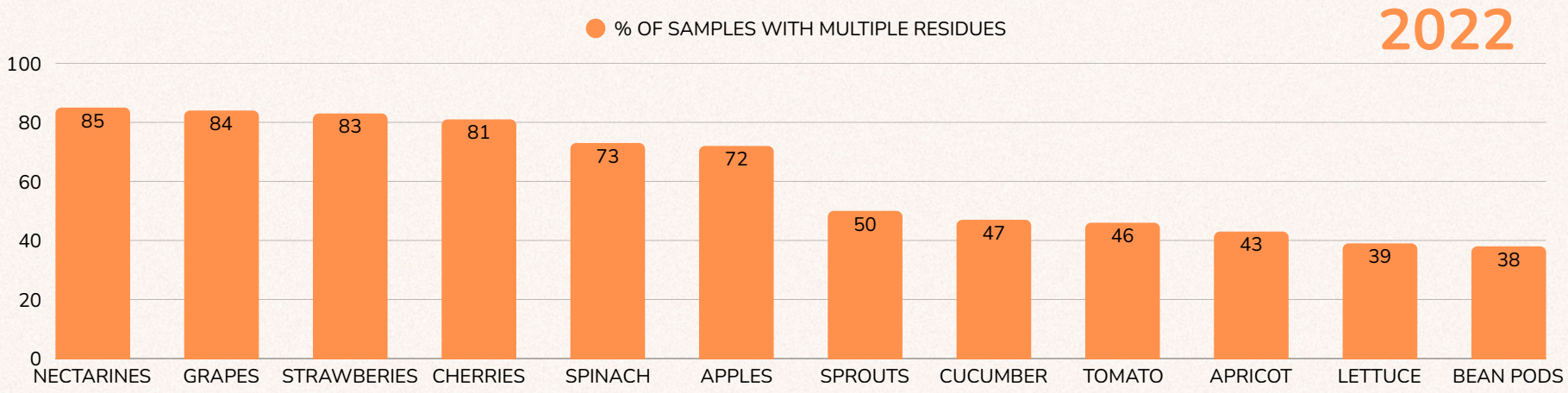


DIRTY DOZEN - UK

BASED ON *PAN'S PFAS PESTICIDE RAPPORT*

The UK's gouvernement tests around 3000kg of food each year but lacks consistency in the fact that it doesn't necessarily test the same products every year. This means that there is no follow-up or possibility to establish long-term trends.





DIRTY DOZEN & CLEAN FIFTEEN - USA

BASED ON *THE EWG DIRTY DOZEN LIST*

EWG's analyse is based on the yearly publication of the Department of Agriculture and Food and Drug Administration, these analyses include data from 47,510 samples of 46 fruits and vegetables. Here are listed the produce with the most ("dirty") and the least ("clean") amount of chemicals residues.

I have included this list because it's seen pretty much everywhere on the internet but remember that European laws are very different from American ones so this list doesn't really apply on the Old Continent. Note also that while the amount of samples is high, the amount of single foods is pretty low. Also, EWG lacks transparency by not giving away their numbers and data.

DIRTY DOZEN

1. Strawberries,
2. Spinach,
3. Kale, collard and mustard greens,
4. Grapes,
5. Peaches,
6. Pears,
7. Nectarines,
8. Apples,
9. Bell and hot peppers,
10. Cherries,
11. Blueberries,
12. Green beans.

CLEAN FIFTEEN

1. Avocados,
2. Sweet corn,
3. Pineappel,
4. Onions,
5. Papaya,
6. Sweet peas (frozen),
7. Aspargus,
8. Honeydew Melon,
9. Kiwi,
10. Cabbage,
11. Mushrooms,
12. Mangoes,
13. Sweet potatoes,
14. Watermelon,
15. Carrots.

BEING PRACTICAL

Pesticides in food are currently unavoidable: the smart move is to be pragmatic and flexible.

To make better choices in the stores/markets:

- You don't have to buy only organic produce, instead prioritise low risk produce grown conventionally and buy riskier foods organic (look at the different charts for details).
- Ask the seller/farmer what type of farming they do, "short chain" doesn't necessarily mean "cleaner", your local farmer might be using harmful products too.
- Look for regulations and official labels, like the EU eco-label. Beware of unregulated ones (for example: "pesticide free" might look good on the package but it isn't set on any real rules and tests).
- Compare the country of origin of the products to this documents charts and map:

1. countries with the highest use of pesticides tend to have the highest levels of ground pollution too: their organic products might be corrupted,
2. if you're looking for a widely grown produce (like tomatoes), you can look for alternative/"cleaner" countries,
3. producers from outside the EU don't have to follow the same rules, the biggest exporters (like Brazil or the USA) might not have the same regulations as we do, produce that are banned here might still be used there.

To protect yourself in the kitchen:

- Wash your produce for 15-20 seconds under cold water, use a brush to clean the skin when possible (like for apples, carrots and potatoes). Doing that won't remove every pesticides but that's a good start.
- Peeling will remove some residues but not all and it can have the big downside of removing the part of the fruit that contains most of the fibres, vitamins and minerals.
- Cooked produce have lower amount of residues than their fresh counterpart. Heating reduces the presence of chemicals but heat-sensitive micronutrients will get lost in the process. The difference isn't that big so you don't have to worry about it as long as you consume fresh fruits and vegetables regularly.

SOURCES & EXTRA INFORMATION

Studies & articles:

- Pesticides impacts on human health and the environment with their mechanisms of action and possible countermeasures (2024)
- Des pesticides dans l'assiette ? (Belgium - 2023)
- Quels pays utilisent le plus de pesticides en Europe ? (Europe - 2024)
- Banned pesticides still widely used: How EU Member states abuse emergency authorisations (Europe - 2023)
- Soils: impact on the invisible ecosystem (Europe - 2022)
- Pesticide residues in European agricultural soils – A hidden reality unfolded (Europe - 2019)
- Toxicological Comparison of Pesticide Active Substances Approved for Conventional vs. Organic Agriculture in Europe (2022)
- Monitoring data on pesticide residues in food: results on organic versus conventionally produced food (Europe - 2018)
- The PFAS 'Dirty Dozen' Exposed (2023)
- Europe's toxic harvest (2023)
- Résidus de pesticides : état des lieux 2024 (France - 2024)
- Dirty dozen PAN-UK (UK- 2024)
- EWG's 2024 Shopper's Guide to Pesticides in Produce (USA - 2024)
- Pesticides : par quoi peut-on les remplacer ? (France - 2024)
- Sempre più PFAS anche nell'ortofrutta italiana (Italy - 2024)
- More and more PFAS pesticides also in Italian fruits and vegetables (Italy - 2024)
- EU Chemical Plant Protection Products in 2023: Current State and Perspectives (Europe - 2023)

Official websites:

- Pesticide Action Network (Europe)
- Generations Futures (France)
- UFC que choisir : Observatoire des pesticides (France)
- European Food Safety Authority (Europe)

Got a question?
Want to know more?
Let me know!

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