

Tin allergy

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Tin [chemical symbol: Sn] (Latin: *stannum*, derivative terms used in chemical compounds: **stannous**, **stannic**, **stannate**), is a malleable, so-called post-transition metal with many uses. It is commonly used for soldering and for tin-plating of metal objects including cans for preserved food. It can also be a component of dental amalgams (so-called silver fillings). Tin chloride is used in the textile industry as a mordant - a substance that improves binding of dyes to fabric fibres. Tin chloride and tin oxalate are used as catalysts in the synthesis of organic compounds, including esterification reactions; in methods for the detection of mercury, gold, platinum, and palladium; and in the silver plating of mirrors. Some tin compounds are also used as cosmetic product ingredients, food additives, in cavity-preventing toothpaste, and in certain radio-pharmaceuticals. Organotin(IV) complexes are being studied as anti-cancer agents.

Synonyms and names in other languages

CAS 7440-31-5, Cín, Cyna, EC 231-141-8, Estaño, Étain, Zinn

Tin in cosmetic products / toiletries

Whilst the INCI name Tin may be found listed as an ingredient of a cosmetic product, it is likely that it is not metallic tin that is present in the product but Tin Oxide, this being used to impart desirable physical properties (viscosity, density, opacity, and colour/shimmer) in, for example, eye shadows, eyeliners, and mascaras. Stannous Chloride [= tin(II) chloride; tin dichloride] is included in cosmetic product formulations as a reducing agent (i.e. an antioxidant, protecting other ingredients including pigments from oxidative degradation). Both Tin Oxide and Stannous Chloride are also recognised as pigments / colourants: CI 77861 & CI 77864 respectively. However, neither is listed in Annex IV - List of Colorants Allowed in Cosmetic Products of [Regulation \(EC\) No 1223/2009](#) on cosmetic products. Stannous Fluoride [= tin(II) fluoride; tin difluoride] is an ingredient in fluoride toothpastes, whilst Stannous Pyrophosphate [= tin pyrophosphate] is added to oral hygiene products to prevent dental plaque formation and achieve a soothing effect. Sodium Stannate [= sodium stannate(IV) trihydrate, sodium hexahydroxystannate(IV), sodium hexahydroxostannate(IV), disodium stannic hexahydroxide, disodium tin hexahydroxide] is used in cosmetics to protect the product against photodegradation and to regulate viscosity.

- INCI: Tin
- INCI: Tin Oxide / CI 77861
- INCI: Sodium Stannate
- INCI: Stannous Chloride / CI 77864
- INCI: Stannous Fluoride
- INCI: Stannous Pyrophosphate

Our own analyses showed that among 2210 cosmetics other than toothpaste offered in Kraków stores between 2014 and 2022, over 6% contained tin compounds - most often creams, gels, foundations and lotions for the face and body, hair dyes, lipsticks, lip glosses, and lip balms (Spiewak et al. 2026, Wolowiec & Spiewak 2026).

Numerous Tin Oxide-, Stannous Chloride-, Stannous Fluoride-, and Sodium Stannate-containing cosmetic products and toiletries are to be found listed on INCIDecoder

INCI: International Nomenclature of Cosmetic Ingredients — In the UK, the European Union, and in other global regions, manufacturers of cosmetic products are legally required to list ingredients on product labels / packaging using standardised INCI nomenclature. The Personal Care Products Council cautions that "The designation of an INCI name for a cosmetic ingredient is an essential part of ingredient identification; however, the assignment of an INCI name does not mean that the ingredient has been approved for cosmetics."

CI: Colour Index, a unique number of a dye in the Colour Index™ International (CI) reference database, published online by the Society of Dyers and Colourists and American Association of Textile Chemists and Colorists.

Tin in food

Stannous chloride is a food additive (E 512) used as a colour stabiliser and antioxidant. In the European Union, Regulation (EC) No 1333/2008 on food additives (as amended by Commission Regulation (EU) No 1129/2011) restricts the use of stannous chloride to a maximum permitted level of 25 mg/kg (expressed as Sn) only for the preservation of white asparagus (EFSA ANS Panel 2018).

Clinical presentation of tin allergy

The source of tin in most previously described cases of allergy has been toothpaste and dental amalgams (Menné et al. 1987, Aggarwal et al. 2010, Pigatto et al. 2011, Enamandram et al. 2014, Toma et al. 2018, George et al. 2023). Cases of occupational eczema including airborne dermatitis have also been described (Nielsen & Skov 1998, Quenan et al. 2014, Gil et al. 2019).

Available diagnostic methods and materials

At present, the only validated method of detecting tin allergy is patch testing performed in line with current guidelines provided by national or international scientific societies, e.g., European Society of Contact Dermatitis (Uter et al. 2026). Patch test material available for testing includes:

- Stannous chloride 1% pet. [Chemotechnique Diagnostics, cat. number S-013] – recommended by the author as most suitable, although some authors raise the possibility of false positive, irritant reactions
- Tin(II) oxalate 1% pet. [Chemotechnique Diagnostics, cat. number S-014]
- Tin (metallic) 50% pet. [Chemotechnique Diagnostics, cat. number T-008]

Positivity rates

The frequency of positive reactions to tin ranges widely depending on population tested and patch test material used. Positivity rates reported to date include:

- 0.3% - 8.2% (Menné et al. 1987, Davis et al. 2011, Haddad et al. 2019).
- 39.8% among 324 Polish consecutive patients patch tested with stannous chloride 1% pet., including clinically relevant reactions in 7.4% (Śpiewak 2024, Śpiewak 2026).

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