



MICROPLASTICS: AN INVISIBLE THREAT GROWING EVERY SECOND

ESTIMATED PLASTIC INGESTION COUNTER*

A visual tool that brings an
unseen problem into view.

THE PROBLEM

Microplastic pollution does not remain where plastic waste is discarded. These particles can persist in the environment, making their way into the air we breathe, the water we drink and the food we eat. This is an issue that crosses borders and industries. As these particles become increasingly present in the environment, they raise broader questions about the materials we produce, consume and discard - and about the policies needed to reduce this form of pollution.

WHAT EXACTLY IS A MICROPLASTIC?

Microplastics are tiny plastic particles measuring less than 5 millimetres. They may be released at this size or result from the breakdown and wear of larger plastic products.

One source is synthetic textiles made from fossil-based materials such as polyester, nylon and acrylic. Throughout their life cycle - during use, through wear and, especially, during washing - these products shed plastic microfibrils. The fibres can enter household dust, air and water, eventually reaching rivers and oceans. According to data compiled for this campaign, synthetic textiles account for approximately 35% of the microplastic pollution entering the oceans.

FROM THE ENVIRONMENT TO PEOPLE

The 2019 WWF report "No Plastic in Nature: Assessing Plastic Ingestion From Nature to People" presents an analysis based on research by the University of Newcastle, Australia, examining the different ways plastic particles can reach the human body.

Microplastics have already been detected in the air we breathe, the water we drink and the food we eat. The analysis considered exposure through food and beverages, as well as inhalation.

The sources assessed include drinking water, seafood and salt. In WWF's analysis, water emerges as an important route of exposure.



HOW MUCH PLASTIC COULD WE BE INGESTING?

One of the findings from WWF's analysis that received the most attention was the estimate that a person could ingest, on average, 5 GRAMS OF PLASTIC PER WEEK - roughly the weight of a credit card.

This estimate was based on an analysis and synthesis of the scientific literature available at the time on plastic ingestion by humans. When the weekly estimate of 5 grams is mathematically distributed over time, it produces the following projection:

Period	Calculation	Estimated mass*
1 second	$5 \div 604.800$	0,0000082672 g
1 minute	$5 \times 60 \div 604.800$	0,00049603 g
1 hour	$5 \times 3.600 \div 604.800$	0,0297619 g
1 day	$5 \times 86.400 \div 604.800$	0,7142857 g
1 week	$5 \times 604.800 \div 604.800$	5 g

*These figures are mathematical conversions of the weekly estimate, not new independent scientific measurements

WHY TURN THIS DATA INTO A COUNTER?

Five grams per week may seem like just another number. And 0.0000082672 grams per second is almost impossible to picture.

But seeing these figures accumulate makes an invisible issue easier to grasp. The counter was created to turn scientific data into a visual tool for awareness. It is not intended to show exactly how much plastic is present in a person's body.

Its aim is to make a broader issue tangible: if plastic particles are already present in the environment, water and food — and have been detected in the human body — how can we reduce their circulation?

The counter gives visible scale to something we would not normally perceive.

METHODOLOGY AT A GLANCE

Parameter	Basis used
Main indicator	Estimated plastic mass
Reference assumption	Approximately 5 g per week
Base period	7 days
Seconds in the base period	604.800
Estimated average rate	0,0000082672 g/s
Calculation	Average rate x elapsed time
Type of indicator	Mathematical projection
Individual measurement?	No
Health diagnosis?	No
Direct conversion into number of particles?	No



ABOUT THE ESTIMATED PLASTIC INGESTION COUNTER

The Estimated Plastic Ingestion Counter was developed to make this otherwise imperceptible exposure easier to understand. It converts the reference value of 5 grams per week into a continuous rate and displays its progression over time. Its purpose is educational: to turn an abstract figure into a visual experience that helps convey the scale of the issue.

TIME UNITS USED IN THE CALCULATION

Unit	Equivalent
1 minute	60 seconds
1 hour	3.600 seconds
1 day	86.400 seconds
1 week	604.800 seconds
1 reference year	31.536.000 seconds

HOW DOES THE COUNTER WORK?

The calculation starts with an estimated total amount over a longer period and converts it into an average rate for shorter intervals.

1. Average rate

Average rate = total amount over the base period ÷ duration of the base period

For the counter: 5 g ÷ 604,800 seconds = 0.0000082672 g per second

2. Accumulated value

Once the average rate per second has been established, the value displayed by the counter can be continuously updated:

Estimated accumulated mass = average rate × elapsed time

$C_{mass}(t) = (5 \div 604,800) \times t$

where t represents the number of seconds elapsed since the counter started.

THE SAME CALCULATION, IN MILLIGRAMS

To make the smaller values easier to understand, the estimate can also be expressed in milligrams:

Period	Estimated mass
1 second	0,008267 mg
1 minute	0,496032 mg
1 hour	29,7619 mg
1 day	714,286 mg
1 week	5.000 mg

These equivalents allow the counter to display a continuous progression without suggesting that actual ingestion occurs at a uniform rate.



WHAT THE COUNTER SHOWS – AND WHAT IT DOES NOT MEASURE

The counter does not measure the actual amount of plastic or microplastics present in a person's body. Nor does it determine when a particle was ingested, where it came from or an individual's level of exposure.

It is a mathematical projection for awareness purposes, based on an average estimate presented in the WWF report. Actual exposure is neither constant nor linear and may vary with diet, water consumption, environment, location, habits and other factors.

For this reason, the figure displayed should be understood as an illustrative reference estimate - not a personal measurement, diagnosis or individual risk assessment.

PLASTIC MASS ≠ NUMBER OF MICROPARTICLES

This distinction is essential to understanding the counter correctly.

The reference used for the counter provides an estimate of the mass of plastic ingested. It does not, however, allow that mass to be directly converted into a specific number of microparticles.

Particles vary in size, shape, density and composition. The assumptions used in this document do not include a validated average mass per particle that would allow the 5-gram estimate to be converted directly into a number of microparticles.

The main counter therefore uses mass rather than an artificial particle count. This avoids creating a false sense of precision and keeps the experience consistent with the limitations of the scientific evidence on which it is based.

THE TEXTILE SECTOR IS PART OF THE DISCUSSION

Changes in Brazil's textile market help illustrate the relevance of this issue. According to data compiled for the campaign, 95% of textile imports - approximately 2 million tonnes - consist of synthetic fibres, along with a small share of artificial fibres.

At the same time, cotton represents only 26% of textile fibres consumed in Brazil, based on final consumption. According to the sources cited in the document - ICAC, Abrapa, ABIT and MDIC, using 2025 data - this share has fallen by 16 percentage points over the past ten years. These figures place textile composition at the centre of a broader discussion about materials, waste, circularity and microplastic pollution.

WHAT ABOUT BRAZIL?

According to the reference adopted for this campaign, Brazil currently ranks as the world's eighth-largest plastic polluter and the largest in Latin America. The figure points to the need for public policies and initiatives to reduce plastic waste generation and improper disposal.

As one of the world's leading cotton producers, Brazil has an additional reason to examine the composition of textile products, the characteristics of different fibres and their environmental impacts.



MICROPLASTICS HAVE ALREADY BEEN FOUND IN THE HUMAN BODY

Research has identified plastic particles in different parts of the human body. The references compiled for this campaign include studies that detected microplastics in placentas and umbilical cords, as well as research that found particles in the human brain and in atherosclerotic plaques removed from carotid arteries. In the studies cited, their presence was associated with a higher risk of heart attack, stroke or death during the follow-up period.

The word “associated” is important here: these findings should not, on their own, be interpreted as evidence that microplastics caused these events.

WHAT DO WE KNOW ABOUT THE HEALTH EFFECTS?

Detecting microplastics in the human body does not mean that all their health effects are already understood.

The WWF report notes that the specific effects of microplastic ingestion on human health are not yet fully understood and that their long-term effects require further research.

Important questions remain about exposure levels and pathways, particle size, chemical composition and potential biological effects.

Emerging evidence points to the need for further scientific research and for measures to reduce the release of plastic into the environment.



WHY TALK ABOUT FIBRES?

Not all fibres have the same origin or characteristics.

Fossil-based synthetic fibres such as polyester, nylon and acrylic can release plastic microfibres throughout their life cycle. Cotton, by contrast, is a natural, plant-based and biodegradable fibre that breaks down without leaving plastic behind in the environment.

Understanding these differences can inform discussions about materials, innovation, responsible production, consumption, circularity and public policy.

Environmental comparisons between fibres, however, should consider their respective life cycles and different impact categories. The counter presented in this campaign specifically addresses the issue of plastic and microplastic pollution.

KEY REFERENCES

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HANGING BY
A THREAD

