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Research Information for Farm Advisers

From the Grains Research and Development Corporation (GRDC)

Research Update

Keep Phosphine Safe

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GRDC

Grains Research & Development Corporation

Keep phosphine safe

Phosphine fumigation, often called 'bombing' with phostoxin, is commonly used to control weevils in grain. The grains industry must retain this product in order to deliver insect and residue-free grain. Alternatives to phosphine are more expensive, more difficult to use, and less accepted by markets.

However, the future availability and effectiveness of phosphine as a grain treatment is under threat on two fronts:

- Insect resistance to phosphine is being found more frequently – all stages of the resistant insects can survive fumigation in unsealed silos.
- If phosphine's good safety record is not upheld, it could be withdrawn from some uses including on-farm use.

Continuing use of this important grain insect treatment depends on safe, responsible use - ***Keep Phosphine Safe.***

Controlling resistance

Phosphine fumigation in unsealed silos or containers does not kill resistant insects, and can lead to resistance. Phosphine leaks quickly from an unsealed silo.

However, fumigation in a sealed silo passing a pressure test keeps the phosphine concentration high for long enough to kill resistant insects.

In a sealed silo the phosphine-generating product should be applied in the headspace. Bag, chain or belt formulations, which have the powder enclosed in fabric, can be hung from the roof of the silo. Tablets can be applied in trays such as disposable baking trays hung in the headspace, but tablets should not be heaped together otherwise a fire or explosion might result. Keep the silo sealed for the full exposure period on the label. After fumigation and ventilation to remove the phosphine gas, the residual powder can be removed safely from outside the silo. The residue does not contact the commodity being fumigated, so there are no residue problems.

Be careful

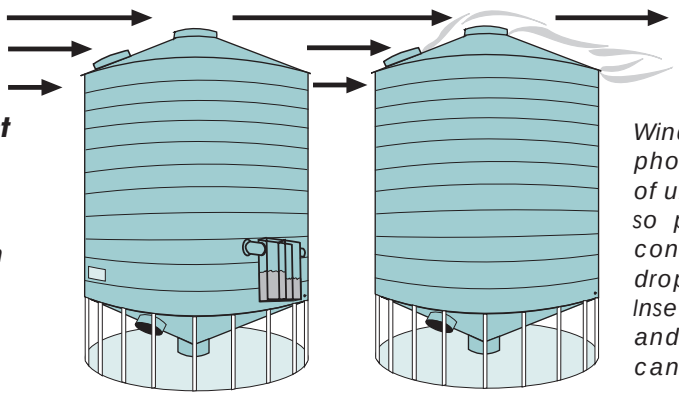
Phosphine tablets release toxic gas when exposed to air. These products can kill if:

- the tablet is swallowed
- the phosphine gas is inhaled.

The residual dust can be harmful if swallowed or inhaled by humans or livestock, as it can release more phosphine gas.

Will your silo Keep Phosphine Safe against resistant insects?

Phosphine concentration stays high in a sealed silo, killing resistant insects.



Wind draws phosphine out of unsealed silos, so phosphine concentration drops quickly Insects survive and resistance can develop'.

Phosphine is flammable and explosive at high concentrations.

Everyone using phosphine has a moral and legal duty of care to prevent others being harmed. Follow label directions and Keep Phosphine Safe.

Safe practices

Plan ahead - inspect and treat grain well in advance of handling and implement practices which do not put grain handlers and truck drivers at risk of exposure to phosphine gas and the residual dust.

- **Do not fumigate during transport**
- **Do not** move or handle treated grain before the full exposure period **followed by** the full ventilation period to remove phosphine
- **Do not** fumigate where gas could leak into working or living areas
- **Do not** mix tablets with grain.
- **Do not** add water to phosphine-generating products and **do not** heap tablets together as these practices can cause a fire or an explosion.

Observe label directions for safe storage, application and disposal of residues. These include:

- **Do not** handle or carry phosphine-generating products in a confined space or inside a vehicle.
- **Do not** allow children or livestock near the fumigation area.
- **Do not** enter a silo or fumigation area to clean out residual dust unless wearing a respirator with an appropriate phosphine exclusion cartridge, not a dusk mask, or self-contained breathing apparatus.
- **Do not** handle or carry the residual dust from the tablets in a confined space. Immerse the residual dust in soapy water or bury it 500 mm deep away from living or working areas.

How long does safe use take?

- Safe practice requires a **minimum of eight days** from application to handling the grain, and a **minimum of 10 days** from application to using the grain. The minimum safe periods are longer in many cases - follow label directions for exposure and ventilation periods.
- Phosphine tablets take up to five days to release all the gas.
- An exposure period of at least seven days is needed to kill all stages of weevils – longer periods are needed for some formulations or for low temperatures.
- After the exposure period a ventilation period is needed to remove phosphine gas from the grain so it can be handled safely.
- After the exposure and ventilation periods, a withholding period of another two days is required before the grain can be used.

DON'T BE REJECTED!

Increasingly grain handlers are monitoring grain deliveries for phosphine gas and will reject loads if they find it. This action is necessary to protect the safety of their workers. Use phosphine safely and responsibly - DO NOT treat grain in transit or just prior to handling or you may suffer the costs of your grain delivery being rejected and be liable for an offence against the label.

Alternatives to phosphine

If you do not have sealed silos, consider using other methods to avoid insect problems. These include:

- Deliver your grain during or soon after harvest.
- Use controlled aeration to cool the grain. Clean your storages and handling equipment, and turn aeration on as soon as grain goes into storage.
- Spray the grain with protectant insecticides, but first check if your buyers accept them. These insecticides are not registered for use in Western Australia.

If you have weevils in grain to be delivered:

- Fumigate on-farm before delivery, allowing sufficient time for exposure and ventilation, or
- Spray the grain with dichlorvos and hold it for the required withholding period. (Note that dichlorvos is not registered for use on pulses or oilseeds anywhere in Australia, and not for any grain in Western Australia), or

For the future, use reliable insect control methods to protect grain in storage, and inspect the grain before sale to allow time for treatment well prior to transport if it is infested. Invest in sealed storages if you plan to upgrade your storage system.

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