

Diatomaceous Earth as Insecticide

Diatomaceous Earth (DE) is a naturally occurring, soft, siliceous sedimentary rock that is easily crumbled into a fine white powder. It contains fossilized remains of marine phytoplankton, the diatom. Food grade DE can be used for pest control.

DE is used in various products. Due to its abrasive nature, it is used in some toothpaste. It can also be used as insecticide in terms of its action on insect exoskeleton. It absorbs and removes the protective waxy covering of insects that are exposed to it. This covering protects insects from water loss so they dehydrate when the protective layer is removed. The abrasiveness of DE elevates the mode of action by injuring the insect body with sharp edges of the diatom remains, causing further exposure to desiccation. The DE powder must be kept dry to be effective. Moisture causes the fine powder to clump and lose its absorptive properties.

The advantages of using DE over conventional insecticides are safety to pets and humans and proven effectiveness notwithstanding insecticide resistance. However, DE does not work well in humid conditions and it is not recommended to use in areas with regular flushing. DE which has become damp should be removed and reapplication is necessary. Moreover, premises with the application of DE may appear to be dusty.

When using DE as insecticide, product instruction and insecticide label should be strictly followed. Face mask, goggles and gloves should be worn when handling DE as the abrasive and absorbent nature may dry out the skin and cause irritation when breathed in

or get into the eyes. To achieve effective pest control, sanitation efforts are keys. Elimination of food sources and harbouraging places for pests are the basic and long term approach. Application of insecticides could only provide a short term and immediate effect, so it should be considered as a supplementary effort and the last resort in pest control strategies.



Diatomaceous Earth (DE)

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Rice weevil

The rice weevil, *Sitophilus oryzae*, is one of the most economically important pests of stored whole grains in the world. This weevil is widely distributed worldwide in warmer regions. They are usually found in grain storage facilities or processing plants, infesting rice, wheat, oats, corn, nuts, rye, and barley. At home, infestations are generally found in rice, beans, sunflower seeds, whole corn, and occasionally in old pasta such as macaroni and spaghetti.



The rice weevils are small snout beetles. Adult weevils are reddish-brown and about 3 mm long. There are four light red or yellow spots on the corners of the hard protective forewings. They have a long snout of about 1 mm, which is almost 1/3 of the total length and is an easily recognizable character of rice weevils. Both adults and larvae feed on a wide variety of grains. The female bores a hole in a grain kernel by the mouth part at the tip of the snout. It then deposits a single egg in this depression, and seals the hole with a gelatinous fluid. She may lay as many as

300 to 400 eggs in her average lifetime of four to five months. The egg hatches into a legless larva which has a short, stout, whitish body and tan head. It feeds on the interior of the grain kernel. When mature, the larva changes to a white pupa and later emerges as an adult beetle. The adult can fly and is attracted to light. They feign death when disturbed by drawing their legs close to the body and then lying still for several minutes.

Rice weevils are harmless to people, pets, furniture and clothes. They do not bite, sting or transmit diseases. The damage they do is destruction of the grains they infest. Products contaminated by this beetle can cause serious reduction in value.

Prevention is the best strategy to avoid rice weevil problem in stored grains. Carefully inspect the items before purchasing can help prevent getting an infestation. Products with holes or signs of damage on the packaging should not be purchased. Items should be inspected again at home before putting them into storage containers. Since weevils are attracted to unsealed grains, always store food items in airtight glass, metal or heavy plastic containers or in the refrigerator or freezer. If infestation is later observed in such containers or infestation is already existed, control could be done by discarding of the infested item, in case it is too damaged to be fit for consumption. Alternatively, it can be saved by controlling the weevils with heat or cold. Heating the infested item to 60°C for one hour or freezing at 0°C for a week will kill all stages of weevils. Cupboards or shelves holding infested items should be thoroughly vacuum cleaned, with special attention to cracks and corners. To avoid the likelihood of contaminating the food items with insecticides, insecticide sprays are not recommended for controlling insects in stored food cupboards.

Sanitation plays a very important role in denying stored product pests. Proper storage, prompt removal of spillage and regular cleaning can prevent future infestations or the spread of current infestations.

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