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## UK FLOUR MILLERS BRIEFING DOCUMENT

# Pesticides for use in grain stores

*Revised October 2018*

### Summary

The range of agrochemical (pesticide) products for use both on stored wheat and on the fabric of grain stores remain restricted. Four active ingredients are available to treat both grain and the fabric of grain stores. Phosphine is also available as a fumigant treatment for buildings but can only be applied by trained and qualified contractors. Desiccant dusts (diatomaceous earths) also remain available for the treatment of stores and grain. However, some millers have encountered flow-rate issues when handling wheat to which they have been added and generally the milling sector does not favour wheat treated in this way.

### Post-harvest treatment of grain

Grain that is in long-term storage may be protected from insect and mite infestation in a number of ways. Pesticides may be applied as residual insecticides, fumigants or as diatomaceous earths. All grain arriving at flour mills will be accompanied by a combinable crops passport indicating whether post-harvest insecticides have been applied.

For UK-produced grain, the following residual insecticides may be used: **chlorpyrifos-methyl**, **cypermethrin**, **deltamethrin**, and **pirimiphos-methyl**.

### Contact insecticides

These offer some protection over a prolonged period after application but may take time to control an existing infestation. Control may take longer to achieve at lower temperatures depending on the active ingredient.

Deltamethrin is a 'relatively old' active ingredient and has been used in other situations for many years. Pirimiphos-methyl has been reviewed several times but remains approved. Both K-Obiol (deltamethrin + piperonyl butoxide) and Talisma (cypermethrin + piperonyl butoxide) have **UK Flour Millers** approval for use on milling wheat and in stores. Piperonyl butoxide is a synergist for the deltamethrin to produce a rapid 'knock-down' of insects.

The following are ‘approved’ for use on stored grain and to treat the structure of empty grain stores.

Active Ingredient	Trade Name	Application Rates	Comments
Chlorpyrifos-methyl (225g/l)*	Reldan 22 (Dow AgroSciences)	For structures: 200ml product in 5 l water per 100 sq.m surface.  For grain: Apply to grain on conveyors at the rate of 20 ml product in 1.5 l water per tonne of grain on conveyor rates below 5 tonnes per hour. At higher conveyor rates apply 0.75 l water per tonne.  For immediate eradication a rate of 10ml/tonne can be used.	Water volume may be increased to 10 l per 100 sq.m on porous surfaces.  A minimum of 90 days must elapse between treatment of grain and consumption or processing.  However, there is no withholding period when product has been applied at rate for immediate eradication.
Cypermethrin (80g/l) + piperonyl butoxide (228g/l)	Talisma EC (Agriphar)	For grain: 1 – 2 litres Talisma EC diluted in 99-98litres water per 100 tonnes grain.  For porous structural surfaces 0.06 litres Talisma EC diluted in 5 l water per 100 sq.m surface. For non-porous structural surfaces 0.03 litres Talisma EC diluted in 5 l water per 100 sq.m surface.	Rate depends on period and type of protection sought  Ideally, treatment should be applied 3 months before the grain goes into store.
Cypermethrin (6.75 % w/w)	Phobi Smoke Pro 90C	One generator per 570 m <sup>3</sup> . Maximum two treatments per storage area for stores intended to contain cereals.	For use in empty grain stores.
Deltamethrin (25g/l) + piperonyl butoxide (225g/l)	K-Obiol EC25 (Bayer CropScience Ltd)	For porous structural surfaces: 20-30ml product in 5 l water applied to 50 sq.m surface. For non-porous structure surfaces: 40-60 ml product in 5 l water applied to 100 sq.m surface.  For grain: 1 l of product in 99 l water applied to 100 tonnes grain.	Approved by Chemicals Regulation Directorate (CRD) and accepted by <b>UK Flour Millers</b> for use on milling wheat.
Deltamethrin (6g/l) + piperonyl butoxide (54g/l)	K-Obiol ULV6 (Bayer CropScience Ltd)	For grain: 4.2 l ULV product per 100 tonnes grain.	Approved by CRD and accepted by <b>UK Flour Millers</b> for use on milling wheat.
Pirimiphos-methyl (500g/l),	Actellic 50 EC (Syngenta UK Ltd)	For grain: Apply to grain on conveyors at the rate of 8 ml product in 1.5 l water per tonne of grain on conveyor rates below 22.5 tonnes per hour. At higher conveyor rates apply 0.75 l water per tonne.	Admixture with grain and cannot use hand held equipment.  Where grain has been treated by admixture, it must be labelled as follows: “THIS GRAIN HAS BEEN CHEMICALLY TREATED”.

**N.B.** Products should be applied in accordance with the label and by suitably qualified operatives. Enquiries about specific products should be directed to the relevant supplier.

\* **A lower MRL** for chlorpyrifos-methyl of 0.05 mg/kg applied from 5<sup>th</sup> December 2018. This low MRL effectively ends the use of this active ingredient. However, as long as grain store or post-harvest treatment took place before 5<sup>th</sup> December 2018, the grain would only need to comply with the previous MRL (3.0 mg/kg).

## Maximum Residue Levels (MRLs)

Please refer to briefing on 'Pesticide Residues in Wheat and Flour' for the current MRLs.

## Fumigants

Fumigants have no lasting activity but penetrate and disinfect static bulks. Phosphine and sulphuryl fluoride are the only remaining fumigants for this use in the UK. Phosphine is unusual as it is generated in grain by a chemical process from either aluminium phosphide or magnesium phosphide. The aim of fumigation is to achieve the necessary concentration/time factor for each store or pest present. These products must always be applied by suitably qualified contractors.

Gas Produced	Active Ingredient	Trade Name(s)	Supplier	Notes
Phosphine	aluminium phosphide	Various e.g. Detia Gas Ex-P Detia Gas Ex-T Detia Gas Ex-B  DAI Phostoxin Fumigation Tablets	Igrox  Rentokil Initial Ltd	Various formulations  For use by Rentokil fumigant technicians only
Phosphine	magnesium phosphide	Detia Gas-Ex-B Forte Degesch Plates	Igrox  Rentokil Initial Ltd	For use on bagged/palleted products in shipping containers
Sulphuryl fluoride	sulphuryl fluoride	Profume	Dow AgroSciences  Rentokil	Only for empty stores Professional contractors only

## Diatomaceous earths

Generally, UK flour millers do not purchase grain treated with diatomaceous earth. However, these products may be used for insect control within voids in buildings.

Product	UK Distributor	Rate	Comment
Silico-sec	Interfarm (UK) Ltd – distributed by Nufarm UK	Grain treatment: apply to surface of stored grain at 200g/m <sup>2</sup> for preventative control and 600g/m <sup>2</sup> for curative control and rake evenly into top 30cm.  Structures: SilicoSec requires an air stream to be distributed on surfaces and into crevices. Bellows-type dusters, sand blasters or venturi applicators provide the best solution.  Treatment rate is 10g/m <sup>2</sup> .	90% silica. Registered food additive (E551c). Has Organic approval.
Oa2ki	Barrettine Environmental Health	200g/m <sup>2</sup> of infested grain.	73% silica.  Registered food additive (E551c).  Soil Association recognised. Comes in different form (Concentrate, powder, aerosol)

## Further information

Information on grain storage and the methods that can be used to prevent mite and insect infestation can be found in the [AHDB 'Grain storage guide for cereals and oilseeds'](#).