

“All woods can be toxic to humans and other living things!!”

But does that mean that YOU are allergic to any particular type of wood?

TOXICITY:

By definition, an allergy occurs when a person's immune system reacts to substances in the environment that are harmless to most people. This allergic reaction is due to the body developing antigens (a defence) against a “foreign” substance. These “foreign” substances are known as allergens and are found in many things, one of which is wood.¹

Many sites on the internet provide information on toxic/allergic reactions to different types of woods, including this website (<https://www.bois-exotique.com/wood-species/>). It is a good precaution to verify allergy symptoms associated with a particular wood to ensure appropriate measures for controlling the reactions should there be contamination of either the woodworker or individuals who come into contact with the woodworker.

In general, toxicity occurs by one of the following methods: Irritation (caused by skin contact absorption – think “nicotine patches”), sensitization (caused by repeated exposure – think “smoking cigarettes”), and poisoning (caused by exposure to bark or sap in certain trees or plants -- think “poison ivy”).

The most common way that wood can cause harm is through the respiratory system (e.g., breathing in wood dust). Other methods of bodily penetration are through the eyes, ears, pores, cuts, and open sores.

DUST:

Woodworking involves removing unwanted wood (carving/sculpting/woodturning, etc.) to obtain a desired form. It can also involve the assembly of pieces of wood which have been cut/perforated/sanded to create a project. In either case, dust is created during the process.

“*Fine Particulate Matter*” (also known as “PM_{2.5}”) are particles in the air that measure less than 2.5 micrometers (µm) in diameter; these typically consist of common things like smoke, soot, liquid or solid particles in aerosol, or also biological matter like mould, bacteria, pollen, animal dander, and wood dust. PM_{2.5} poses a risk to your health because, when inhaled, it can travel deeply into your lungs.

In woodworking, there are basically two types of dust, “heavy” dust and “fine” dust.

Heavy dust is often referred to as “sawdust”; it typically weighs more than 30 microns and will generally yield to gravity and immediately fall to the floor.

Fine dust is ambient dust (a.k.a. “PM_{2.5}”); generally, it is not very noticeable while floating around. It is also susceptible to electrostatic electricity and will stick to walls (wipe a small section of wall in the workshop area with a clean paper towel—you will be surprised!) and other surfaces quite readily. Even when there is no dust-producing activity in a shop, air displacement caused by walking around will stir up dust clinging to surfaces.

It should be noted that the dimensions of wood dust from sanding range between 0.005 to 100 microns in diameter (for comparison, the average diameter of a human hair is 60 microns). As an average, 1 mg of dust = 2 million 10 micron particles. To correctly calculate air filtering units required for an area, verify its C.F.M. (cubic foot per minute) and particle size rating.

¹ This article discusses wood in its natural state. It does NOT include wood by-products such as MDF, Press wood, Plywood or any other processed wood products.

Suspended particles can “float” around anywhere from a half an hour to a couple of days. The workplace exposure standard for airborne inhalable wood dust is 1 mg/m³ for hardwoods and 5 mg/m³ for softwoods (based on an 8-hour time-weighted average). There are many different types of equipment that can be used to test the air, such as samplers, analyzers, and direct-reading devices.

Either type of wood dust can cause reactions. The reactions caused by heavy dust will typically be of the “dermatitis” type. This means that areas where the wood shavings or dust have touched the skin may become red, swollen, and sore; often the area will itch and sometimes there may be small blisters.

Wood-workers can inhale fine dust particles if not properly protected. The upper respiratory system (nostrils, nasal cavity, mouth, throat (pharynx), and voice box (larynx)) can filter out the larger particles by sneezing or coughing, but smaller particles can go deep into the lower respiratory tract through the trachea (windpipe) and into the bronchial tubes carrying air to the lungs and branching into smaller and smaller bronchioles ending in the alveoli (air sacs). The particles in the air may then cause irreversible damage and scarring of the tissues. Breathing in wood dust may cause allergic respiratory symptoms, mucosal and non-allergic respiratory symptoms, as well as cancer.

The preceding discussion was primarily aimed at the wood worker indicating an occupational hazard. But what about the wooden item itself. Is a bowl, plate, or cutting board made from wood safe to use?

CONTAMINATION:

It is assumed that when the confection of the item is complete, there will normally be some form of a finishing product (normally with a “food safe” designation) applied to the surface, as the types of items mentioned above will be used in a “wet” environment.

Before the application of a finishing product whether a penetrating oil (“mineral oil”) or a catalyzing “topcoat” (“Tung oil”), the surfaces will be well cleaned, removing any dust in order to maximize the penetration or adherence of the finishing product.

Once the finishing product is applied and allowed to dry, the wood is protected from external elements. Which also means that any possible tiny particles of wood dust will be trapped under the finishing coat, rendering it inaccessible. So, if particles are inaccessible, then contamination is not possible.

There are arguments that a few particles (microns) of wood can be cut away from a surface such as a cutting board when cutting food and be ingested. Can a couple of microns be a problem? It is possible, but improbable. We ingest many more microns of toxic matter every time we breathe in one gulp of air.

At this point, the discussion becomes academic in terms of potential risk from a bowl, cutting board or any other wooden item used with food, much like the probability of being hit by a car while crossing a street. 1 in 10? 1 in 1,000? 1 in 1,000,000?

References:

https://www.ccohs.ca/oshanswers/chemicals/wood_dust.html

<https://www.worksafe.govt.nz/topic-and-industry/dust/wood-dust-controlling-the-risks/>

https://www.ccohs.ca/oshanswers/chemicals/lungs_dust.html

<https://www.canada.ca/en/health-canada/services/air-quality/indoor-air-contaminants/fine-particulate-matter.html>

<https://www.canada.ca/en/health-canada/services/publications/healthy-living/infographic-fine-particulate-matter.html>

<https://forum.canadianwoodworking.com/forum/workshop-talk/shop-related-discussions/dust-collection/1247422-musings-on-dust-collection>