

Risks Presented in Walnuts



Aflatoxins

Mycotoxins (ie: aflatoxins and ochratoxins) can develop in a variety of foodstuffs. In dried fruit and nuts the most common strands of these are B1, B2, G1 and G2. Aflatoxins are produced by strands of the *Aspergillus* fungus. These are caused when the foodstuff gets mouldy, creating an ideal environment for the fungus to grow. The most common varieties of the fungus found in walnuts are *Aspergillus flavus* and *A. parasiticus* which thrive in hot and humid environments. Tree nuts (ie: almonds, walnuts, pistachios) are most at risk of aflatoxins. Kernels that have been affected by insect damage or other damages that might expose the nut are more susceptible to aflatoxins. The fungus also commonly develops when the nuts are lying on the ground, allowing them to come into contact with numerous microorganisms. Of the tree nuts, walnuts seem to be the most resistant to aflatoxins, having some of the fewest cases of alerts in the EU. Growth of aflatoxins can be reduced by mechanical drying (for more information on processing see our [Harvesting and Processing information sheet](#)). It can also be prevented with good hygiene practices during the orchard phase, and proper storage conditions (low humidity, cool temperatures) during and after production.

Mould

Mould seems to be the biggest issue for this crop. It is caused by fungi; particularly *Aspergillus*, *Penicillium*, and *Alternaria*. Some research has indicated that the earlier the kernels split, the more likely it is that the kernel will develop mould. Kernels that may be more susceptible to mould are as follows: nuts with insect damage (namely Navel Orangeworm), sunburned nuts, kernels with large splits or shrivelled husks and nuts that have been on the ground for over two weeks before harvest. These nuts are more susceptible because the mould is able to colonize in the damaged nut flesh, therefore, making the nut unmarketable. It is important to maintain proper storage conditions and avoid moist/humid environments in order to reduce the likelihood of mould development.

Rancidity

Since walnuts are a rather oily nut, they can be more susceptible to rancidity. This occurs when the oils in the nut oxidise, meaning triglycerides in the nut are exposed to oxygen. It is also caused by hydrolysis (the introduction of water). Rancidity causes an off and unpleasant taste and odour. The most common way of testing for rancidity is through peroxide values and free fatty acids. As the nut oxidises the peroxide value decreases. Rancidity can be avoided by

practicing proper packaging and storage. It is important to keep these nuts in air/water tight containers, in the proper temperature (ideally cold store 2-10°C).

Infestation

1. Navel Orangeworm (*Amyelois transitella*):

The *Navel Orangeworm* (NOW) is the most common pest for walnuts. These worms are most likely to infest the kernels once the hull begins to split and expose the in-shell nut. The damage can be hard to see as minor infestation normally causes internal damage. However, more severe infestations can cause prominent damage to the nut, shell and hull. The visible damage from NOW is webbing and frass in/on the nut kernel. Mummy nuts are particularly susceptible to this infestation as they are left in the tree or on the orchard floor for a prolonged period of time. The presence of these mummy nuts makes the spread of the infestation more likely. Therefore, keeping these to a minimum by practicing good orchard hygiene is very important.

2. Ambrosia Beetles:

The ambrosia beetle is a boring pest. There are two varieties; the more serious being the *Xylosandrus germanus*. As the beetle bores into the tree, it transfers a fusarium fungus. This fungus will cause the entry area to canker as well as cause extra sprouting at the base of the tree. Although the fungus may show some damages, it is still very difficult to determine if a tree/fruit has been infected. Commonly it is unknown that the pest has attacked the tree until the tree dies. It is necessary to inspect the fruits closely for 'pinholes' made by the beetle. This pest is found in the United States.

3. Walnut Husk Fly:

This fly can be identified by a characteristic yellow spot where the wings meet the body. The female flies lay their eggs just under the husk surface. These eggs develop into maggots which feed on the nut for about a week before falling to the orchard floor and overwintering until the next harvesting season. Certain walnut varieties are more susceptible to the husk fly, such as the Chandler and Ashley. The damage caused by the fly is as follows: blackened husk, shriveled kernels, soft husk, decay, etc. Although late infestations cause little to no damage to the inshell kernel. This pest is mostly found in California orchards.

There are obviously a number of pests not mentioned here which can also affect the walnuts. The risk of these infestations makes good sanitary/hygiene practices in the orchards a vital practice. Although, infestation is most common while the nuts are in the orchard, it is possible for infestation to occur at any point. Therefore, we recommend checking the goods on delivery for any signs of infestation (for more information on inspecting cartons, [click here](#)).

Tree Damage and Disease

1. Walnut Blight:

Walnut blight is one of the common diseases for walnuts, caused by the *Xanthomonas campestris* bacterium. The bacteria over-winter on the buds. The bacteria spreads and infection occurs when the buds open. This will cause black spots on the leaves, sprouts and fruits. Many of these leaves and fruit will fall prematurely from the tree, while others will remain intact, but turn shriveled and black. This disease can cause damage to the kernel as well. Lesions can appear on the hull and this can make the nuts more susceptible to other infection or infestation. The Chandler species is the most commonly requested species which is quite resistant to blight. Walnut blight can eventually cause low yield and, if severe enough, tree death.

2. Walnut Blotch (Walnut anthracnose):

Walnut blotch is another common disease that can infect walnut trees. This disease is caused by the *Gnomonia leptostyla* fungus (which is now the *Ophiognomonia leptostyla* fungus, an imperfect stage of *Marssonina juglandis*). This is most commonly an issue in the eastern blackwalnuts that are naturally found in the south east of the United States, where most trees that are infected experience severe infection. The varieties most commonly grown in the Jammu and Kashmir region of India have been thought to be very resistant to this disease. Walnut blotch can be recognised by its characteristic round dark spot with a yellow ring on the leaves of the tree. The walnut husks will also be affected, developing sunken spots and, if infected early, will detach from the tree early. This disease can also cause low yield and weak/dying trees over time.

Physical Contaminants

1. Septum:

The septum is the section of the walnut that develops between the two halves of the walnut. It is hard, spiky and can be damaging if bitten or swallowed. It can get lodged in the throat and can cause some serious health risks. Therefore, it is very important to inspect the nuts thoroughly. Although the product passes through foreign body checks, it is possible that a septum could make its way into the final product as it is of similar colour to the kernel itself. It is also very small and light, making it harder to detect.

2. Shell:

Adhering shell or shell fragments are a potential risk with walnuts. This is possible when the shell is not cracked cleanly and parts of the shell remain stuck to the kernel. It is also possible to find pieces of shell in the finished product. The product does go through foreign body checks which should pick up on and remove any shell pieces. However, due to their similar colour and variety in sizes, it is possible for some fragments to find their way into the final product. Again, it is recommended that the goods are inspected for shell fragments upon reception.

References:

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