



Nickel and Stainless Steel Cookware

Nickel Stewardship



Nickel is commonly used in as an alloying element in stainless steel cookware. The nickel increases the durability of cookware so that pots, pans and utensils can be cleaned thoroughly, over and over again, with minimal tarnishing or corroding over time.

The most typical grade of stainless steel in food contact applications is AISI 304, commonly referred to as 18/8. The first number refers to the amount of chromium that is contained in the stainless (18% chromium), and the second number is the amount of nickel (8% nickel).

Nickel-containing stainless steel cookware has a long history of safe and hygienic use in food contact applications. There is one possible concern however: a very small subgroup of nickel-sensitised people might experience flare-ups of nickel dermatitis after ingesting sufficient volumes of nickel in food and water.

This advisory note seeks to advise manufacturers of cookware and consumers on how to minimise the risk of elevated nickel levels in food.

Assessing the risk

Nickel release from consumer items that come into direct and prolonged contact with the skin (e.g. jewellery) is the central issue in nickel allergy. There is no evidence that nickel in the diet will make anyone allergic to nickel. However, for those already allergic to nickel, there is evidence that for certain hyper-sensitive individuals high nickel levels in the diet may trigger an allergic reaction.

Those hyper-sensitive to nickel and wishing to limit their exposure to nickel are often advised to reduce



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the amount of nickel in their diet. Nickel is present in the diet because it is found naturally in soils and water. Nickel is taken up in small amounts by all plants as an essential element for healthy growth. Some plants, however, accumulate more nickel than others. To reduce the amount of nickel in the diet, therefore, hyper-sensitive individuals may be told to avoid oats, nuts, cacao (chocolate), pulses (such as peas, beans and lentils) and other foods.

Advice sometimes goes beyond the foods consumed to consider the pots, pans and utensils used to prepare the food. The concern is that the nickel present in the diet is being increased by nickel that "migrates" from stainless steel pots and pans during cooking.

A number of studies on this subject have studied the effects of how cooking aggressive foods (tomatoes, apricots, rhubarb: fruits known for their acidity) contributes to the amount of nickel added to the cooked final products. Some increase was noted, particularly from new pots and

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pans, but the amount released decreased quickly after the first 3 or 4 uses.

In one typical study, new stainless steel pots showed an average pickup of 0.2 micrograms nickel per kilogram of food cooked. After five cooking and cleaning operations, the stainless steel pots showed an average pickup of 0.03 micrograms nickel per kilogram of food cooked. These are relatively small contributions to the average range of dietary intake of 100 - 600 micrograms nickel per day.

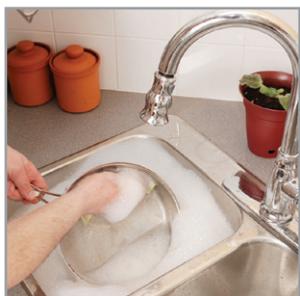
Nickel-containing stainless steels in cooking vessels and utensils are therefore not significant in the consideration of the overall exposure of any individual to nickel either by dermal (skin contact) or oral (ingestion) routes of exposure.

Recommendations

For designers and manufacturers:

Be aware that the Council of Europe has developed recommendations for the use of metals and alloys intended to come into contact with food¹. These recommendations include the following for nickel:

- The migration of nickel to foodstuffs should be as low as reasonably achievable and no more than: 0.1 mg/kg as a general limit of migration into foodstuffs. In the case of stainless steel, these values can safely be reached if, before initial cooking (first use of new items), the food contact items are exposed to boiling water and the water is discarded.
- Nickel-plated food contact materials should not be used.
- Nickel-containing food contact materials with the exception of stainless steel should be labeled to ensure that the product meet the above recommendations.



When purchasing new cookware, thoroughly wash with water and detergent before use.

For consumers:

When purchasing new cookware, thoroughly wash with water and detergent before use. For new pots and pans, boil water in cooking vessel and discard the water prior to first use.

If you are concerned about the amount of nickel in your diet, be aware that there are two consumer products that could also be considered: kettles with nickel-plated immersion heating elements and chromium-nickel plated taps and faucets. For more information about these specific cases, please refer to the corresponding Advisory Notes entitled Nickel and Kettles, and Nickel and Water Faucets.

Nickel Institute policy and practice

As part of the Nickel Stewardship programme, the Nickel Institute communicates with manufacturers and industry bodies to discourage the use of nickel-plated components that come into contact with foodstuffs. More generally, the Nickel Institute works with regulatory bodies on the safe and appropriate use of nickel and nickel-containing materials in all aspects of food and beverage production.

The Nickel Institute will work with any individual, industry sector, dermatological association or government agency to increase knowledge, improve practices or educate consumers. The Nickel Institute supports the use of regulation similar to that that exists in the European Union to reduce direct and prolonged skin contact with high nickel release materials in consumer goods.

Useful reference information

For a technical discussion on the use of stainless steels in food preparation, see Flint & Packirisamy: "Systemic Nickel: The contribution made by stainless steel cooking utensils", Nickel Institute publication number 14033.

If you have any questions or inquiries regarding the use of nickel used in cookware, please direct them to Peter Cutler at pcutler@nickelinstitute.org.

¹ Council of Europe (2001). Guidelines on metals and alloys used as food contact materials.