



AVICENN



SEARCHING FOR [NANOS]

in everyday products

December 2022

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Author: Mathilde Detcheverry and Sarah Nouvellon, AVICENN



AVICENN

*Association de veille et d'information civique
sur les enjeux des nanosciences
et des nanotechnologies*

Founded in 2010, AVICENN monitors and provides information on nanos and the associated risks, available at veillenanos.fr. AVICENN also carries out advocacy work for greater transparency and vigilance on nanos.

➤ **more information:** <https://veillenanos.fr>

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BACKGROUND

• Nanos, “the law of silence”¹ • But what are nanos?

Getting an answer from brands to the question “do your products contain nanoparticles?” is an almost impossible task. For years, **the subject of nanos has been taboo within companies.**


Health agencies, both in France and in Europe, highlight the **lack of information and data provided by manufacturers** on manufactured nanos.² In France, an r-nano register³ was set up in 2013, but it does not allow to identify the products containing the nanoparticles declared in it. There is no European nano registration scheme and nanos are notoriously under-reported as part of the REACH regulation⁴. As for the European “nano” labelling requirement, not only is it limited to three product categories (cosmetics, food and biocidal products⁵), but brands very rarely comply with it. Publicly and freely accessible data are therefore very limited.

It is always **extremely difficult** - not only for the consumer, but also for the public authorities - **to identify products that contain nanos** and obtain a precise idea of the extent of their presence in everyday items.

Nanos are **very small** particles, around a billionth of a metre⁶, highly prized by manufacturers: their **very high reactivity** gives them special properties⁷ that have resulted in a plethora of variously realistic “promises”⁸. But these nanos are also more likely to spread further into the body than larger “conventional” particles, with potentially harmful effects on health.

► “nanos” ?



For the sake of clarity, the term “**nanos**” is used in this report to mean “**nanomaterial**” as **defined by the International Organization for Standardization** :

“material with any external dimension in the nanoscale or having an internal structure or surface in the nanoscale”

where the nanometric scale is *“approximately between 1 and 100 nm*⁹.

This definition is **scientific** and not regulatory. For questions relating to legal requirements for labelling or authorisation of certain nanomaterials, the definitions of ad hoc regulations (food, cosmetics, biocides, etc.) will be considered.¹⁰

PURPOSE OF OUR INVESTIGATION

- **Verify the presence of nanos in everyday consumer products**

"More than four years after the *60 Millions de Consommateurs*¹ survey on 18 food products in 2017, followed closely in 2018 by Que Choisir's study² on 20 products, we wanted to obtain **an overview of "nano impregnation" in everyday consumer products in 2021-2022.**

Laboratory tests are the only reliable method for **determining the presence (or not) of nanos in finished products, yet they are very expensive.** Due to the high cost of tests, we had to limit ourselves to **around 20 products.** Our "investigation" is therefore by nature **qualitative** and does not claim to be **exhaustive or representative.**

We expanded the scope of our investigation by testing:

➤ Products from categories already tested to determine if any change was found: food products, cosmetics, medicines;

➤ Products where the **presence of nanos was suspected, but never publicly tested until now:** hygiene products, toys, clothing, packaging.

Since 2015, AVICENN has advised and supported several of its members in testing their products: Agir pour l'Environnement, UFC Que Choisir, *60 millions de consommateurs*.

In 2020 and 2021, and for the first time, AVICENN had a product tested for its own account: IKEA's GUNRID curtains, presented as "air purifiers", but which turned out to be covered with nanoparticles of titanium dioxide,³ a suspected carcinogen for humans by inhalation... and moreover, ineffective in terms of depollution. Faced with these contradictions, the Swedish retailer, which had put the curtains on the "front page" of its 2020-2021 catalogue, eventually pulled them off the market.

With this initial experience and having benefited from an increase in its grants, the AVICENN association was able to launch a larger-scale testing programme at the end of 2021.

• Better understand consumer exposure

Our approach is intended to **inform decision-makers and consumers about the extent of the presence of nanos in manufactured items.**

It provides a concrete contribution to the objective of ***“improving knowledge on the use of nanomaterials”*** promoted by the French 4th National Environmental Health Plan (PNSE 4)¹ published in 2021. In this respect, it may contribute to the work of the French Economic, Social and Environmental Council (CESE), as part of the referral provided for by PNSE 4 on the **distinction between “uses of nanomaterials with collective utility” and “those where the utility is less obvious”.**

Our approach has not sought to respond - for the time being - to another objective of the PNSE 4 that aimed at ***“improving knowledge about the health and environmental risks associated with nanomaterials”***... even if it is indeed because of the existence of these risks that AVICENN was created and that we launched this testing programme.



Our investigation was limited to searching for nanos in products with the most documented hazards.

At this stage, it is still **too early to assess the health and environmental risks associated with the nanos identified.**

Assessing these potential risks requires studies that mobilise human means and resources **over the long term** which go far beyond what an association like ours can consider. AVICENN is, however, interested in any contribution from academic or institutional organisations that would like to examine such an approach, its feasibility, its methods and/or the data that may be obtained.

Risks associated with nanomaterials



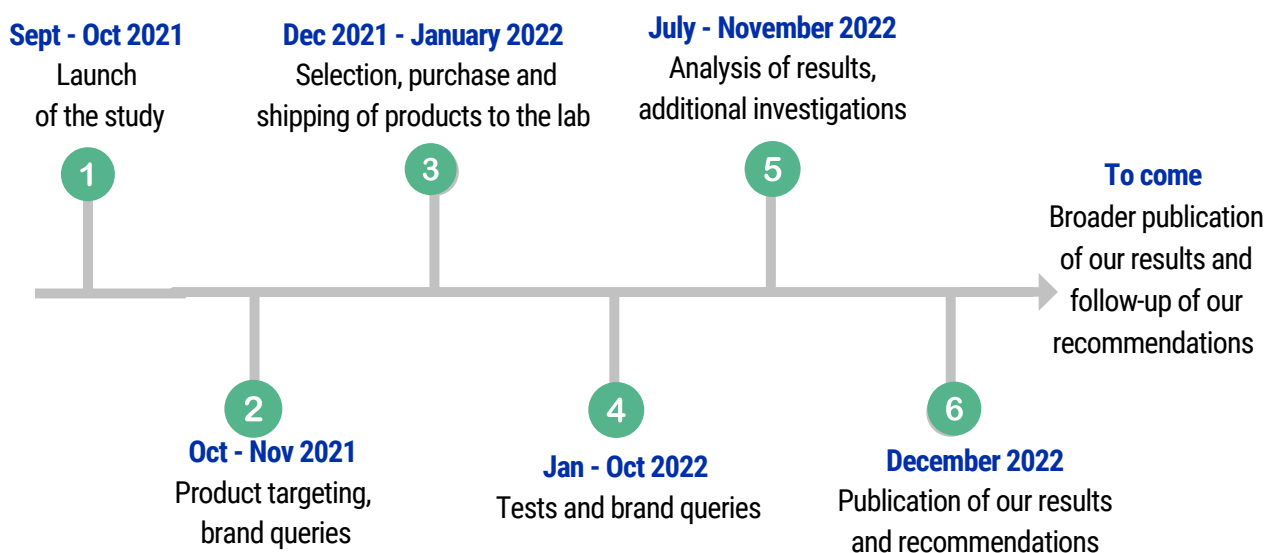
Because of their very small size, nanos are likely to spread into the body and cross physiological barriers² that conventional larger particles do not cross. However, due to a lack of data from manufacturers and to insufficient resources allocated to toxicology research, it is difficult to know precisely what risks our daily and repeated exposure to these added nanos generates. Many adverse effects³ associated with nanos have been highlighted by the scientific community, however mainly demonstrated *in vitro* or on animals. These effects are particularly worrying in cases of chronic exposure particularly for silver, titanium dioxide and silica nanoparticles.

→ See more details on page 22.

METHODOLOGY

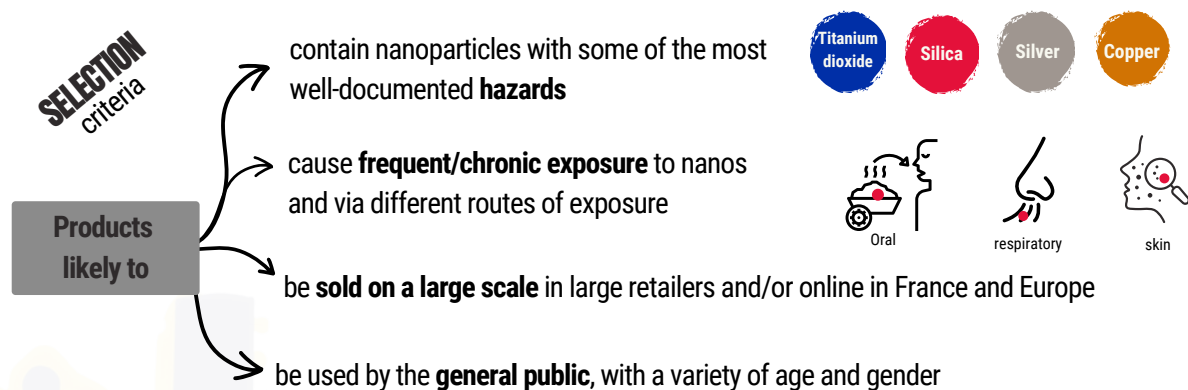
AND CONDUCT OF OUR STUDY

Launched in September 2021, our investigation was conducted **over 15 months**:



► How did we select the products?

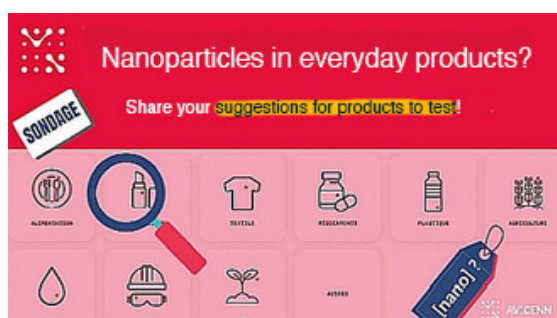
In order to obtain the broadest possible picture despite the small number of testable products, we used the following criteria:



Unlike the tests carried out in 2021 by the French fraud authority (DGCCRF), which focused mainly on products labelled [nano], we chose to select **only products that were not labelled "nano"**, because we wanted to **measure the extent of the use of "off-the-radar" nanos, in other words, nanos that are not visible to consumers.**

To refine our product selection, we then relied on:

- **Document and literature reviews:** the numerous documents referenced on our website veillennanos.fr, the Danish Nano Database, etc.
- **Scouting** in supermarkets and online on sales websites (technical data sheets, safety data sheets, etc.)



We also asked:

- our **members** and **subscribers** to share the questions or doubts they might have about specific products.
- **public authorities, research laboratories and brands**

Unsurprisingly, these organisations provided us almost no usable information due to their "duty of discretion", "impartiality" for the former, or due to a lack of knowledge or transparency for the latter.



You've asked for transparency on nanos? Please hold the line...

- **ANSES** could only *"direct us towards work already published by ANSES that could be useful to you"*.
- **The Ministry of Ecological Transition** could not disclose the names of companies that declare nanos in the r-nano register due to *"industrial and commercial confidentiality"*.
- **The DGCCRF**, *"given (its) duty of impartiality in monitoring the market"*, refused to provide us with the list of products tested during its inspections (even those that were tested and declared nano-free, which would have spared us from re-testing products without nanos).
- **The CEA (PNS)** replied that it worked *"solely under R&D contracts with industrial companies or academic partners"* and *"not on consumer products"*.
- Very few **brands** approached prior to our tests answered our questions. The few who did so usually responded that they do not use nanoparticles and/or that their products complied with regulations.

➤ Which laboratory did we use to test products?

All the products were tested by the French **National Metrology and Testing Laboratory (LNE)**, a leading organisation in measuring expertise, and particularly in the field of **nano-metrology** in which it has been involved for over 15 years.

The LNE produces research in the field of **nano-characterisation** with scientific articles published in peer-reviewed journals.

The LNE participates or has participated in national projects ("NANOMET", a cross-comparison exercise within the framework of the NanoMetrology Club), European ("nPSize" project) or international projects ("OECD cross-comparison exercise"), the aim of which is to harmonise measurement methods and develop reference protocols.

It also carries out tests for manufacturers, associations and public authorities (notably fraud prevention).



➤ How did it proceed?

LNE experts searched for nanos in the 23 products using a **scanning electron microscope (SEM)**¹ equipped with two secondary electron detectors, through which they were able to obtain images to identify the shape and size of the nanos. SEM is the reference method recommended at the European level to measure the size of nanos.

In order to identify the nature of the nano substance detected (silver, titanium, silica, etc.), an elementary analysis was carried out using **the EDX technique**, which analyses X photons emitted from the particles.

➤ And legally?

Our legal questions to the LNE, ministries and health agencies (including the ANSES Biocides HelpDesk) remained unanswered when they concerned the regulatory compliance of the specific products in which we found nanos. We only obtained very general reminders of existing regulations.

We therefore asked the **TTLA law firm** to provide us with legal advice on product compliance in light of the regulatory obligations relating to the identified nanos (authorisations, labelling, etc.).

The regulatory arsenal is so complex and abstract that it does not always allow for a clear statement on such compliance. This is particularly the case when only qualitative analyses are available. However, the financial and technical resources available to us were too limited to conduct quantitative studies for all products.



For more details, the full LNE test report is available on request by contacting contact@veillenanos.fr

THE 23 PRODUCTS TESTED



**Light from
Paradise, L'OREAL**
Face powder



**Vegan Naturally,
LABELLO**
Lip balm



**Party face paint,
SNAZAROO**
Children's make-up



**5-in-1 BB Cream,
NIVEA**
Face cream



**Magic Retouch
Blond L'OREAL**
Colouring spray
for hair



**Scalp-Care-Relaxer
DARK AND LOVELY**
Children's hair-relaxer
cream



**9-vegetables soup
KNORR**
Dehydrated soup



**Tarte en Or -30%
HERTA**
Puff pastry



**Les fines et fondantes
AOSTE**
Ham



**Optipro 0-6 months
formula GUIGOZ**
Infant formula



**SOLGAR
Vitamin C**
Dietary supplement



**MINI kibble Royal
Canin**
Animal food



**Absorbent pad
LE GAULOIS**
Food packaging



**SIGNAL
Toothbrush**
Children's toothbrush



**Xarelto 20 mg
BAYER**
Anticoagulant drug



**Intimewear
NANA panties**
Menstrual panties



**Boxer shorts
SUPIMA UNIQLO**
Underwear



Next BW FFP2 mask
Face mask



**Anti-viral mask
BACCIDE**
Face mask



**Claricup
CLARIPHARM**
Antibacterial
menstrual cup



**Slime Powder,
Canal Toys**
Children's toy



**Sprays Glitzzy
GP Toys**
Children's creative set



**Ondi Pure Velvet
ZOPLAN**
Depolluting paint

* Company document

TEST RESULTS

• Nanos were detected in 20 products:

➤ Results by product category

→ COSMETICS

- The 6 cosmetic products contained **titanium dioxide (TiO₂)** nanoparticles.
- Three also contained **iron oxide** nanoparticles.

→ HYGIENE & HEALTH*

- The toothbrush, menstrual panties, boxer shorts and antiviral mask contained **nanosilver**.
- The tablets and the boxer shorts contained **TiO₂ nanoparticles**.
- The medicines also contained **iron oxide** nanoparticles.
- The FFP2 mask contained **silica nanoparticles**.

→ FOOD

All 6 food products contained **silica nanoparticles**.

→ TOYS

Only* the children's make-up contained **TiO₂ nanoparticles**.

→ PAINT

The paint contained **TiO₂ nanoparticles**.

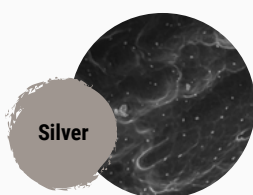
* The analyses did not show nanos in the menstrual cup, slime powder or creative colouring sprays.

➤ Results by nanoparticle type



→ 10 products:

- L'OREAL Face powder
- L'OREAL Colouring spray
- LABELLO Lip balm
- NIVEA Face cream
- SNAZAROO Children's make-up
- DARK AND LOVELY Children's hair relaxer
- XARELTO Drug
- UNIQLO Boxer shorts
- LE GAULOIS Absorbent pad
- ZOPLAN Paint



→ 4 products:

- SIGNAL Toothbrush
- NANA Menstrual panties
- BACCIDE Face mask
- UNIQLO Boxer shorts



→ 7 products:

- HERTA Puff pastry
- KNORR Dehydrated soup
- AOSTA Ham
- GUIGOZ Infant formula
- ROYAL CANIN Dog food
- SOLGAR Vitamin C
- NEXT BW, Facial mask



→ 5 products:

- L'OREAL Face powder
- L'OREAL Colouring spray
- LABELLO Lip balm
- NIVEA Face cream
- XARELTO Drug

KEY FINDINGS

1

• More nanos than expected and some new questions...

➤ Nanos identified in 20 out of 23 products tested

AVICENN set itself a real challenge by selecting products that are not labelled “nano”. “You might as well look for a needle in a haystack”, we were told. It is true that the gamble was ambitious - and particularly expensive for a small association like ours.

And yet, nanos were identified in **20 of the 23 products tested**. We wouldn't have bet on such a high proportion!

➤ Nanos where they were not expected

We selected products that, although not labelled “nano”, were more likely than others to contain nanos. And yet we were surprised to discover nanosilica in food products with no mention of silica or E551 in the list of ingredients, and titanium dioxide (TiO₂) nanoparticles in the boxer shorts, for example. For what properties has it been integrated into these last two products? The brands surveyed did not answer our questions.



COSMOS-certified Labello balm... but with nanos



Surprise. The analysis results of the Labello balm revealed the **presence of titanium dioxide and iron oxide nanos**, probably coming from the colouring agents indicated on the product packaging (CI77891 and CI77492). The presence of these nanos is particularly problematic: not only are they not authorised by the European Cosmetics Regulation, but the **COSMOS Natural reference framework that certifies the balm is supposed to guarantee the absence of these nanos**. This raises the question of the level of requirement of the certification criteria.

Titanium dioxide

Iron oxides

A single **bowl of Knorr soup** contains nearly **40 mg of silica**.

This represents **billions of nanoparticles!**

Silica



If **smallness** of nanos goes hand in hand with **reduced weight**, don't be mistaken: for a given mass and substance, the number of nanos is greater than for **larger particles**.

And nanos are **more reactive than larger particles**. This is one of the features of nanos. Why? Because the proportion of atoms on the surface is higher (relative to volume) than for larger materials. This “specific surface area” allows for larger, **potentially undesirable interactions with the environment**.

It is for this reason that the European recommendation on the definition of the term “nanomaterial” **introduced a concept of size distribution by number of particles and not by weight** (contrary to what the industry would have liked).

➤ Are nanos present in practically all everyday objects?



To what extent is this high proportion of products containing nanos representative of the extent to which everyday consumer products are permeated by nanos? Was it only down to luck or advances in detection, or can we conclude that nanos are present in virtually all everyday items?

Some products contain a considerable number of nanos. At the top of the list: L'Oréal's highlighting powder. Titanium dioxide is ranked 3rd on the list of ingredients and our tests revealed nanoparticles that were very homogeneous in size and shape with 100% being less than 100 nm.

Nevertheless, **in some products, nanos were detected in a much lower proportion.** This is the case for the depolluting paint or the absorbent pads under the chicken cutlets, for example, for which some of the titanium particles identified were "around 100 nm", falling within the "nanomaterials" category as defined by ISO (see page 3, the concept of approximation).

Our **questions about the extent to which nanos are present in our daily lives** persist. Tests on two products in the "toys" category (excluding cosmetics: a powder for slime and a colouring spray) did not reveal nanos. Good news! **However, it is impossible to draw any conclusion about the presence - or absence - of nanos in toys more generally.**

A few nanos were detected in the two face masks we selected, which is enlightening: **it should not be deduced that there are few nanos in masks.** For example, tests carried out in 2021/2022 by the Sciensano Institute revealed large quantities¹ of silver nanoparticles and titanium dioxide on a large number of masks sold in Belgium.

In any case, our tests confirm the relevance, as well as the necessity - of using existing new tools and going off-the-beaten track by looking for nanos in everyday items.



In any case, advances in measuring instruments has helped us a lot. Three years ago, some analyses would not have been possible with such a degree of precision, especially those on insulating products: products containing textile fibres, or plastic or polymer matrices can now be analysed using "new generation" equipment.

KEY FINDINGS

2 • [Nano] labelling assessment: a real fiasco!



➤ No [nano] labelled product

The results show the failure of **[nano] labelling**.

The majority of the products in which we detected nanos is covered by the **European "nano" labelling requirement**, which has been in force for nearly 10 years¹ for cosmetics, food products and biocidal products. Insiders know that compliance with this requirement has always been very poor. Our results confirm this state of affairs and above all, reveal the scale of the phenomenon. It shows that there is an **urgent need to reinforce reminders of the law, controls and sanctions by the authorities**.

The presence of nanos in other products, in addition to cosmetics, biocides and food, also highlights the **need to extend the [nano] labelling requirement to the product categories unfortunately still not covered**².

The arguments invoked by certain brands to justify this lack of labelling are known to specialists (see pages 19-21). Although French fraud authorities have made it clear that they are not legally admissible in most cases, a certain number of suppliers and brands continue to play the game of "out of sight, out of mind", hoping not to be inspected...

➤ Has silica disappeared from food products... or just from labels?



Our study also allowed us to discover with astonishment that the **mention E551**, which previously commonly reported the presence of this anti-caking agent, **has disappeared from the lists of ingredients in food products!** Yet, it was very common until a few years ago, especially in powdered foods (dehydrated soups, salts, cocoa, spices, etc.).



FOCUS - The end of E551... really?

Attention has recently been focused on the additive E171: a white pigment made of titanium dioxide, partly nano, which was eventually banned in France in 2020 and then in Europe in 2022³.

But it is not the only additive in nanoparticle form: very common just a few years ago, **E551** is an **anti-caking agent** composed of **silica nanoparticles** that are all smaller.

And yet, when we scouted supermarkets for products to be tested, we discovered that **E551 is now almost impossible to find on the labels** of food products sold in supermarkets!

To find out for sure, we decided to test **5 products that did not mention silica in their composition:**



➤ The results showed that **all contained silica nanoparticles**.

Note: Only Solgar vitamins C mention "silicon dioxide" in the product composition.



→ How do we explain finding silica nanoparticles in these 5 food items, while none mentioned "silica" or its additive code name "E551" in the product composition?

The legislation provides for labelling exemptions for some food additives.

This is the case for **silica**, in particular, which can be present as...



➤ A **"carry-over" additive**¹: its presence in foodstuffs is explained by its use in one or more ingredients or additives used to manufacture this foodstuff.

According to Aoste, silica nanoparticles in their ham are due to their initial and authorised presence in potassium nitrate (E252) added to the ham.³

➤ A **"processing aid"**²: when used to promote the flow of powders during packaging, for example, provided that it represents less than 1% of the product weight.

No brand referred to this, but our tests show that silica constitutes less than 1% of the product weight for the 5 products with no mention of silica on the packaging.

... without any obligation to inform consumers.



With no mention of silica in the list of ingredients, the [nano] mention⁴ also goes down the drain...



The European legislator had thought it was a good idea to create legal **nanolabelling requirements**, allowing citizens to make an informed choice when purchasing their products - at the very least for **food, cosmetics and biocides**.

But the combination of the bad faith of some suppliers, the poor will of some brands and the intricacy of different legal provisions short-circuiting each other, has led to this very unfortunate situation.

➤ Except in the sun creams category and a few rare cosmetics, **[nano] labelling is almost non-existent in supermarkets...** while our tests show that nanos are, if not omnipresent, at least much more widespread than we thought.



KEY FINDINGS

3 • Many unauthorised nanos

Our tests unexpectedly revealed that many **nanos are commonly used even when they are unauthorised**. This applies particularly to cosmetics and hygiene and health products.

➤ All cosmetics tested contain unauthorised nanos.



The six cosmetic products contain **titanium dioxide nanoparticles...**
and **four*** contain **iron oxide nanorods...**

... **unauthorised in nano form as a colouring agent**.¹



*



*



*



*



- **Iron oxide nanorods** were identified in four cosmetics* as colouring agents², in high nano proportions for the following three:
 - L'Oréal colouring hair spray (**75%**),
 - Nivea face cream (**85%**).



- The **TiO₂ particles** found in the 6 cosmetics tested for use as a colouring agent³ are present in **nano form in significant proportions**. The level of TiO₂ particles smaller than 100 nm:
 - is around **25%** for 3 products: Nivea cream, Labello lip balm and Dark and lovely children's hair-relaxer cream
 - is around **40%** in L'Oréal's colouring spray and Snazaroo children's make-up
 - and reaches **100%** in L'Oréal's face powder.



These levels are much higher than the **10% level allowed by the French consumer protection authorities** in order to "cover measurement uncertainties and rule out the hypothesis of nanoparticles resulting from environmental contamination"⁴.



WHAT DOES THE REGULATION SAY?

In cosmetics:

- Only **carbon black** is currently **authorised as a [nano] colouring agent** (our products did not contain any; it is mainly found in mascaras, eye pencils, eye liners, eye shadows, etc.).
- **Titanium dioxide** (CI 77891) or **iron oxides** (CI 77491, CI 77492, CI 77499) are **authorised as colouring agents, but not in nano form**.
- **Titanium dioxide** is only authorised in nano form as a **UV filter** under certain conditions.




As the French authorities have repeatedly pointed out⁵, the **50% threshold** invoked by certain brands is not relevant to the regulations in force for cosmetic products (see page 15).

However, it is relevant for biocidal products.

➤ Nanosilver in hygiene and health products


Silver

- Nana menstrual panties, the Baccide face mask and the Signal toothbrush contain silver nanoparticles.
- The ongoing commercialisation of the Signal toothbrush does not seem to comply with the European regulation. 

In the three products where silver nanoparticles were identified, only a qualitative analysis was carried out, making it impossible to obtain a particle size distribution.

However, regarding the **Signal children's toothbrush**, the LNE was able to establish that a **majority - if not 100% - of the silver particles detected were below 100 nm**. Subject to quantitative verification on a larger number of particles, the product does not appear to comply with the biocidal products regulation.

Following our warning, the Unilever group, which owns the Signal brand, asked another laboratory to analyse the ingredient (silver phosphate). They concluded that it was not a nanomaterial according to their results. Yet, in the finished product, silver nanoparticles were nevertheless clearly identified...

➤ How can we account for the difference between these results? Is this because the analysis was carried out on the **"raw" ingredient** and not on the **finished product**? It is difficult to know, especially since our questions to Unilever (about the method and instruments used for their analysis as well as the particle size distribution) remain unanswered. 



WHAT DOES THE REGULATION SAY?

At the time of purchasing the items, in late 2021, the marketing of this type of product containing nanosilver was still authorised - provided that the mention "(nano)" appeared after the term "silver" on the packaging (which was not true for any of the three products) .

Since January 2022¹ however, items treated with silver "as nanomaterial" for these product types can no longer be put on the market following a non-approval decision for various substances in biocidal products in August 2021².

REMINDER: Contrary to the definition of nanomaterials in force in European regulations governing cosmetics and food, **the definition of nanomaterials used in the REACH Regulation and the Biocidal Regulation does contain a threshold of more than 50% of particles with sizes inferior to 100 nm.**





FOCUS - Panties, boxer shorts, face masks, toothbrushes, socks: silver nanoparticles from head to toe...

The presence of nanosilver in many products has been the subject of multiple research studies and publications. The Danish Nano Database currently lists over 500 products that may contain nanosilver¹, but without having been able to verify by tests the allegations or suspicions that led to them being listed in the database. Only tests on the products (and the raw materials used in their composition) can make it possible to confirm or refute the presence of nano-silver:



In **socks**, the use of silver nanoparticles for anti-odour properties has been known for a long time. In 2010, the French health agency (ANSES) pointed out the absurdity and risks associated with the presence of nanosilver in socks, with significant release of nanoparticles during washing².

→ In 2020/2021, the French fraud authorities (DGCCRF) carried out checks and detected silver nanoparticles in two packs of socks not labelled [nano] (nanosilver was still authorised at the time), yet the brands withdrew their products from the market³. We have not tested any of them, in order to favor products belonging to the other categories listed on this page.



The presence of nanosilver in **menstrual panties** was suspected for several years. In 2019, the American NGO Women's Voices for the Earth (WVE) raised concerns about the use of nanosilver in period pads and underwear⁴ due to health AND environmental risks. Various brands promote panties supposedly "without silver nanoparticles". How reliable is this?



To our knowledge, **no test had been conducted so far on toothbrushes** to verify the presence of nanosilver.

In addition to the Signal children's toothbrush, the version of the same brand, but for adults, is also potentially affected - it bears the same statement "infused with silver ions"⁶.

Other brands also offer toothbrushes with silver in "pure", ionic and/or nanoparticle form⁷.

Yet researchers recently warned that silver nanoparticles could pass through the oral mucosa, even at low doses.



Tests carried out in 2022 by the Sciensano Institute clearly established the presence of silver nanoparticles on 20 face **masks** sold in Belgium, with a silver limit value exceeded for a quarter of them⁵.



In any case, regardless of the harmful effects of silver and nanosilver on health and the environment (see page 22), **silver in the form of nanomaterials is no longer permitted** in these types of products.

BRAND RESPONSES

• Faced with questions from AVICENN, different attitudes of the brands



The brands questioned by AVICENN to understand the reasons for the presence of the nanos identified in their products took different positions:

- Some brands have chosen the “silent” approach:

Labello



- Others responded that their **products** were “safe” and “compliant with regulations”, sometimes using poorly or badly substantiated arguments and, in some cases*, without even bothering to ask us about LNE’s detailed results on their products.



L'ORÉAL*

snazaroo*

- Conversely, some brands said they were “astonished” or even extremely surprised” by our results, asked us for details and indicated that they had **initiated investigations internally and/or with their suppliers**. Two** have commissioned tests from other laboratories.

Thanks to our exchanges, several brands have even told us that they have embarked on a **programme to withdraw nanos**!

Signal**

LABORATOIRES Guigoz**



• The arguments put forward:

"We have a 'non-nano' certificate from our supplier"

Brands may have been misled by their suppliers, who sell them supposedly “non-nano” substances, sometimes with certificates as supporting evidence. Problem: some “non-nano” certificates are based on analyses that have been carried out using measurement methods and instruments that cannot detect particles below 100 nm (laser diffraction, for example) or that measure the size of agglomerates, but not that of primary particles (this is the case for DLS¹), potentially leading to false negatives!

Towards more non-nano products

Aoste has committed to removing “nanometric ingredients, additives and processing aids” from its products (as well as E252², which is associated with an increased risk of colorectal cancer and also contains silica E551 nano³). The last batches of “Fines et fondantes - 25% de sel” likely to contain them were put on the market in autumn 2022; the next ones should be free of nanos.

Nana told us that a “new range of Intimewear by Nana™ period panties without silver particles will be launched in the first half of 2023”.

BRAND RESPONSES

"We didn't do it on purpose"

Some brands argue that the presence of nanos in their products is **"not intentional"**. Several cases can be distinguished:



- In **food**, the identified silica nanoparticles may come from another carry-over additive or from processing aids (see page 14).



- In **hygiene products**, the hypothesis that detected silver nanoparticles are *"dust" or "impurities from the environment and not from our products"*, as put forward by Nana, for example, is unconvincing. Silver nanoparticles are much more likely to be derived from the biocide used, deliberately, by the brands: silver phosphate, silver chloride or silver zeolite → the 3 are allowed, but not in nano form.



- With regard to **cosmetics**, using the "unintentional" argument is particularly devious. It is frequently used by cosmetic brands, which "interpret" (not to say re-write) the law in a way that suits them.



The definition of the term "nanomaterial" in the Cosmetic Regulations requires that the nanomaterial be **"intentionally manufactured"** and, later on, refers to a *"scale of 1 to 100 nm"*¹.

However, in an astounding shortcut, the cosmetics industry has decreed that the adverb *"intentionally"* does not qualify manufacturing, but refers to the scale of 1 to 100 nm, which amounts to rearranging the word order in the text as they wish. It is therefore not only the wording, but also the spirit of the law that has been distorted for years.

The good news? The French consumer protection authorities have explicitly contested this distortion in the interpretation of the regulations². The bad news? Many brands continue to interpret the text as they wish and use unauthorised nanos, without labelling them.

In all sectors, brands are responsible for the products they market: the absence of nanos in raw materials does not guarantee their absence in finished products. **Brands must carry out self-checks** by having products tested by laboratories with adequate methods and instruments, combined with solid expertise.



"There is no standard method for measuring nanos"



Companies point to the lack of validated and harmonized reference methods, protocols and techniques to determine the qualification of nanos substances as "nanomaterials" or not. Nevertheless, **the standardisation of nanomaterial characterisation methods is progressing**³ and **recent work is proposing appropriate techniques**⁴.

And new publications from DGCCRF⁵ the Common Laboratory Service⁶ (SCL) and the European Joint Research Centre (JRC)⁷ are expected imminently on this subject.

BRAND RESPONSES

"There are fewer than 50% particles smaller than 100 nm"

Another argument regularly used by certain brands to justify their use and non-labelling of certain nanos: the fact that there are fewer than **50% of particles smaller than 100 nm**.

This **arbitrary threshold with no scientific basis**^{*} appeared in 2011 in the European recommendation¹ on the definition of the term "nanomaterial" and was then introduced in the biocidal products regulation, but NOT in the regulations governing food and cosmetics.

However, this 50% threshold has been systematically invoked for years by part of the cosmetics industry in order to avoid its labelling and authorisation obligations.

L'Oréal's response illustrates this:

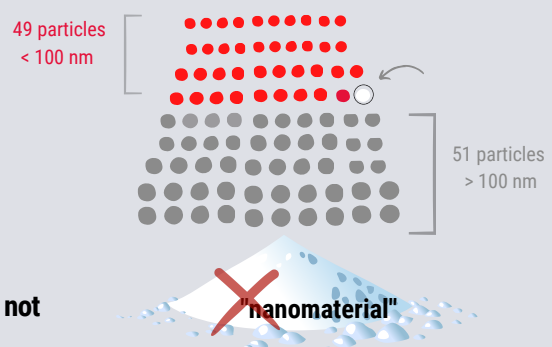
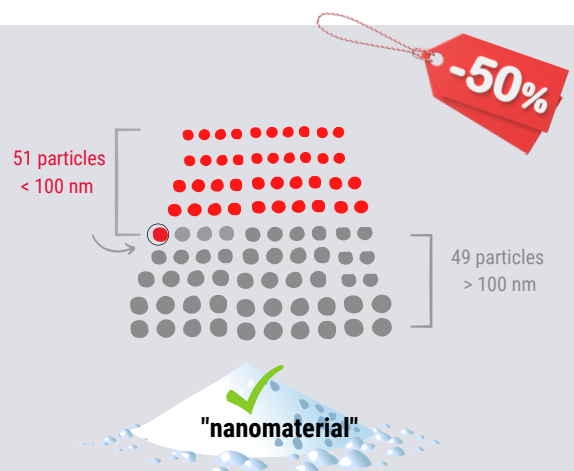
“ we apply the 50% of nanoparticles threshold like the entire cosmetics industry^{*}, the European Commission and the other Member States of the European Union^{**} ”

^{*} Fortunately, this is not true for the whole sector: COSMED, for example, the association of SME in the cosmetics sector, has a more honest interpretation of the regulations², in line with that of the French authorities and NGOs.

What does this 50% threshold mean?

- Take a powder made up of:
- more than 50% of particles smaller than 100 nm (for example 51%)
 - fewer than 50% of particles larger than 100 nm (e.g. 49%)
- You have a powder that can be considered as a **nanomaterial** within the definition recommended^{*} by the European Commission (* it is not legally binding).

- Change the composition of the powder from 51% to 49% of particles smaller than 100 nm.
- The powder, which is very similar, is no longer considered a nanomaterial! Which means that there won't be any specific reporting requirements in REACH, in the r-nano register, in the authorisation and labelling requirements for biocides, etc.



A substance that contains fewer than 50% nanos is not "predominantly" nano, for sure...

But this does not prevent it from containing a very large quantity of nanos!

** This strategy is paying off: **the European Commission and the other Member States are turning a blind eye** to this tailor-made rewriting of the law carried out by some cosmetics professionals.

Only the French authorities (DGCCRF and ANSM) **carry out checks under the regulations in force, without considering a threshold** (but with a tolerance of 10%).¹

The European Commission, alerted by the French authorities from 2017, has not considered it appropriate to put a stop to these practices, which do not comply with European law.

And worse, after 13 years of lobbying, the cosmetics federations seem to have succeeded:

the 50% threshold is in the process of being integrated into the European regulations governing cosmetics and new foods, which until now have not had any threshold.



It remains to be seen what will be decided and whether specific measures will be put in place concerning substances with a proportion of nanos below this threshold.

This is an inglorious illustration of how industrial lobbying manages to bring the interests of regulated industry into the law or, as here, in its interpretation and perhaps even in its rewriting².

After all, the brands that have played the wait-and-see card, failing to comply with the [nano] labelling requirement since it came into force in 2013, have won at least a decade during which they have used unauthorised nanos and without labelling them as [nano].



WHAT ABOUT RISKS?

The **small size** of nanos can facilitate their passage¹ across protective barriers (lung, blood-brain, intestine, placenta, etc.) and their distribution and accumulation in the body² where their high reactivity can lead to adverse effects. These risks are unfortunately still insufficiently characterised, and may vary depending on the nanos considered, their concentrations, frequency and routes of exposure (inhalation, ingestion, skin penetration), etc.

Due to the **lack** of industrial and scientific data, it is not possible at this stage to propose an assessment of the health and environmental risks associated with nanos in general, nor in those detected in the products tested. However, the results of our survey call for increased efforts to assess the adverse effects associated with nanos present in everyday consumer products (see our requests on pages 25-26).



Adverse effects associated with nanosilver

Silver

Nanosilver is currently being classified at the European level³ due to suspected risks of serious **effects on the nervous system** (neurotoxicity following repeated or prolonged exposure), **risks to fertility** and **dangers to the aquatic environment**.

Numerous studies⁴, such as the one published in *Nature nanotechnology* in 2021, warn against the widespread use of nanosilver in everyday consumer products and insist on the need to limit its use solely to health equipment: it is a matter of limiting the harmful effects of this powerful and non-selective bactericide and avoiding increased bacterial resistance (a major challenge essential to reduce antibiotic resistance responsible for more than one million deaths per year).

Adverse effects associated with silica nanoparticles

Silica

Recent studies by scientists at CEA and CNRS have shown in 2020 that silica nanoparticles could not only damage DNA (genotoxicity), but also transport other substances on their surface that are also genotoxic and therefore increase their potential for **DNA damage**⁵. Other studies at INRAE show that ingested silica nanoparticles can lead to **immune disturbances** and **intestinal inflammation**⁶. This could increase **food intolerances** and even allergies.


However, studies exploring the impact of chronic exposure to food silica nanoparticles⁷ are still rare (most had been conducted so far on nanoparticles synthesised in the laboratory under conditions not representative of actual exposure).




Adverse effects associated with titanium dioxide nanoparticles



Studies have been conducted on animals and report concerning effects:

•  **Inhalation** of TiO_2 nanoparticles is likely to cause cardiovascular dysfunctions, neurotoxic effects, disturbances of the immune system and, in rats at high exposure, pulmonary inflammations and tumours.¹ The latter led to the classification of TiO_2 as a **possible carcinogen for humans** by inhalation in 2006 by the International Agency for Research on Cancer (IARC) and then in 2019 by the European Commission. Invalidated by the Court of Justice of the European Union at the end of 2022, this latest classification of TiO_2 ² is expected to undergo new developments in the coming months as TiO_2 nanoparticles remain suspected of being particularly dangerous.

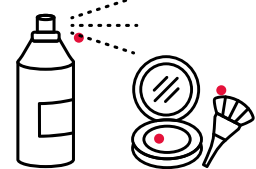
•  **Ingestion** of TiO_2 nanoparticles could lead to alterations in the intestinal barrier and microbiota as well as inflammation and immune problems, and even, in rats, precancerous lesions in the colon. Because of doubts about its genotoxicity (DNA damage), the additive E171 was banned throughout Europe in 2022, as a precaution, for foodstuffs³. Nonetheless, it is still authorised for the time being:

- in cosmetics likely to be ingested (balms, lipsticks, toothpaste, etc.)
- and in drugs until 2024⁴.



FOCUS - Daily inhalation of TiO_2 nanoparticles from powders and sprays: what effects?

Titanium dioxide is about 40% nano in the hair colouring spray and 100% nano in the "highlighting" powder tested.



However, the European Scientific Committee on Consumer Safety (SCCS) recommends that titanium dioxide in the nano form should not be used in applications that may cause inhalation exposure.

→ **How much TiO_2 can you breathe by applying these products?** Hard to know... But researchers from the University of New Jersey in the United States conducted experiments on eyebrow powders containing TiO_2 and identified high concentrations, up to $50 \mu\text{g}/\text{m}^3$ of TiO_2 with $4 \mu\text{m}$ ⁵ particle size, i.e. 12 times the limit value recommended by ANSES in 2021 for TiO_2 nanoparticles over a period of 15 minutes⁶.

→ **What are the risks for people who use and partially inhale these products, sometimes daily?** The colouring spray "will last until your next shampoo", so it may be applied every day by some people. The powder may be used several times a day...

So many questions for researchers!





Is the recent craze for “pearlescent” make-up safe?

Among the face powders, eyeshadows, blushers, lipsticks, etc., L'Oréal's "Light from Paradise" "highlighting" powder is only one of the many make-up products marketed by different brands in recent years **containing "pearlescent" pigments**.

Composed of (micrometric) **mica flakes** coated with the colouring agents, these pigments **can contain numerous titanium dioxide nanoparticles, even smaller than those used in the conventional colouring agent (CI77891)**, their small size making it possible to produce the desired effect: *"pearl pigments naturally capture light and give the skin a natural shiny appearance,"* reads the presentation page (in French) of L'Oréal's "highlighting" powder.

Nevertheless, ***"It is not excluded that particles of titanium dioxide grafted on mica plates (pearlescent pigments) can detach themselves from their support"***, the consumer protection authorities² have warned. Yet, inhalation of TiO₂ nano is not without risk (see page 23).

AVICENN questioned L'Oréal, LVMH and FEBEA on this subject, as well as all the brands attending the LNE "nanomaterials and cosmetics" technical day in September 2022.³ However, no answer was given on this point.



Another question and cause for concern: **are the TiO₂ nanoparticles in this make-up "coated"**, as in sun filters? We couldn't get an answer to this crucial question: if it turns out that no coating covers them, then these "naked" TiO₂ nanoparticles, particularly photocatalytic, could lead to the formation of free radicals, **which cause DNA damage** and increase the **risk of cancer and other diseases**.

OUR REQUESTS

1

Improve knowledge of nanos and associated risks

➤ Characterise nano-sized particles in raw materials and finished products



- **For public authorities:**

- Encouraging continued research efforts in nanometrology by developing the expertise and instruments available to industry, public authorities and associations.
- Providing clear technical instructions to help companies better detect and characterise nanos in their ingredients and finished products.

- **For companies:**

- Checking supplier certificates and carrying out frequent **tests to check** particle size of raw materials and finished products with the appropriate instruments and methods.¹
- Pooling resources across business federations, retail chains, labels, etc. to conduct regular analyses of supplier's raw materials and create "pools" of very well characterised and safe raw materials.

➤ Assessment of the health and environmental risks of nanos

- **For public authorities:** Deploying a multi-year risk assessment system for nanomaterials, financed by a "**nano-safety account**" **funded by companies**, within a formalised framework that ensures the independence of research conducted.²
- **For companies:** Upstream, conducting research and **contributing to the funding of independent research** via the "nano-safety" account to study and minimise the risks of their nanos. Downstream, **preventing their release throughout the product life cycle**: from manufacture to end of life, including use, washing, wear, etc.



2

Increase transparency and [nano] labelling

➤ Address the [nano] non-labelling fiasco³



- **For public authorities:**

- Intensifying **inspections** and **sanctions** for failure to comply with labelling requirements.
- **Extending the [nano] labelling requirement to sectors not currently covered today*** and which nevertheless lead to significant exposure to nanos⁴.

** Food packaging, kitchen equipment & animal food; textiles (clothing, underwear, masks, bedding and linens); hygiene products, drugs⁵ and medical devices; games, toys and childcare items; school supplies; sports items; detergents, cleaning products, phytosanitary & veterinary products; furniture, paints, plasters, coatings and other do-it-yourself materials, etc.*

- Adapting the regulations on "carry-over" additives and processing aids to **remove the silica labelling exemption for quantities less than 1% of the product weight**.

- **For companies:** systematically apply the [nano] statement in the list of ingredients rather than trying to take advantage of the flaws in the legislation.



Don't forget the environment!

Environmental contamination must also be studied, taking into account the accumulation of nanos released during product manufacture, use, maintenance and end-of-life. Health risks were discussed in this report, but it is very important to consider environmental risks fully.

► Playing the transparency card

• For public authorities:

- In France, improving the r-nano¹ register which, 10 years after its creation, has resulted in numerous nanos falling through the cracks and still make it impossible to identify products containing nanos.
- At the community level, establishing a European registry of nanomaterials and products containing them².

This involves having a complete and updated inventory of products containing nanos³ in order to take action in the event of a risk discovered after they have been placed on the market .

• For companies:

- When, after risk characterisation and assessment, companies decide to produce nanos or incorporate them into their products, they must act on this choice and **provide the authorities with the related characterisation and risk data, and inform workers and consumers of their presence in the products.**
- Conversely, if they choose not to use nanos, companies should **communicate about their nano-exclusion approach:**

“Science is advancing, so are safety requirements. We must go further than the regulations and anticipate consumer expectations”, the Confiseurs de France said in 2018, explaining their decision to remove E171 and its titanium dioxide nanoparticles two years before it was banned.

Forget "wait and see" position: instead, be proactive and protective!

3 Develop collective vigilance on nanos

► Provide specific guidance for nanos that slip through the regulatory net

- **For public authorities:** designing specific measures to provide a **framework for nanos in the blind spots of the regulations**, starting with those not considered by the new recommendation on the definition of the term "nanomaterial" soon-to-be transposed into European and national regulations: substances with less than 50% nanos, nanocomposites, etc.
- **For companies:** not considering that below 50%, there are neither risks nor nanos, or that above 100 nm there is no problem...

► Withdrawing nanos for which the risk/benefit analysis is unfavourable

- **For public authorities:** imposing a risk/benefit analysis* necessary to obtain a marketing authorisation for nanos, taking care to avoid their benefits being overestimated compared to their risks⁴, which are often underestimated or undervalued.
- **For companies:**
 - Complying with regulations rather than seeking to take advantage of legislative flaws, whether in terms of labelling, registration of nanos or applications for authorisation.
 - Going even further by sharing best practices that respect the health of consumers, workers and the environment, in line with corporate social responsibility (CSR).

* Unlike ANSES⁵, we consider that **the exclusion of nanomaterials** should not be considered only “when there are equivalents in terms of efficacy”, but rather **whenever risk/benefit analysis is unfavourable.**

- Radium, for example, was banned in cosmetic products in 1937..⁶ and yet there was no better way to make the skin shine⁷!
- The additive E171 containing titanium dioxide (nano)particles was recently banned even though it was the best white pigment available to food professionals.

- The sole consideration of efficacy should not take precedence over the **analysis of the risk/benefit** ratio and over the notions of **essential use** and **collective utility.**

CONCLUSION & OUTLOOK

Fifteen years ago, the subject of nano was still little known, but now things have changed considerably: information and awareness actions have been deployed by the public authorities who, under pressure from associations, have also started inspections.

Nevertheless, the results of our tests show that many nanos are still present in products that are not labelled "nano". In some cases, these nanos are not even authorized and their health and environmental effects are constantly the subject of scientific alerts. Today, **the head-in-the-sand policy is no longer appropriate**. Large companies can no longer say "we didn't know"; the public authorities – the European Commission in particular – must apply the precautionary principle.

We are often asked how we, as consumers, can avoid nanos. Individually, it is possible to restrict the use of products that are particularly likely to contain them: powdered foodstuffs, antibacterial or depolluting products, shiny sweets and cosmetics, in particular.

But our study shows that there are also nanos in many everyday products, leading to cumulative exposure throughout the day and life, and difficult to avoid from the earliest age. Clearly, **individual action is not enough: both public authorities and companies need to intensify their efforts**.

Businesses must confirm the presence of nanos in their products, assess the associated risks and act responsibly. They must participate in funding risk research efforts and provide authorities with evidence of their safety and all the data required for hazard classifications and risk assessments (the latest twist in the classification of titanium dioxide as a suspected inhalation carcinogen is a reminder that the opposite is still too often the case). **Authorities must also play their part in supervising and controlling more products on the market** - not only in France but also, and even more so, at the European level and beyond, so that French companies are not the only ones to be controlled.

AVICENN will closely monitor the implementation of its requests for greater **transparency and vigilance** in the coming months and years. Thanks to the progress of nanometrology, we also plan to carry out **new tests**. You can now send us your suggestions for products that you would like to see tested at contact@veillenanos.fr and/or support our association's work by visiting our website <https://veillenanos.fr> "support us" section!








APPENDIX 1

RESULTS BY PRODUCT CATEGORY











COSMETICS

		Presence of type 1 nano			Presence of type 2 nano		
		Type	Nanos detected?	% nanos*	Type	Nanos detected?	% nanos*
	Light from Paradise, L'OREAL <i>Face powder</i>	TiO ₂	yes	100 %	Iron oxide	yes	PNQ**
	Magic Retouch Blond L'OREAL <i>Hair colouring spray</i>	TiO ₂	yes	39.3 %	Iron oxide	yes	75 %
	Naturally LABELLO Vegan Stick <i>Lip balm</i>	TiO ₂	yes	24.6 %	Iron oxide	yes	63 %
	5-in-1 BB Cream NIVEA <i>Face cream</i>	TiO ₂	yes	25.7 %	Iron oxide	yes	85 %
	SNAZAROO party make-up <i>Children's make-up</i>	TiO ₂	yes	42 %	-	-	-
	Scalp-Care-Relaxer, DARK AND LOVELY <i>Children's toothbrush</i>	TiO ₂	yes	23 %	-	-	-

HYGIENE AND HEALTH

	Toothbrush, SIGNAL <i>Children's toothbrush</i>	Silver	yes	100 %	-	-	-
	Claricup CLARIPHARM <i>Antibacterial menstrual cup</i>	Silver	no	Details: Micrometric and nanometric particles (approximately 200 nm) were identified. Given the technical difficulties associated with this material, we have no information about the nature of these particles.			
	20 mg XARELTO tablets <i>Drug</i>	TiO ₂	yes	35 %	Iron oxide	yes	38 %
	Intimewear panties NANA <i>Menstrual panties</i>	Silver	yes	Detail: presence of some silver nanoparticles in contact with the surface of zeolite particles.			
	Boxer shorts SUPIMA UNIQLO <i>Underwear</i>	TiO ₂	yes	NQP	ClAg	yes	NQP
	Next BW FFP2 mask <i>Face mask</i>	Silica	yes	NQP	Copper	no	-
	Mask BACCIDE, <i>Face mask</i>	Silver	yes	NQP	Details: Identification of the presence of silver-based particles, some of which could be nanometric in size, but neither the size nor the shape could be determined.		

RESULTS BY PRODUCT CATEGORY

		Presence of type 1 nano			Presence of type 2 nano		
		Type	Nanos detected?	% nanos*	Type	Nanos detected?	% nanos*
FOOD	 9-vegetables soup KNORR <i>Dehydrated soup</i>	Silica	yes	100 %	-	-	-
	 Puff pastry -30% fat HERTA <i>Puff pastry</i>	Silica	yes	100 %	-	-	-
	 Jambon Les fines et fondantes AOSTE <i>Ham</i>	Silica	yes	100 %	-	-	-
	 Vitamin C with rose hip, SOLGAR, <i>Dietary supplement</i>	Silica	yes	100 %	-	-	-
	 MINI kibble Royal Canin <i>Animal food</i>	Silica	yes	100 %	-	-	-
	 Absorbent pad LE GAULOIS <i>Food packaging</i>	TiO₂	yes	NQP	-	-	-
	 Optipro 0-6 months formula LABORATOIRE GUIGOZ, <i>Infant formula</i>	Silica	yes	100 %	-	-	-
TOYS	 Glitzy, GP Toys <i>Children's arts and crafts box</i>	TiO₂	no	-	Iron oxide	no	-
	 Slime powder, Canal Toys <i>Children's arts and crafts box</i>	TiO₂	no	-	Silica	no	-
PAINT	 Ondi Pur Velours ZOPLAN, <i>Depolluting paint</i>	TiO₂	yes	NQP	Details: The tested paint contains TiO ₂ pigment particles and to a lesser extent, TiO ₂ nanoparticles (approximately 95 nm)		

* % of nanos detected: Percentage of population < 100 nm

** NQP : Proportion not quantified

APPENDIX 2

NOTES & REFERENCES

PAGE 3:

1. The expression was used by 60 Millions de Consommateurs in 2015: <https://www.60millions-mag.com/2015/03/19/nanoparticules-dans-les-aliments-la-loi-du-silence-7988#>
2. See "Nanomaterials: assessment of R-Nano, the national reporting scheme", ANSES, December 2020 and sur Report on the use of nanomaterials in cosmetics, European Commission, July 2021
3. See <https://veillenanos.fr/en/dossier/gouvernance/reglementations-nano/r-nano>
4. See <https://veillenanos.fr/en/dossier/gouvernance/reglementations-nano/europe-reglementation-reach>
5. See <https://veillenanos.fr/en/dossier/gouvernance/reglementations-nano/etiquetage>
6. See <https://veillenanos.fr/en/dossier/echelle/taille-definition>
7. Nanosilver is a powerful antibacterial agent; titanium dioxide nanoparticles can serve as white colouring agent or depolluting agent, silica nanoparticle anti-agglomerator or anti-caking agent, etc.
8. For example, see 15 years apart "Nano-improved industrial materials: Preparing for the next European industrial revolution", CORDIS, January 2019 and "Nanotechnology - Innovation for the world of tomorrow", European Commission, 2004
9. See ISO/TS 80004-1 standard, ISO, 2015
10. See <https://veillenanos.fr/en/dossier/echelle/taille-definition/>

PAGE 4:

1. See <http://www.60millions-mag.com/kiosque/bonbons-gateaux-stop-aux-nanoparticules>
<https://www.quechoisir.org/comparatif-nanoparticules-dans-l-alimentation-les-cosmetiques-et-les-medicaments-n50744/>
2. See <http://www.60millions-mag.com/kiosque/bonbons-gateaux-stop-aux-nanoparticules>
<https://www.quechoisir.org/comparatif-nanoparticules-dans-l-alimentation-les-cosmetiques-et-les-medicaments-n50744/>
3. See veillenanos.fr/en/dossier/applications/enquete-rideaux-ikea

PAGE 5:

1. See <https://veillenanos.fr/en/nanomateriaux-pnse4/>
2. See <https://veillenanos.fr/en/dossier/risques/sante/voies-exposition-devenir-corps>
3. See <https://veillenanos.fr/en/dossier/risques/sante/risques-sante>

PAGE 6:

1. Titanium dioxide, silver and silica nanoparticles are among the nanomaterials identified as most at risk by a team from University College Dublin, in a study from July 2021. See A semiquantitative risk ranking of potential human exposure to engineered nanoparticles (ENP s) in Europe, Li Y. and Cummins E; Science of the Total Environment, 778, July 2021. See also our website: <https://veillenanos.fr/en/dossier/risques/risques-specifiques>

PAGE 8:

1. SEM analyses are recommended by specialised bodies to detect nanos (see Identification of nanomaterials through measurements, Joint Research Centre (JRC), 2019).

NOTES & REFERENCES

PAGE 12:

1. TiO₂ Mask - Identification, physico-chemical characterisation and estimation of the release of titanium dioxide particles from face masks and AgMask - Assessment of the types, efficacy and health risks of silver biocides used in face masks to give them antimicrobial properties, Sciensano (2020-2022).

PAGE 13:

1. In 2013 and 2014, several European regulations made “nano” labelling mandatory for cosmetics, biocides and food products. See <https://veillenanos.fr/en/dossier/gouvernance/reglementations-nano/etiquetage>. But apart from sun creams and some cosmetics, [nano] mentions are still extremely rare, as several associations and the DGCCRF have already pointed out. See <https://veillenanos.fr/controles-dgccrf-nano-cosmetiques>
2. Games, food packaging, drugs, paints or animal food are not covered by the labelling requirement, which only applies to cosmetics, biocides and packaged food products. A voluntary standard was formalised in 2013 for “voluntary” product labelling, but has never been applied. See Nanotechnologies - Guidelines for voluntary labelling of consumer products containing manufactured nano-objects, ISO/TS 13830, December 2013
3. Ban on TiO₂ in food (E171) - chronology and current situation, AVICENN @VeilleNanos, 2022

PAGE 14:

1. The carry-over principle is explained in Article 18 of Regulation (EC) No 1333/2008. With the exception of certain specific cases, the presence of a food additive is allowed in compound foodstuffs, provided that the additive in question is permitted in one of the ingredients of the compound foodstuff.
2. See <https://www.legifrance.gouv.fr/jorf/id/JORFARTI000035742835>. This 2017 order amends Article 8 of the Order of 19 October 2006 relating to the use of processing aids in the manufacture of certain foodstuffs: when silica is present in quantities less than 1% of the weight of the product that contains it, it is no longer considered as an ingredient, but as a processing aid, which makes it possible not to include silica in the list of ingredients.
3. Commission Regulation (EU) 2017/1271 permits the use of silicon dioxide (E 551) as an anti-caking agent in potassium nitrate (E 252).
4. If silica is no longer included in the list of ingredients, brands are not obliged to affix the wording [nano] provided for by Regulation (EU) no. 1169/2011 of 25 October 2011 on the provision of food information to consumers.

PAGE 15:

1. See <https://eur-lex.europa.eu/legal-content/FR/TXT/PDF/?uri=CELEX:32009R1223&from=FR>
2. With the mention of the following “colour indices” in the list of ingredients: CI 77491 (red pigment) and/or CI 77492 (yellow pigment) and/or CI 77499 (black pigment)
3. As shown by reference to CI77891, the “colour index” is attached to the mention “titanium dioxide” in the list of ingredients
4. Information note for the application of the definition of nanomaterials under Regulation (EC) no. 1223/2009 on cosmetic products, DGCCRF & ANSM, 5 July 2021
5. See the information note mentioned above, as well as presentations by DGCCRF in various colloquia and training courses since 2016

NOTES & REFERENCES

PAGE 16:

1. See <https://veillenanos.fr/en/dossier/gouvernance/reglementations-nano/encadrement-des-nanos-dans-biocides>
2. See [Commission Implementing Decision \(EU\) 2021/1283 on non-approval of certain active substances in biocidal products](#), European Commission, 2 August 2021

PAGE 17:

1. See https://nanodb.dk/en/searchdatabase/#pageno=&keyword=&kst=0&fn.lp m=2937&fn.d cd f=&fn.d c d _t=
2. See First DGCCRF controls of nanosilver textiles in France, 3 June 2022
3. See Assessment of risks related to nanomaterials for the general population and the environment, Afsset (today ANSES), March 2010
4. See Concerns About Nanosilver in Period Products, WVE, April 2019
5. See [AgMask - Assessment of the types, efficacy and health risks of silver biocides used in face masks to give them antimicrobial properties](#), Sciensano (2020/2022)
6. For example, "Inava Precision" toothbrushes by Pierre Fabre, sold in pharmacies, the bristles of which are presented as being "ionised with silver ions that slow bacterial growth"; online, there are also "pure silver" Ampheris toothbrushes (they also exist in versions for children and adults and even for babies) or Biomed Silver with silver ions, etc.
7. See [Use of single particle ICP-MS to estimate silver nanoparticle penetration through baby porcine mucosa](#), Zanoni I et al., *Nanotoxicology*, 15(8): 1005-1015, 2021

PAGE 18:

1. DLS: Dynamic light scattering
2. Aoste bans nitrites from its hams, LSA Conso, January 2019
3. Risk assessment for nitrates and nitrites, ANSES, July 2022

PAGE 19:

1. According to the European Regulation (EC) No 1223/2009 on cosmetic products, nanomaterial means "an insoluble or bio-persistent and intentionally manufactured material with one or more external dimensions, or an internal structure, on the scale from 1 to 100 nm".
2. Information note for the application of the definition of nanomaterials under Regulation (EC) no. 1223/2009 on cosmetic products, DGCCRF & ANSM, 5 July 2021 (page 3)
3. Standard FD ISO/TR 18196, guide XP CEN/TS 17010
4. Decision tree for the European project "NanoDefine", reports from the Joint Research Centre (JRC) in 2019 and ANSES in 2020, see our sheet Detecting and measuring nanos, online at veillenanos.fr, AVICENN
5. An update of the DGCCRF "Information Memorandum" for the application of the definition of nanomaterials in the context of the cosmetic regulations.
6. A methodological note from the Joint Laboratory Service (SCL) on the analysis and characterisation of nanomaterials in consumer products
7. A new guide to the Joint Research Centre (JRC)

NOTES & REFERENCES

PAGE 20:

1. This is a legally non-binding text, see <https://veillenanos.fr/en/dossier/gouvernance/reglementations-nano/revision-definition>
2. See Nano or not Nano? (video), COSMED, May 2022 and NANOMATERIALS: Cosmed untangles true from false, (press release), COSMED, February 2021

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1. To take account of measurement uncertainties and potential environmental contamination - See [Information note for the application of the definition of nanomaterials under Regulation \(EC\) no. 1223/2009 on cosmetic products](#), DGCCRF & ANSM, 5 July 2021, page 3
2. The expression comes from the Nobel laureate of economics Georges Stigler, quoted by Stéphane Horel in her book *Lobbytomy, Comment les lobbies empoisonner nos vies et la démocratie* published in 2018 by La Découverte

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1. See <https://veillenanos.fr/en/dossier/risques/sante/voies-exposition-devenir-corps>
2. See <https://veillenanos.fr/dossier/risques/sante/risques-sante> and <https://veillenanos.fr/dossier/risques/dossier-risques-environnement/risques-environnement>
3. See <https://echa.europa.eu/fr/registry-of-clh-intentions-until-outcome/-/dislist/details/0b0236e183963736> and echa.europa.eu/documents/10162/2200976/rac-61_minutes_en.pdf; à suivre sur <https://veillenanos.fr/en/dossier/risques/risques-specifiques/risques-nanoargent>
4. See <https://veillenanos.fr/dossier/risques/risques-specifiques/risques-nanoargent>
5. See Toxicity to RAW264.7 Macrophages of Silica Nanoparticles and the E551 Food Additive, in Combination with Genotoxic Agents, *Nanomaterials*, Dussert F et al., 10(7), 1418, 2020
6. See Une exposition orale chronique à l'additif alimentaire E551 (dioxyde de silice) bloque l'induction de la tolérance orale et prédispose à l'intolérance alimentaire chez la souris, NM Breyner et al., Journées Francophones de Nutrition, Nov 2019, Rennes, France and Chronic exposure to the food additive silicon dioxide (E551) at a human-relevant dose blocks induction of oral tolerance to dietary antigens, NM Breyner et al., Society of Toxicology 61 st annual meeting, March 2022, San Diego, United States.
7. See <https://veillenanos.fr/dossier/risques/risques-specifiques/risques-silice/>

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1. See <https://veillenanos.fr/dossier/risques/risques-specifiques/risques-nanoparticules-tio2> and more particularly Titanium dioxide in nanoparticle form: recommendation of limit values for occupational exposure, ANSES, March 2021 and Toxicological sheet on titanium dioxide, no. 291 INRS, January 2022
2. See <https://veillenanos.fr/annulation-classification-TiO2/>
3. See <https://veillenanos.fr/dossier/gouvernance/reglementations-nano/interdiction-e171/>
4. The European regulation n°2022/63 banning the food additive titanium dioxide (E171) opens the possibility, in its considerations 17 and 18 and in its article 3, of a ban on E171 in medicines. Cf. <https://veillenanos.fr/en/dossier/gouvernance/reglementations-nano/suspension-elargie-tio2>
5. Potential consumer exposure to respirable particles and TiO₂ due to the use of eyebrow powders. Oh HJ, Han TT & mainelis G. J Expo Sci Environ Epidemiol, 31, 1032-1046 (2021).
6. See Titanium dioxide in nanoparticle form: recommendation for occupational exposure limit values, ANSES, March 2021

NOTES & REFERENCES

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1. As a reminder, in the L'Oréal powder tested, 100% of the particles were less than 100 nm in size, with an average size of around 50 nm; compared to Nivea cream, this is 4 times more nanoparticles and an average size over 2 and a half times smaller
2. See Briefing note on the definition of nanomaterials within the meaning of Regulation (EC) No 1223/2009 on cosmetic products, DGCCRF & ANSM, 5 July 2021, page 3
3. See "nanomaterials and cosmetics" technical day of the LNE, 29 September 2022. Reaction collected by AVICENN during the "nanomaterials and cosmetics" LNE technical day, 29 September 2022

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1. See "How to correctly classify a chemical in the 'nanomaterials' category", LNE
2. See <https://veillenanos.fr/dossier/gouvernance/evaluation-risques/financement-etudes-risques>
3. More info on nano labelling: <https://veillenanos.fr/dossier/gouvernance/reglementations-nano/etiquetage>
4. See What do EU citizens think about nanomaterials?, EUON, November 2020: *"A recent survey carried out in five selected EU countries shows that citizens demand better labelling of everyday products containing nanomaterials and increased awareness of the risks and benefits of products containing nanomaterials"*.
5. The European Regulation no. 2022/63 banning the food additive titanium dioxide (E171) opens up the possibility, in its considerations 17 and 18 and in its article 3, of a ban on E171 in medicinal products. See <https://veillenanos.fr/dossier/gouvernance/reglementations-nano/suspension-elargie-tio2>

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1. See <https://veillenanos.fr/en/dossier/gouvernance/reglementations-nano/r-nano>
2. See <https://veillenanos.fr/en/dossier/gouvernance/reglementations-nano/registre-europeen/>. The latest report by the European Observatory of Nanomaterials (EUON) published in November 2022 only accounts for 2,200 products containing nanomaterials on the European market - a significantly underestimated number. Another European Commission report last year said that on average, about 3,620 new cosmetics containing nanomaterials were reported each year between 2016 and 2020.
3. A recommendation already made over 12 years ago by the French National Consumer Council (CNC) in its opinion on consumer information on the presence of nanomaterials in consumer products of 2010...
4. See <https://veillenanos.fr/en/dossier/gouvernance/evaluation-risques/benefices-risques/>
5. See <https://www.anses.fr/fr/content/sur-la-question-des-nanomat%C3%A9riaux-nous-devons-questionner-leur-utilit%C3%A9-au-regard-des-risques>
6. See <https://culturesciences.chimie.ens.fr/thematiques/chimie-et-societe/sante/le-radium-decouverte-utilisation-et-danger>
7. See <https://www.franceculture.fr/emissions/une-histoire-particulier-un-recit-documentaire-en-deux-parties/radium-girls-12-des-femmes-lumineuses>