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**VITERRA** THE  
AGRICULTURE  
NETWORK

## FOOD SAFETY FACT SHEET

# TOPIC: DIATOMACEOUS EARTH

### What is diatomaceous earth (DE)?

Diatomaceous earth is made from the fossilized remains of tiny, aquatic organisms called diatoms. Their skeletons are made of a natural substance called silica. Today silica deposits are mined in areas where diatoms accumulated in sediment.

Most diatomaceous earth is made of amorphous silicon dioxide. However, it can contain very low levels of crystalline silicon dioxide. The first pesticide products containing silicon dioxide (diatomaceous earth) were registered in 1960 to kill insects and mites.

Testing has shown that there is no effect on end use quality regarding baking, malting or pasta production with grain treated with DE.

The U.S. Food & Drug Administration lists diatomaceous earth as "Generally Recognized as Safe."

### How does diatomaceous earth work for insect control?

Diatomaceous earth is not poisonous; the mode of action is physical desiccation. DE causes insects to dry out and die by absorbing the oils and fats from the cuticle of the insect's exoskeleton. Its sharp edges are abrasive, speeding up the process. It remains effective as long as it is kept dry and undisturbed.

### Uses of diatomaceous earth for insect control:

DE products are used for dry empty container treatments where grain is transported or stored. Examples are silos, grain elevators, food and feed processing facilities, rail cars, ships, and truck trailers.

DE products are also used for general, spot and crack and crevice treatment.

DE products can also be used for treatment of stored grain.

### Diatomaceous Earth products approved by Viterra:

Protect-It and DE-CIDE are two DE products that have been approved for **treatment of stored grain.**

Protect-It ingredient: Amorphous silicon dioxide comprised of 90% Natural Diatomaceous Earth and 10% Silica Gel. Health Canada PCP No. 24259

DE-CIDE ingredient: 100% Naturally Occurring Diatomaceous Earth. Health Canada PCP No. 27265

### Factors to consider regarding diatomaceous earth use:

**Moisture Content:** Since desiccation is the mode of action, treating high moisture content grain with DE products will have low efficacy, and will not control insects as it would being applied to dry grain.

**Grain temperature:** Grain temperatures between 18 and 40C are ideal for insects like Rusty grain beetles to have population growth explosions. Diatomaceous Earth requires a 6-week treatment period if the grain temperature is above 20C. Rusty grain beetles do not feed or reproduce at grain temperatures below 15C. Rusty grain beetles are one of the most cold tolerant stored product insects. A constant grain temperature of -5C would take 12 weeks to freeze kill stored grain insects, with no other pest control measure taken.

**Time to work:** Treatment time needs to be considered when looking at inventory space and upcoming shipments. It is recommended to wait 4 weeks after treatment before blending the DE treated grain. We have found that DE products have been effective in as little as 14 days after application.

**Label directions:** If label directions for application are not followed then Diatomaceous Earth may not be effective in controlling infestation. Label directions are important to know when procuring the DE product as the amount required depends on the amount of grain needing treatment considering the commodity infested and the type of insect.

**Test weights:** If too much DE is used, there is a potential for the grain to have a reduced test weight.

**Costs:** Costs will vary depending on the DE product used, type of insect infestation, the commodity to be treated and the amount that requires treating. Below are examples of approximate costs for Rusty grain beetle control using Protect-It.

- Treating a bin with 500MT of wheat would cost approximately \$5000.00



- Treating a bin with 200MT of oats, flax or soybeans would cost approximately \$2200.00

Costs to consider would also be missed shipping opportunities and loss of inventory space for up to 1 month.

**Control of primary insects:** Diatomaceous Earth is only one option for controlling insects feeding on stored grain. Other options that have worked include freezing through cold temperatures. Grain temperatures can be lowered by aeration or turning grain slowly during cold days.

### Resources:

Canadian Grain Commission "Insecticides to control grain insect pests" & "Physical control of grain insect pests" [www.grainscanada.gc.ca](http://www.grainscanada.gc.ca)

Health Canada Consumer Product Safety Registered products. [www.hc-sc.ca](http://www.hc-sc.ca)

Protect-It label [www.hedleytech.com](http://www.hedleytech.com)

DE-CIDE label [www.absorbentproductsltd.com](http://www.absorbentproductsltd.com)

Diatomaceous earth: Advantages and limitations by Paul G. Fields from the proceedings of the seventh International Working Conference on Stored-product Protection - Volume 1.

