

toxSeek

POLLUTANT SCREENING

TOXICOLOGICAL ANALYSIS REPORT

TOXSEEK INTEGRAL

Organic pollutants

(PESTICIDES, PARABEN, PHTHALATES, BISPHENOLS, PFOA, ALKYLPHENOLS ...)

& Metals

(METALS, METALLOIDS AND HEAVY METALS)

File SPECIMEN1

Date 17/03/2019

SERFI-TOXSEEK

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SCR 322 068 313

More than 85% of today's illnesses among which are cancers, cardiovascular, auto-immune and neuro-degenerative diseases, but also reproductive problems can be attributed to 3 environmental factors: substance addiction such as tobacco and alcohol, to stress, and to pollution.

Environmental health is the challenge of our century

For the pollution factor, numerous studies have established the link between pollutants and endocrine disruption in the context of chronic intoxication. One solution: identify the pollutants interacting with our bodies and remove their sources from our environment. Chronic intoxication and its long-term devastating effects will be reduced.

Active prevention is the key

ToxSeek allows you to identify the pollutants you have been exposed to over the last 3 months thanks to cutting-edge technologies used to run tests in a toxicological analysis laboratory. The interpretation of the results is led by our expert medical biologist - pharmacotoxicological doctor.

toxSeek, a healthcare revolution

SUMMARY

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UNDERSTANDING TOXSEEK ANALYSES

Important

ToxSeek toxicological analyses deal with **chronic toxicity**. Health risks exist mainly **in the case of repeated and long-term exposure**.

Eliminating sources of detected pollutants with 'at-risk' or 'to be monitored' levels of exposure can reduce risks to your health.

Chronic toxicity assumes:

- 1- An administration of the pollutant at rates deemed to be non-toxic (not causing the clinical effects associated with acute toxicity)
- 2- Repeated administration of (exposure to) the pollutant. (Our tests allow for an evaluation over a 3-month period of exposure).

Endocrine disruption

The clinical effects observed during acute intoxication can be life-threatening. On the other hand, the effects of chronic intoxication are different. The most commonly observed effect is endocrine disruption.

The central and peripheral endocrine system is responsible for the functioning, evolution, development and protection of our bodies. Organic and inorganic pollutants are interposed in the millions of enzymatic systems governed by hormones. The problem of repeated endocrine disruption is that the body sees its defence mechanisms weaken or even change, depending on the mechanisms involved. This endocrine disruption can begin to be clinically tested from a few months to several years after repeated exposure. The clinical effects are four-fold: mutagen to carcinogenic, immunological (autoimmune diseases), reproductive (reproduction problems), teratogenic (embryo malformations), neurotoxic (neurocognitive disorders, neurological degeneration).

UNDERSTANDING TOXSEEK ANALYSES (CONTINUED)

Information on thresholds of toxSeek exposure levels

Organic Pollutants

Non-targeted research (screening) in hair can not be quantified because capillary levels are not correlated with blood levels. In addition, black hair, more robust, retains pollutants at higher levels than thin blonde hair. But the trend remains the same: the higher the dose administered, the stronger the signal obtained on our analyzers.

We do not indicate pollutants whose signal is weak or very weak to be sure of the repetition of the exposure.

If the pollutant is at the 'at risk' exposure level, we consider that exposure is high and that it is necessary to look for its sources in order to to eliminate this pollutant from your surroundings.

Metals

The metal elements have been separated into two groups:

Essential elements may be prescribed or taken during oligotherapy. This factor has been taken into account during the definition of thresholds. Thus, even if these elements are useful to our body, it is important not to overdo them and not to underestimate 'at risk' exposure levels.

The **toxic and potentially toxic** elements found at 'at risk' and 'to be monitored' levels contribute to endocrine disruption.

RESULTS SUMMARY

File SPECIMEN1

IMPORTANT - LEVELS OF EXPOSURE ARE EXPRESSED IN A CONTEXT OF CHRONIC TOXICITY -

ORGANIC POLLUTANT SCREENING

(PESTICIDES, PARABENS, PHTHALATES, BISPHENOLS, PFOA, ALKYLPHENOLS...)

Exposure level **AT RISK:**

Exposure to these molecules has been very high over the last 3 months. It is necessary to identify the sources and remove them from your surroundings.

- glyphosate
- Tri-iso-butyl phosphate
- fipronil
- DEET / Diethyltoluamide

Exposure level **TO BE MONITORED:**

Exposure to these molecules has been high over the last 3 months. It is advisable to identify their sources and to monitor or remove them.

- Butyl 4-hydroxybenzoate (Butylparaben)
- Metam sodium
- BPA / Bisphenol A
- DMP / Dimethyl phthalate (DMF)
- Quinacetol
- thiacloprid

RESULTS SUMMARY (CONTINUED)

File SPECIMEN1

IMPORTANT - LEVELS OF EXPOSURE ARE EXPRESSED IN A CONTEXT OF CHRONIC TOXICITY -

METAL SCREENING

(METALS, HEAVY METALS, METALLOIDS)

Exposure level **AT RISK:**

Exposure to these metals is of concern. It is necessary to identify the sources and remove them from your surroundings.

- Aluminum
- Titanium
- Mercury
- Lead

Exposure level **TO BE MONITORED:**

Exposure to these metals is high. It is advisable to identify the sources and reduce their presence in your surroundings.

- Vanadium
- Tellurium
- Cadmium

RESULTS OF ANALYSES

ORGANIC POLLUTANT SCREENING

(PESTICIDES, PARABENS, PHTHALATES, BISPHENOLS, PFOA, ALKYLPHENOLS ...)

LC-QTOF ANALYZER

FILE N ° SPECIMENT

DATE 17/03/2019

Name	Formula	CASE No.	Reference mass	Observed Mass	Score	Area
glyphosate	C ₃ H ₈ NO ₅ P	1071-83-6	169.0140	169.0140	99.00	10 000 000
Tri-iso-butyl phosphate	C ₁₂ H ₂₇ O ₄ P	126-71-6	266.1647	266.1650	99.00	7 500 000
fipronil	C ₁₂ H ₄ Cl ₂ F ₆ N ₄ OS	120068-37-3	435.9387	435.9390	99.00	6 000 000
DEET / Diethyltoluamide	C ₁₂ H ₁₇ NO	134-62-3	191.1310	191.1310	99.00	5 500 000
Butyl 4-hydroxybenzoate (Butylparaben)	C ₁₁ H ₁₄ O ₃	94-26-8	194.0943	194.0940	95.00	2 000 000
Metam sodium	C ₂ H ₄ NNaS ₂	137-42-8	128.9683	128.9680	95.00	1 500 000
BPA / Bisphenol A	C ₁₅ H ₁₆ O ₂	80-5-7	228.1150	228.1150	95.00	1 200 000
DMP / Dimethyl phthalate (DMF)	C ₁₀ H ₁₀ O ₄	131-11-3	194.0579	194.0580	95.00	1 000 000
Quinacetol	C ₁₁ H ₉ NO ₂	2598-31-4	187.0633	187.0630	95.00	700 000
thiacloprid	C ₁₀ H ₉ CIN ₄ S	111988-49-9	252.0236	252.0240	95.00	500 000

RESULTS OF ANALYSES

METAL SCREENING
(METALS, METALLOIDS, HEAVY METALS)

ICP-MS ANALYZER

FILE N ° SPECIMENT1

DATE 17/03/2019

Essential elements	Dosage ug / g	Chronic toxicity thresholds	Flag
Chrome	<LD	0.5300 - 11.0000	
Cobalt	<LD	0.1400 - 2.9000	
Copper	5.0000	10.2275 - 35.0000	Acceptable
Iron	10.0000	20.0000 - 44.0000	Acceptable
Manganese	<LD	0.1302 - 2.4100	
Molybdenum	<LD	0.1650 - 3.4000	
Nickel	0.2000	1.0000 - 1.6000	Acceptable
Selenium	<LD	0.8000 - 2.0000	
Vanadium	1.0000	0.1340 - 2.8000	Acceptable
Zinc	<LD	200.0000 - 300.0000	

Toxic and potentially toxic elements	Dosage ug / g	Chronic toxicity thresholds	Flag
Aluminum	50.0000	10.0000 - 25.6000	Acceptable
Antimony	<LD	0.0100 - 0.1000	
Arsenic	<LD	0.0300 - 0.3000	
Barium	<LD	1.9000 - 4.0000	
Beryllium	<LD	0.0010 - 0.0100	
Boron	0.1000	0.2928 - 2.5000	Acceptable
Cadmium	0.1000	0.0040 - 0.4000	Acceptable
Caesium	<LD	0.0006 - 0.0010	
Gallium	<LD	0.0040 - 0.0120	
Hafnium	0.0050	0.0100 - 0.0500	Acceptable
Lead	1.5000	0.1300 - 1.0000	Acceptable
Mercury	5.0000	0.0530 - 1.7000	Acceptable
Niobium	<LD	0.0010 - 0.0050	
Silver	0.1000	0.2000 - 0.5000	Acceptable
Strontium	1.0000	2.4000 - 6.0000	Acceptable
Tantalum	0.0002	0.0004 - 0.0010	Acceptable
Tellurium	0.0010	0.0003 - 0.0030	Acceptable
Thallium	<LD	0.0001 - 0.0016	
Thorium	<LD	0.0034 - 0.0100	
Tin	<LD	0.0070 - 1.4000	
Titanium	15.0000	2.3000 - 5.0000	Acceptable
Tungsten	<LD	0.0649 - 0.1000	
Uranium	0.0100	0.0400 - 0.4360	Acceptable
Zirconium	<LD	0.0400 - 0.7000	

Rare earths	Dosage ug / g	Chronic toxicity thresholds	Flag
Cerium	0.0010	0.0048 - 0.0100	Acceptable
Dysprosium	<LD	0.0010 - 0.0030	
Erbium	0.0005	0.0010 - 0.0030	Acceptable
Europium	<LD	0.0004 - 0.0010	
Gadolinium	<LD	0.0014 - 0.0050	
Holmium	<LD	0.0003 - 0.0010	
Lanthanum	<LD	0.0070 - 0.0200	
Neodymium	<LD	0.0020 - 0.0100	
Praseodymium	<LD	0.0005 - 0.0010	
Samarium	<LD	0.0010 - 0.0030	
Thulium	<LD	0.0003 - 0.0010	
Ytterbium	<LD	0.0011 - 0.0050	

EXPOSURE LEVEL INDICATOR

Acceptable To be monitored At risk

<LD: BELOW THE DETECTION LIMIT

LABORATORY METHODOLOGY

MATRIX

The hair (shaft) is the matrix used to analyze chronic exposure to target pollutants. A length of 3 cm from the root of the hair corresponds to your exposure to pollutants during the 3 months preceding the date of sampling.

The hair samples are completely destroyed during the analysis.

TECHNOLOGIES USED

The samples are analyzed by two very advanced technologies:

For the toxSeek Organic analysis: LC-QTOF: Liquid chromatography analyzer coupled with quadrupole time-of-flight tandem mass spectrometry.

For the toxSeek Metal analysis: ICP-MS: Inductively coupled plasma mass spectrometry.

INTERPRETATION

The interpretation and validation of the results are carried out by our medical biologist - doctor in pharmaco-toxicology.

ACCREDITATION, SCIENTIFIC VALIDATION, CERTIFICATION, CONFIDENTIALITY

ACCREDITATION AND EXTERNAL QUALITY CONTROL

Our laboratory is accredited Cofrac n°8-4182 - ISO 15189 standard (for its activity as a medical biology laboratory). Our laboratory participates in the QMEQAS program (External Quality Assurance of the Institut National de Santé Publique du Québec).

ACCREDITATION

The processes are scientifically validated by a scientific publication (peer-reviewed journal)

Assesment of exposure to Organic and Inorganic Pollutants in Children's Hair - International Journal of Public Health Research-2019; 7(1); 18-22.

CERTIFICATION

All our equipment is certified according to IEC / EN 61010, EN61326, EN55011.

PRIVACY POLICY

The security and the confidentiality of the data are ensured by the implementation of organizational (individual commitment, collective guidelines) and material (premises, computerized systems, instruments) means, compliant with GDPR.

IDENTIFICATION OF EXPOSURE LEVELS

ORGANIC POLLUTANTS - LC-QTOF

Semi-quantitative research

Results classified according to 2 levels of exposure (AT RISK, TO BE MONITORED) defined by the criteria of our pharmaco-toxicological doctor.

METALS - ICP-MS

Quantitative research

Results classified according to 3 levels of exposure (AT RISK, TO BE MONITORED, ACCEPTABLE) defined by the criteria of our pharmaco-toxicological doctor and based on the scientific reference literature.

toxSeek

POLLUTANT SCREENING

BACKGROUND INFORMATION

POLLUTANTS DETECTED
(ORGANIC AND METAL POLLUTANTS)

- Summary table of potential sources
- Data by detected pollutant

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IMPORTANT

Organic pollutants and metal pollutants (toxic and potentially toxic) detected by toxSeek toxicological analyses are all potential endocrine disruptors. In the case of joint exposure, an additional or potentiating effect may exist.

To protect you from the risks related to the chronic toxicity of pollutants detected, the referenced potential sources will enable you to remove the offending products from your diet or your surroundings.

Information is extracted, to a great extent, from the following sources:

Pesticide Action Network North America, Chemistry Data Base, Pesticide Properties DataBase, NCBI, Scientific Articles, Mechanism of Action Organophosphorus and Carbamate insecticides, US National Library of Medicine, IARC, European Food Safety Authority, Vidal, National Agency for Food Safety, Environment and Labor, National Institute of Industrial Environment and Risks, CNRS, INRS occupational health body...

We are not responsible for the information quoted. It is provided for informational purposes only and may be updated according to progress in scientific research or the release of information into the public domain.

DETECTED POLLUTANT DATA

File SPECIMEN1

Organic pollutants detected

BPA / Bisphenol A

CASE NUMBER 80-5-7

FAMILY	SUBFAMILY	CHEMICAL FUNCTION
bisphenol	Synthesis intermediate	Bisphenol A

MAIN USE

An antioxidant for the chemical industry (production of plastic) used in sixty sectors (wide range).

SOURCES

plastic food (water canisters, cans, cans). non-food plastic (PVC, toys, DVDs, eyeglass lenses and lights, sockets and electrical switches, thermal papers). Paints, coatings, resins, elastomers, sealants, cables, adhesives. In industry: brake fluids, heat transfer fluids, electrical installation equipment.

TOXICITY

Possible infertility and impaired fetal development. Possible hyperactivity for exposed embryos. Possible obesity and diabetes, childhood obesity. Possible effects on the intestine and cardiovascular. Likely to be carcinogenic (breast, prostate).

STATUS

Inscribed on the EU list of endocrine disruptors (category 1). Prohibited for certain uses.

Butyl 4-hydroxybenzoate (Butylparaben)

CASE NUMBER 94-26-8

FAMILY	SUBFAMILY	CHEMICAL FUNCTION
paraben	-	paraben

MAIN USE

Food industry, cosmetics, pharmaceuticals as a preservative, flavouring. Microbiocide, action against parasitic fungi.

SOURCES

Creams, lotions, ointments and other cosmetic products. Food (salad dressings, mayonnaise, spicy sauces, mustard - frozen dairy products, ready-made products). Pharmaceutical preparations and toothpastes.

TOXICITY

Estrogenic endocrine disruptor (EU list of potential endocrine disruptors).

STATUS

Authorized

DEET / Diethyltoluamide

CASE NUMBER 134-62-3

FAMILY	SUBFAMILY	CHEMICAL FUNCTION
Pesticide	Insecticide	Derived from the benzamide

MAIN USE

Protection against insect bites (topical application to the skin or clothing).

SOURCES

Creams, lotions, insect sprays.

TOXICITY

Neurotoxic, a suspected reproductive toxicant. Acetylcholinesterase inhibitor. increased toxicity in combination with other insecticides.

STATUS

Authorized

DMP / Dimethyl phthalate (DMF)

CASE NUMBER 131-11-3

FAMILY	SUBFAMILY	CHEMICAL FUNCTION
Pesticide	Insecticide	phthalate

MAIN USE

Plasticizer. Solvent. Insecticide. Antiparasitic drug.

SOURCES

Cow, pig, horse. Cosmetics (Fars shadow, nail polish and remover, aftershave lotions, skin care). Food packaging.

Toys. Tool handles, automobile parts.

TOXICITY

Reprotoxic. Toxic to the kidneys.

STATUS

Authorized

fipronil

CASE NUMBER 120068-37-3

FAMILY	SUBFAMILY	CHEMICAL FUNCTION
Pesticide	Insecticide / miticide / miticide	pyrazole

MAIN USE

Action against insects (agriculture). Pest (fleas, ticks, termites, cockroaches ...) for pets. Horticulture.

SOURCES

Sprays insecticides. Veterinary products. Grass. Ornamentals.

TOXICITY

Risks of side effects on the liver and thyroid. Registered in category C (carcinogenic Possible for human) carcinogen on the list of EPA. endocrine disruptor possible.

STATUS

Under surveillance

glyphosate

CASE NUMBER 1071-83-6

FAMILY
Pesticide

SUBFAMILY
Herbicide

CHEMICAL FUNCTION
phosphonoglycine

MAIN USE

Against weeds (crop). Chelator. Antibiotic (2010).

SOURCES

Grains, soybeans. Horticulture, home gardens, lawn. descaler boilers and pipes.

TOXICITY

Joined 2015-2017 on the carcinogen list of IARC Group 2A (probably carcinogenic (EPA USA). In 2015, the European Food Safety Authority (EFSA) considered that unlikely that glyphosate presents a carcinogenic hazard to man. Possible endocrine problems: disruption of aromatase activity. Its toxicity also depends on other compounds in different formulations marketed Notes: "There is no data on exposure to glyphosate alone, but only in commercial preparation Acute exposure to these preparations is irritating usually Voircaustique, skin and mucous membranes Allergic reactions are reported The voluntary intake or accidental causes severe disease can be fatal the presence of surfactant in the preparation. was blamed pulmonary complications commonly seen repeated exposure causes contact dermatitis An increased risk of developing certain blood diseases. A was reported, but no conclusions can be made at present there are no data on the genotoxic effects or toxic for reproduction "(INRS-February 2018). "The results (low toxicity of glyphosate) are increasingly controversial due to several publications from the animal model that ascribe nephrotoxic properties neurotoxique.s, teratogenic and effects as endocrine disruptors" (CNRS June 2016). "The current assessment concluded that the weight of evidence indicates that glyphosate does not have endocrine disrupting properties through an extensive database available in the field of toxicology, by estrogen, androgen, thyroid or steroidogenesis "(EFSA August 2017).

STATUS

Under supervision (EPA USA)

Metam sodium

CASE NUMBER 137-42-8

FAMILY
Pesticide

SUBFAMILY
Insecticide / fungicide

CHEMICAL FUNCTION
carbamate

MAIN USE

Disinfectant for mold and fungus. Insect Elimination. protection of multiple-acting cultures agent for sterilizing soil before planting.

SOURCES

Vegetables, fruit. Ornamentals.

TOXICITY

Reprotoxic. Listed as "endocrine disruptor or disruptive potential endocrine system" in the EU regulations and not included in the List of Prohibited Pesticides. Carcinogenic. Toxic to the liver and urinary system. sensitizing agent.

STATUS

Under supervision WFD (EU)

Quinacetol

CASE NUMBER 2598-31-4

FAMILY
Pesticide

SUBFAMILY
Fungicide

CHEMICAL FUNCTION
quinoline

MAIN USE

Elimination of parasitic fungi.

SOURCES

Potatoes.

TOXICITY

Quinolines may harm the developing fetus, can be neurotoxic, can cause liver disease and have a potential carcinogenic and mutagenic.

STATUS

Authorized

thiacloprid

CASE NUMBER 111988-49-9

FAMILY
Pesticide

SUBFAMILY
Insecticide / molluscicide

CHEMICAL FUNCTION
neonicotinoid

MAIN USE

Action against sucking and chewing insects (agricultural crops).

SOURCES

Apples, pears, citrus fruits. Cabbage, carrots, peas, potatoes, oilseed rape.

TOXICITY

Joined in the "Likely to be carcinogenic to humans" on the list carcinogen by the US EPA. Toxic to the liver and thyroid.

STATUS

Under supervision (EPA USA)

Tri-iso-butyl phosphate

CASE NUMBER 126-71-6

FAMILY
Other

SUBFAMILY
Synthesis intermediate

CHEMICAL FUNCTION
organophosphorus

MAIN USE

textile and adhesive industries. Aviation industry. Plasticizer and antifoaming agent in aqueous systems.

SOURCES

Mainly flame retardant in household cleaning products and furnishings. But also in plastic objects, textiles and adhesives. Stains. paint additives. At work: component of hydraulic fluids, building materials.

TOXICITY

Reprotoxic (congenital abnormalities). Mutagenic (malformations). developmental delay.

STATUS

Authorized

DETECTED METAL DATA

File SPECIMEN1

Metals detected

Aluminum

SYMBOL Al

MAIN USE

Industries: chemistry, metalworking, electronic, textile, pharmacy

SOURCE

Food packaging, kitchen utensils, electrical appliances, alloys (car), pharmaceutical products (vaccines) and cosmetics (antiperspirant), water treatment. Construction industry, street furniture, electrical conductors.

TOXICITY

Haematological, hepatic, renal and immunological effects. Neurotoxic effects (disorders of the central nervous system, memory disorders, disorders of visual-spatial organization, psychomotor disorders ...). Causes oxidative stress in brain tissue. The brain cells of Alzheimer's patients show a very higher concentration of aluminum than normal. Possible involvement in breast cancer (use of deodorants) and in the development of autism.

Cadmium

SYMBOL Cd

MAIN USE

Metallurgical, electroplating, plastics industries

SOURCE

Alloys, electronic components, paints, inks, glass, enamel, ceramics, plastics, tobacco.

TOXICITY

Dry skin, joint pains, neuralgia, anorexia with weight loss. Kidney, bone, dental, cardiovascular and respiratory complications. Suspected of causing lung and prostate cancers (classified as carcinogenic to humans by the International Agency for Research on Cancer (IARC)).

Lead

SYMBOL Pb

MAIN USE

Weapons, nuclear, electricity, metallurgical industries, and plumbing.

SOURCE

Plumbing metal, anticorrosion coating, accumulator batteries, radiation protections, ductile metal (crocker, roof plates, gutters), fuses, solid lubricant, anti-knock (fuel), semiconductors, optical crystal, ceramics, paint. Presence to be reported in cosmetics (white lead), food, drinking water.

TOXICITY

Damage of the central and peripheral nervous system, circulatory system, kidneys and reproductive system. Particularly affects brain development of children (lower IQ and behavioral changes). The neurological and behavioral effects would be irreversible. Ranked as carcinogenic for humans by IARC.

Magnesium

SYMBOL Mg

MAIN USE

Automobile, chemical, metallurgical industries.

SOURCE

Naturally present in food (mainly cereals) and water. Food supplements. Mainly used in automobile, but also airplane and car construction. Tools.

TOXICITY

Necessary trace elements to humans, it is drawn from food. Excess of magnesium is often drug-induced (food supplements). No data known as to the chronic toxicity.

Mercury

SYMBOL Hg

MAIN USE

Electrochemical, metallurgical, pharmaceutical industries.

SOURCE

Naturally present in the environment (but rare). Measuring instruments (thermometres and barometres), batteries, lamps and light bulbs, dental fillings, skin lightening products, cosmetics, pharmaceutical products. In food: fish, shellfish (bioaccumulation). In industry: electrical switches and relays.

TOXICITY

Damage to central nervous system and kidney, cardiovascular and gastrointestinal disorders. Oral inflammation of the mucous membranes and gums (dental amalgam). Metallic mercury and its compounds are classified as carcinogenic to humans (Group 3) by IARC.

Tellurium

SYMBOL Te

MAIN USE

Electronic industry.

SOURCE

Laser printers and photocopiers, laser diodes, photovoltaic cells, infrared detectors

TOXICITY

Toxic to the liver and central nervous system.

Titanium

SYMBOL Ti

MAIN USE

Aeronautics, aerospace, and chemical industries, the military and biomedical sectors, energy and automobile industries, optics, architecture

SOURCE

Aeronautic parts for aircraft or cars, paper, shielding, submarines, dental implants, bone implants, surgical tools, MRI coils, lasers, eyeglass frames, pigment (paint, ceramics, colouring, cosmetics, sunscreen, medicines, toothpaste, sweets, food additive E171), certain plastics, body piercing

TOXICITY

In some cases, Titanium dioxide can release free radicals and cause skin ageing. In 2006 the International Agency for Research on Cancer (IARC) classified titanium dioxide (TiO₂) as possibly carcinogenic to humans (class 2 B)

Vanadium

SYMBOL V

MAIN USE

Metallurgical and aeronautics industries

SOURCE

Naturally present in some foods. Jet engines, stainless steels, flow cells.

TOXICITY

In very low doses, vanadium is a trace element and an essential component of certain enzymes. Exposure to vanadium compounds in humans (as in animals) shows variable effects depending on the compound, the dose, route and duration of exposure: . potential disruption of the hormonal system (mimics insulin) . can have reprotoxic and genotoxic effects (DNA oxidation) and developmental disorders . possible neurotoxic effects (depression, tremors, manic-depressive syndrome)