4.8 Bioaccumulation potential

The partition coefficient (Log P_{ow}) for fluxapyroxad is 3.10 suggesting moderate fat solubility. In the animal metabolism studies residues of fluxapyroxad were higher in fat than in muscle, however in the animal transfer studies fluxapyroxad residues in tissues, including fat, rapidly declined to below the LOQ following a period on clean feed. The potential for bioaccumulation is considered to be low.

4.9 Spray drift

In the dairy cattle animal transfer study provided in support of the application, dosing with fluxapyroxad at 3.19 ppm gave highest residues of parent of 0.0108 mg/kg in fat. For residues of parent to be at the LOQ (0.01 mg/kg) the maximum feeding level is 2.95 ppm. Assuming pasture consists of 1500 kg DM/ha this corresponds to a maximum permitted drift of 4.43 g ai/ha.

Calculations of the average deposition over a 300 metre field using the standard scenarios for ground and aerial application available on the APVMA web site indicate that no spray zones are not required for protection of international trade;

Recommendations

The following MRLs will be established:

Table 1

COMPOUND	FOOD	MRL (mg/kg)
FLUXAPYROXAD		
ADD:		
	All other foods	0.1
GC 0640	Barley	0.2
CM 0640	Barley bran, unprocessed	0.5
MO 0105	Edible offal (mammalian)	0.03
PE 0112	Eggs	0.005
MM 0095	Meat [mammalian][in the fat]	0.05
ML 0106	Milks	0.005
	Milk fats	0.02
PO 0111	Poultry, Edible offal of	*0.01
PM 0110	Poultry meat [in the fat]	*0.01

Table 3

COMPOUND	RESIDUE
ADD:	
Fluxapyroxad	Commodities of plant origin: Fluxapyroxad
	Commodities of animal origin for enforcement: Fluxapyroxad
	Commodities of animal origin for dietary exposure assessment: Sum of fluxapyroxad and 3-(difluoromethyl-N-(3',4',5'-trifluoro[1,1'-biphenyl]-2-yl)-1H-pyrazole-4-carboxamide (M700F008)

Table 4

COMPOUND		ANIMAL FEED COMMODITY	MRL (mg/kg)
Fluxapyroxad			
ADD:			
		Barley forage	7
AS	0640	Barley straw and fodder, dry	7
		Primary feed commodities (except barley forage and barley straw and fodder, dry)	1

The following withholding periods are required in relation to the above MRLs:

Harvest: Not required when used as directed.
Grazing: Do not graze or cut for stock food for 14 days after application.

5 ASSESSMENT OF OVERSEAS TRADE ASPECTS OF RESIDUES IN FOOD

Commodities exported

Barley is a major export commodity along with animals that have been fed feeds containing residues arising from the proposed use. Of the possible rotational crops which are major export commodities residues are not expected to occur in the seed/grain of cereals, oilseeds and pulses. The risk to trade in oaten hay from rotational crops must also be considered.

Destination and Value of Exports

In 2009-10 Australia exported 4256 kt of barley, valued at $1098 million (source ABARES). Information provided by the applicant indicated that approximately 65% of the total Australian barley crop is exported annually, which equates to about 2.1 million tonnes of feed barley.

Information on the destination of Australian exports of barley is not readily available. Information on the ABARES website indicates that the major world importers of barley are China, European Union, Japan, Russian Federation and Saudi Arabia. The barley industry has indicated that the major export markets for Australian feed barley are Japan, Saudi Arabia and Kuwait.

The significant export markets for animal commodities are defined in Part 5B of MORAG.

Proposed Australian use-pattern

BAS 700 01F Fungicide (62.5 g/L fluxapyroxad)

CROP	PEST	RATE PER HA	CRITICAL COMMENTS
Barley	Net form of net blotch (*Pyrenophora teres* f *teres*) Spot form of net blotch (*Pyrenophora teres* f *maculate*)	250 mL (15.6 g ai/ha)	Apply when conditions favour disease development and prior to development of disease in the crop. Two applications at this rate are required for adequate disease control. Apply once at around stem elongation (Z32) and again before ear emergence (Z59). DO NOT apply later than Z59.
	Leaf scald (*Rhynchosporium secalis*) Leaf Rust (*Puccinia hordei*	500 mL to 1 L (31.3 – 62.5 g ai/ha)	Apply when conditions favour disease development and prior to development of disease in the crop. A repeat application may be required if infection pressure persists. Regularly monitor the crop from 3-4 weeks after the first application for signs of reinfection. Apply the higher rate when the disease is present on the upper leaves or when conditions are favourable for disease development. DO NOT apply later than Z59.

CROP	PEST	RATE PER HA	CRITICAL COMMENTS
	Powdery mildew (*Blumeria graminis* f. sp. *hordei*	500 mL to 1 L (31.3 – 62.5 g ai/ha)	Apply when conditions favour disease development and prior to development of disease in the crop. A repeat application may be required if infection pressure persists. Regularly monitor the crop from 3-4 weeks after the first application for signs of reinfection. Apply the higher rate when the disease is present on the upper leaves or when conditions are favourable for disease development. DO NOT apply later than Z59.

Withholding periods:
Harvest: Not required when used as directed.
Grazing: Do not graze or cut for stock food for 14 days after application.

Export of treated cereals
Growers should note that Maximum Residue Limits (MRLs) or import tolerances do not exist in all markets for cereals treated with BAS 700 01F Fungicide. Additionally, some export markets have established MRLs different to those in Australia. If you are growing cereals for export, please check with BASF Australia Ltd or your grain exporter for the latest information on MRLs and import tolerances BEFORE using BAS 700 01F Fungicide.

LIVESTOCK DESTINED FOR EXPORT MARKETS
The grazing withholding period only applies to stock slaughtered for the domestic market. Some export markets apply different standards. To meet these standards, ensure that in addition to complying with the grazing withholding period, the Export Slaughter Interval is observed before stock are sold or slaughtered.

EXPORT SLAUGHTER INTERVAL (ESI)
After observing the withholding period for grazing or cutting for stockfood, livestock that have been grazed on or fed treated crops should be placed on clean feed for 2 days prior to slaughter.

Overseas registration and approved label instructions

The applicant indicated that registration applications for BAS 700 01 EC have been lodged in the USA, Canada, New Zealand and the EU for control of fungal diseases in various crops.

Comparison of Australian MRLs with Codex and overseas MRLs.

The Codex Alimentarius Commission (Codex) is responsible for establishing Codex Maximum Residue Limits (CXLs) for pesticides. Codex CXLs are primarily intended to facilitate international trade, and accommodate differences in Good Agricultural Practice (GAP) employed by various countries. Some countries may accept Codex CXLs when importing foods. Fluxapyroxad has not been considered by Codex. Fluxapyroxad is being considered by the JMPR in 2012 and MRLs may be established in 2013.

The following overseas residues MRLs/tolerances have been established for fluxapyroxad.

COUNTRY	COMMODITY	MRL (mg/kg)
EU	Barley	2
	Bovine and sheep meat	*0.01
	Bovine and sheep fat	0.05
	Bovine and sheep liver	0.03
	Bovine and sheep kidney	*0.01
	Bovine and sheep edible offal	*0.01
	Milk	0.005
USA	Grain, cereal, group 15 (except corn, field, grain; except corn, pop, grain; except corn kernels plus cobs with husks removed; except wheat)	3
	Cattle, fat	0.05
	Cattle, meat	0.01
	Cattle, meat byproducts	0.03
	Milk	0.005
	Sheep, fat	0.05
	Sheep, meat	0.01
	Sheep, meat byproducts	0.03
Canada (Proposed)	Cereal grains (Crop Group 15, except wheat and corn)	3
	Fat of cattle, goats, horses and sheep	0.05
	Meat byproducts (except kidney) of cattle goats, horses and sheep	0.03
	Kidney of cattle goats, horses and sheep	0.01
	Milk	0.005

Residue definition for compliance with MRLs is fluxapyroxad in both the EU, USA and Canada (proposed).

Potential risk to trade

Export of treated produce containing finite (measurable) residues of fluxapyroxad may pose a risk to Australian trade in situations where (i) no residue tolerance (import tolerance) is established in the importing country or (ii) where residues in Australian produce are likely to exceed a residue tolerance (import tolerance) established in the importing country.

The draft label includes the following advice regarding export of treated cereals:

Growers should note that Maximum Residue Limits (MRLs) or import tolerances do not exist in all markets for cereals treated with BAS 700 01F Fungicide. Additionally, some export markets have established MRLs different to those in Australia. If you are growing cereals for export, please check with BASF Australia Ltd or your grain exporter for the latest information on MRLs and import tolerances BEFORE using BAS 700 01F Fungicide.

Appropriate MRLs have not been established by Codex or by Japan. The EU has established a relevant MRL at 2 mg/kg for barley. The US has established a cereal grains MRL at 3 mg/kg and a similar MRL has been proposed for Canada. The applicant has indicated their intention to apply for import tolerances in Japan using data from the US, Canada and the EU. The earliest expected decision by Japan would be in the second quarter of 2015. Codex MRLs may be established in 2013 (JMPR evaluation in 2012). The Australian National Residue Survey is expected to include fluxapyroxad in its cereals grains screen prior to the end of 2012 with an LOQ at or below the Japanese uniform limit of 0.01 mg/kg.

Finite animal commodity MRLs are proposed at 0.03 mg/kg for edible offal (mammalian) and 0.05 mg/kg for meat [mammalian][in the fat], which represents a possible risk to trade as overseas tolerances are established in the EU and USA only. However, in the dairy cattle transfer study after dosing with fluxapyroxad for 28 days at 60.3 ppm in the feed, residues of parent in all tissues fell to below the LOQ after a further 2 days on clean feed. A 2 day export slaughter interval is proposed and would ensure no quantifiable residues in animal commodities for export and ensure that the risk to trade is negligible.

Low residues may be expected in milk (0.003 mg/kg parent, assuming consumption of barley forage/fodder as 100% of the diet with maximum residue of 6 mg/kg for 28 days). However, given milk products will be subjected to bulking and blending before export, it is considered that the risk to trade in dairy produce is low.

The risk to trade in livestock that have been fed on rotational crops grown after an initial crop has been treated with fluxapyroxad was also considered. The highest residue in cereal straw in the field rotational studies was 0.54 mg/kg (after application at 1.6× maximum overall rate and a 60 day PBI). Assuming a dry matter content of 88% this converts to 0.61 mg/kg on a dry weight basis. In the animal transfer study dosing with fluxapyroxad at 3.19 ppm gave highest residues of parent in fat of 0.0108 mg/kg. The estimated parent residue in fat after a maximum fluxapyroxad intake of 0.61 ppm from rotational crops is 0.002 mg/kg which is below the LOQ. The feeding level for residues of parent in fat to be at the LOQ is 2.95 ppm. The conservatively modelled peak concentration in soil (as modelled by DSEWPaC) is not expected to produce residues above this level after continuous annual application.

In addition:

- Not all of an aged residue in soil is expected to be bioavailable.
- Estimates of rotational residues in animal feed commodities are based on application to bare soil. Residues following application to crops are expected to be lower.
- Barley is not grown in a continuous rotation.
- Application is not always expected according to maximum GAP.
- Half lives of the target residue in animal tissue are short (<0.4 days).

the risk to trade in animal commodities associated with rotational residues arising from the proposed use is considered to be very low.

There is also a potential risk to trade in rotational crops, noting the proposed establishment of an 'All other foods' MRL at 0.1 mg/kg. However, residues were not observed in grains of rotational cereals or oilseeds. The trade risk for grains, oilseeds and pulses grown in rotation with treated crops is considered to be low.

For oaten hay, standards for fluxapyroxad are not established in *The Ordinance of the Standards of Feed Additives* (to May 2010[3]). The trade risk for oaten hay grown in rotation with treated crops is considered to be low.

[3] www.famic.go.jp/ffis/feed/obj/shore_eng.pdf

6 OCCUPATIONAL HEALTH AND SAFETY ASSESSMENT

Health hazards

Fluxapyroxad (CAS: 907204-31-3) is not listed in Safe Work Australia's (SWA) Hazardous Substances Information System (HSIS) Database (SWA, 2011). With the available toxicology information, OCS has not classified fluxapyroxad as a hazardous substance according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004). No human health risk phrases will be required for this new active constituent.

Based on the product toxicology information, BAS 700 01 F Fungicide is classified as a hazardous substance according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 2004). The product will require the following risk phrase.

R41	Risk of serious damage to eyes

Formulation, packaging, transport, storage and retailing

The active constituent fluxapyroxad will be manufactured overseas. The product BAS700 01 F Fungicide will be manufactured and packaged overseas and be imported into Australia in 5, 10 and 20 L high-density polyethylene (HDPE) containers with a twist cap.

Use pattern

The product, BAS 700 01 F Fungicide an emulsifiable concentrate formulation containing 62.5 g/L fluxapyroxad), is a fungicidal agent that aids in the control of fungal diseases in barley through a process of succinate dehydrogenase inhibition. This prevents fungal growth, spore germination, germ tube and appresoria formation and growth of mycelia.

It is proposed to be used at a rate of 250 - 1000 mL/ha in water to a spray volume of 50 to 100 L/ha for ground boom operations and a minimum of 20 L/ha for aerial application. It is applied to crops up to twice per crop at an early growth stage (tilling) to no later than the emergence of the seed head. It is recommended to apply BAS 700 01F as a broadcast application using a conventional boom sprayer with either mechanical or by-pass agitation or by aerial application using either fixed or rotary winged aircraft.

Exposure during use

Farmers and their employees will be the main users of BAS 700 01 F Fungicide. Workers may be exposed to the product when opening containers, mixing/loading, application, and cleaning up spills and equipment. The main route of exposure to the product will be dermal with inhalation, although ocular exposure is also possible.

In the absence of exposure data for the proposed mode of application, the Pesticide Handler Exposure Database (PHED) Surrogate Exposure Guide (1998) was used to estimate exposure. The toxic endpoint of concern and identified NOAEL is derived from repeat dose study in animals, and in this instance a margin of exposure (MOE) of 100 or above is acceptable.

The MOE takes into account both interspecies extrapolation, intraspecies variability and the seriousness of the critical health effect of concern. The MOE for both ground boom spray and aerial applications are at an acceptable level when a single layer of clothing (cotton overalls or equivalent clothing) are worn for application and chemical resistant gloves are additionally worn during mixing and loading.

Exposure during re-entry

Do not allow entry into treated areas until the spray has dried, unless wearing cotton overalls buttoned to the neck and wrist (or equivalent clothing) and chemical resistant gloves.

Recommendations for safe use

Users should follow the First Aid Instruction, Warning Statement and Safety Directions on the product label.

Conclusion

The registration of BAS 700 01F fungicide containing fluxapyroxad at 62.5 g/L for the control of fungal diseases in barley is supported.

BAS 700 01F fungicide can be used safely if handled in accordance with the instructions on the product label and any other control measures described above. Additional information is available on the product Material Safety Data Sheet.

7 ENVIRONMENTAL ASSESSMENT

Introduction

BASF Australia Ltd. has applied for the approval of a new active constituent fluxapyroxad in conjunction with registration of the end use product BAS 700 01 F fungicide containing that active constituent. This is the first time approval for fluxapyroxad has been sought in Australia. The proposed end use product BAS 700 01 F will contain 62.5 g ac/L. The product will be marketed for the control of certain fungal diseases in barley and will be applied at a rate of up to 1 L/ha (62.5 g ac/ha) twice per season with a minimum interval between treatments of approximately 21 days.

7.1 Environmental Fate

Hydrolysis

Hydrolysis is unlikely to be a major route of degradation for fluxapyroxad (BAS 700 F) in the environment. Under sterile conditions, it is hydrolytically stable in the environmentally relevant pH range (4-9) and no degradation products were identified. The aqueous metabolite M700F007 found under irradiated conditions in aerobic water/sediment systems was also investigated. It was similarly found to be hydrolytically stable in the environmentally relevant pH range, with no degradation products identified.

Photolysis

Fluxapyroxad does not significantly absorb UV/VIS light in the environmentally significant wavelength range of 290-800 nm. In standard soil photolysis and aqueous photolysis studies the degradation rates were not significantly different from the dark controls. Photolysis is not expected to be a significant degradation pathway for fluxapyroxad. Fluxapyroxad is unlikely to remain stable in the atmosphere, due to reactions with photo-chemically produced hydroxyl radicals with an estimated half-life of 0.69 days.

Biodegradation

Aerobic

The metabolism of fluxapyroxad in aerobic soil was studied in several soils at a range of temperatures between 10 and 27°C. Fluxapyroxad is slightly or very slightly degradable with half-life values between 70 and 2850 days. As expected the half-life was longer at 10°C than at 20°C and shorter at 27°C. Major metabolites observed in the soil were M700F001 and M700F002, with M700F008 also occasionally present in minor amounts. The conjectured metabolite M700F003 was never indentified in any study and is believed to rapidly and irreversibly bind to soil. The primary aerobic degradation pathway of fluxapyroxad (BAS700F) is the cleavage of the carboxamide bridge of the parent. This degradation produces the carboxylic acid intermediate M700F001, which is de-methylated to form M700F002. Some direct adsorption of BAS 700 F to soil, without transformation may also occur. Non-extractable residues in all studies were between 8 and 55% of applied radioactivity at the end of the incubation period. The metabolites M700F001 and M700F002 were present at levels up to 33% and 39% of the applied radioactivity, respectively. In the studies where the greatest amounts of metabolites were found both peaked at day around 120 but for M700F002 this was study termination. The metabolite M700F001 is rapidly transformed in soil, with DT50 values in the range of

2.7 to 9.3 days. However, the other major metabolite M700F002 was found to have similar persistence to the parent with half-lives of between 82 and 159 days. Some mineralisation also occurred with CO2 accounting for up to 13% of applied radioactivity.

Under field conditions studied in several North American and European locations, fluxapyroxad generally dissipated more rapidly than under laboratory conditions. Fluxapyroxad dissipated with DT50 values of 9.9 to 436 days. However, some of half-life values need to be considered in context as the data did not fit any of the models describing dissipation very well. In many cases there was considerable slowing of the degradation of fluxapyroxad and regardless of the DT50 value all of the test sites had DT90 values over 1 year with considerable carryover of fluxapyroxad after that period.

In aerobic aquatic conditions (two water/sediment systems) fluxapyroxad dissipates by a combination of partitioning to the sediment from the water phase and also degradation in water and sediment. The major route of degradation is the same as for aerobic soil (cleavage of the carboxamide bridge); however, as the two metabolites are highly water soluble they are only detected in this compartment. In a test under irradiated conditions an additional metabolite M700F007 was also detected in the aquatic compartment. Although dissipation of fluxapyroxad from water to sediment is rapid (DT50 = 4.8 to 6.4 days), fluxapyroxad is still regarded as very slightly degradable with half-lives in the whole system (sediment and water) ranging from 420 to 701 days. Under irradiated conditions fluxapyroxad degraded faster but is still regarded as slightly degradable with half-lives ranging between 116 and 145 days.

Anaerobic

Fluxapyroxad is very slightly degradable based on the treatment of a single soil under anaerobic conditions, with a DT50 value of 591 days. Although a further study was conducted where fluxapyroxad degraded more quickly, it is likely that the aerobic pathway was not completely excluded in this study. Regardless of this, fluxapyroxad was still found to be very slightly degradable. Levels of radioactivity in the surface water for the pyrazole labelled test substance increased slightly with time from 18% of applied radioactivity at flooding (Day 30), to a maximum value of 22% at DAT 123. There was little change in the levels of radioactivity in the water for the trifluorophenyl label. Non-extractable residues rose before falling again for the pyrazole label with a final amount representing 29% TAR. For the trifluorophenyl label the non extractable residue rose steadily to reach a maximum of 37% TAR at study termination. Only minimal amount of CO2 and volatile organics were evolved. The route of degradation is similar to that of aerobic degradation excepting that the metabolite M700F001 did not de-methylate to form M700F002. Fluxapyroxad is very slightly degradable in anaerobic sediment-water systems with a DT50 value of 731 days. It dissipated slowly from the water column with a DT50 of 177 days mainly by partitioning to the sediment. Only minor amounts of the metabolites M700F001 and M700F002 were formed (4.4 and 2.0 % of applied radioactivity, respectively). These were only found in the aqueous phase. After 365 days approximately half of the radioactivity was found in the sediment. Of this between 10 and 14% was non-extractable residue.

Mobility

Fluxapyroxad has moderate to low mobility in soils with Koc values of between 320 and 1108 mL/g. The Kdes values are greater than the Kads values suggesting that once fluxapyroxad is adsorbed on soil it is generally more difficult to desorb it. The slope (1/n) was close to, but less than 1 suggesting that fluxapyroxad will partition slightly more to water as the concentration of fluxapyroxad increases. There was some correlation of adsorption (K) with organic carbon, suggesting that fluxapyroxad binds to organic carbon but other mechanisms of binding are likely to also be involved.

The two major metabolites M700F001 and M700F002 were found to be very highly or highly mobile with little affinity for organic carbon in the soil.

Volatilisation is not expected to be a major route of dissipation of fluxapyroxad.

Accumulation

In spite of fluxapyroxad's persistence and relatively low water solubility, fluxapyroxad was found to be unlikely to bio-accumulate based on a whole fish bio-concentration factor of between 86 and 93. However, it is likely to accumulate in soil and this is the subject of ongoing studies by the applicant.

7.2 Environmental Effects

Avian

Fluxapyroxad is at most slightly toxic (LD50> 2000 mg/kg b.w.;LC > 2000 mg/kg diet) to birds, over the short term. Bobwhite quail showed the greatest sensitivity with an estimated LD50 of 2457 mg ac/kg-diet (≡ 561 mg ac/kg b.w.) based on short term dietary exposure. However, effects from high light intensity may have influenced this study. The exact effect of the light intensity is unknown and the findings of this study are inconsistent with other studies on the bobwhite quail including a repeat short term dietary study, with lower light intensity. Sub-chronic effects on mallard ducks included an increase in the number of dead birds in shells with a flow on effect on the number of survivors at day 14. The NOEL was established at 300^0 mg ac/kg-diet (≡ 31.9 mg ac/kg b.w.).

Fish

All of the toxicity values were established to be below the solubility of fluxapyroxad in water. However, due to fluxapyroxad's low water solubility some studies used a co-solvent. Fluxapyroxad is considered to be moderately or highly toxic on an acute basis and the toxicity of the formulation is considered to be largely from the active constituent. Chronic exposure to fluxapyroxad was found to cause a reduction of growth of fish and it is considered to be moderately toxic. The most sensitive species was carp with an LC50 of 0.29 mg/L. In chronic testing on fathead minnow over 33 days the NOEC was established at 0.039 mg/L. The metabolites of fluxapyroxad were practically non-toxic.

Aquatic Invertebrates

Fluxapyroxad is moderately acutely toxic to daphnia with an LC50 of 6.8 mg/L. This value is higher than the reported water solubility of fluxapyroxad and co-solvents were used in the study to aid dissolution. There may have been some physical effect from colloidal suspensions of fluxapyroxad, but this was not delineated from the chemical effects in the study presented. Chronic exposure to fluxapyroxad caused a reduction in reproduction and growth to daphnia. The 21 day NOEC for fluxapyroxad was established as 0.5 mg/L and it is considered to be slightly chronically toxic. The formulation in terms of active constituent is ten times more toxic, suggesting that other components in the formulation are contributing to the toxicity. As with fish the metabolites of fluxapyroxad were practically non-toxic to daphnia.

Algae and Aquatic Plants

Fluxapyroxad is highly or moderately toxic to algae and duckweed; although for the fresh water diatom, the marine alga and duckweed 50% inhibition based on growth rate did not occur to the limits of fluxapyroxad's water solubility. The ErC50 for green algae, which is the most sensitive species, is 0.66 mg/L. No morphological effects were observed, except for the marine algae and duckweed, where smaller cells or fronds were observed. The toxicity of the formulation is considered to be largely from the active constituent. The three major metabolites of fluxapyroxad (M700F001, M700F002 and M700F007) are at least an order of magnitude less toxic than the parent, and are considered slightly (10-100 mg/L) or practically non toxic (> 100 mg/L) to algae. Part of two of the metabolites' (M700F001 and M700F002) toxicity may be due to their acidity.

Terrestrial Invertebrates

Fluxapyroxad is very slightly toxic to bees on its own and is considered slightly toxic to bees when incorporated in the BAS 700 01 F formulation. The most sensitive endpoint is 15.7 µg/bee for contact with the formulation. In semi-field studies no adverse effects were found to brood feeding at treatment levels of up to 125 g ac/ha. All of the non-target beneficial insects showed some sensitivity to the formulation containing nominally 62.5 g ac/L with increased mortality and/or reduction in reproduction. The predatory mite (Typhlodromus pyri) was the most sensitive but in higher tier tests simulating more realistic exposure, the sensitivity was reduced to the point where no adverse effects were observed.

Earthworms and collembola were slightly sensitive to fluxapyroxad and its formulation. An acute NOEC for earthworms of 125 mg ac/kg dry weight of soil was established and the formulation was slightly more toxic with a NOEC of 39.7 mg ac/kg dry weight of soil. However, no acute EC50 could be established to the level tested. Chronic exposure to the highest concentration of the formulation containing fluxapyroxad appeared to have caused a reduction in the number of juveniles and biomass. The chronic NOEC was therefore determined to be 10.6 mg ac/kg. Chronic exposure of collembola to a formulation containing fluxapyroxad appeared to have caused higher mortality and a reduction in mortality at exposure levels greater than 1.5 mg ac/kg. The higher mortality and reduction was regarded as statistically significant at exposure levels above 3.0 mg/kg. Collembola and earthworms were not sensitive to the major soil metabolites M700F001 and M700F002 to the levels tested.

Micro-organisms

There were no short or long-term effects on soil micro-organisms to the exposure of fluxapyroxad, its formulation or its metabolites at the levels tested. This was 2.01 mg fluxapyroxad/kg, 0.37 mg M700F001/kg, 1 mg M700F002/L and 320 mg formulation/kg, respectively. Fluxapyroxad similarly had no effect to sewage micro-organisms, with a NOEC of 100 mg/L.

Sediment Dwelling Organisms

The fresh water amphipod was insensitive to fluxapyroxad to the level tested. However, the marine amphipod showed significant increase in mortality at exposure levels greater than 18 mg ac/kg, with a corresponding measured concentration of fluxapyroxad in overlying water of 1.11 mg ac/L. An LC50 of 142 mg ac/kg was established with the measured concentration in the overlying water of 2.42 mg ac/L. Chronic exposure of non-biting midge showed slight sensitivity of this species to fluxapyroxad. The emergence rate

was reduced at levels above 75 mg ac/kg. The measured concentration of fluxapyroxad in the overlying water was between 0.9 and 1.61 mg ac/L, whilst it was between 1.15 and 1.88 mg ac/L in the pore water.

Terrestrial Plants

Terrestrial plants showed slight sensitivity to fluxapyroxad. At the highest levels tested effects on growth, seedling emergence and survival were observed. There were also effects on the dry weight of carrots and lettuces in the seedling emergence study but this was not dose responsive. Fifty percent inhibition (EC50) on any parameter was not observed in any of the plants tested.

Marine & Other Organisms

Fluxapyroxad is moderately acutely toxic to mysid. The LC50 of 3.6 mg is approximately equal to the reported solubility of fluxapyroxad and a co-solvent was used to aid dissolution in the study. Oysters were also slightly sensitive to fluxapyroxad. Although no mortality occurred, shell growth was inhibited and an EC50 of 0.96 mg ac/L was established. Sheepshead minnow showed similar sensitivity to fluxapyroxad as freshwater species. Sewage sludge organisms were found to be insensitive to fluxapyroxad.

7.3 Risk Assessment

BAS 700 F 01 may be applied by ground or aerial methods as a broadcast application at a rate of 1 L formulation/ha (≡ 62.5 g ac/ha), up to twice per season, with an approximate minimum 21 day interval between applications.

The major potential risk to the environment was fluxapyroxad's potential to accumulate in soil and sediment from multiple applications. In spite of conservative modelling, likely to over predict the exposure, acceptable risk to aquatic organisms was found from run-off water entering environmental waters. Similarly the risk to sediment and soil dwelling organisms from spray drift and run-off was found to be acceptable in spite of the potential of fluxapyroxad to accumulate in these environmental compartments. However, this modelling of accumulation should be confirmed by the ongoing soil accumulation studies.

8 EFFICACY AND SAFETY ASSESSMENT

This application seeks to register a new product, BAS 700 01 F Fungicide containing a new active fluxapyroxad, for control of various fungal diseases of barley.
BAS 700 01F is a broad spectrum fungicide. It inhibits spore germination, mycelial growth and sporulation of the fungus on the leaf surface. The product can be applied in either pre-or post-infection situations. However, optimum disease control is achieved when the product is applied preventatively in a regular scheduled spray program and is used in a rotational program with other fungicides. Through coverage of the crop is necessary for best results. For fungicide resistance management the product is a Group 7 fungicide.

8.1 Proposed use pattern

The product BAS 700 01 F Fungicide is a new fungicide for the control of specified fungal diseases of barley. The product is intended for control of Net form of net blotch (*Pyrenophora teres* f *teres*), Spot form of net blotch (*Pyrenophora teres* f *maculata*), leaf scald (*Rhynchosporium secalis*), leaf rust (*Puccinia hordei*) and powdery mildew (*Blumeria graminis* f. sp.*hordei*) of barley. BAS 700 01 F Fungicide is intended to be used at a rate of 250 mL – 1L product/ha. It is proposed to complement current fungal programs in barley.

8.2 Assessment of study/trial data

Data are supplied from eleven field trials in four Australian states over two seasons. The candidate formulation proposed for registration was used in all trials at 4-5 rates, including all label rates. Four barley cultivars were utilized – Gairdner, Yagan, Maritime and Mundah. Results were compared with those from untreated plots and plots treated with a commercial fungicide, Opus (epoxiconazole) at its label rate. Trials were carried out by two agrisearch companies and utilized a common trial format : 4-8 reps. of 13-54 sq m plots in a randomized complete block design (RCB), sprayed either once at flag leaf emergence, or twice, at flag leaf emergence plus at early flowering. Application at the rate of 80-120L/ha was by either gas pressurized backpack plus hand held boom or by a quadbike sprayer. Disease assessments were carried out at 2-4 times for incidence and severity on each of the top four leaves on 10-20 tillers per plot and results analysed by analysis of variance and significant differences between treatment means shown.

Disease pressure was sufficient to provide useful supporting data in 10 of the 11 trials with 1-5 trials supporting each disease claim. As assessments were carried out at up to four dates, on each of four leaves, and for both disease incidence and severity, there were a number of data sets to permit comparisons of treatments. To indicate the effectiveness of the candidate against each disease one or two indicative trial results have been summarised in the following table, selecting where possible the incidence or severity ratings on flag (F) or F-1 leaf (as the more important leaves to the plant) at a critical evaluation time for a spray (14 days after application number two), for two or more of the label rates. In these tables the abbreviation BAS500(1) indicates the candidate BAS 700 01 F Fungicide at 500mL/ha, one spray application; the abbreviation 15DAA2 indicates an assessment date 15 days after the second spray application.

Control of Scald

TRIAL NO DATA NO	TRIAL LOCATION COMPANY DATE	ASSESSMENT (SEVERITY OR INCIDENCE AND TIMING)	RESULT (% SEVERITY OR % INCIDENCE)	CONCLUSION
7 48596	Toodyay, West Aust. Peracto 2009	Severity on F 12DAA2	BAS500(1) 2.7 % BAS250(2) 1.0 % Opus(2) 1.7 % Control 37.9 %	Good control by two label rates of BAS, both stat. equiv. to ind. std.
12 48595	Werribee, Vic. Peracto 2010	Severity on F 14DAA2	BAS500(1) 11.0 % BAS1L(1) 1.8 % BAS250(2) 1.6 % Opus(2) 9.2 % Control 63.4 %	Good control by three label rates of BAS, all stat. equiv. to ind. std.

Control of Rust

TRIAL NO DATA NO	TRIAL LOCATION COMPANY DATE	ASSESSMENT (SEVERITY OR INCIDENCE AND TIMING)	RESULT (% SEVERITY OR % INCIDENCE)	CONCLUSION
5 48593	Naracoorte, South Aust. Peracto 2009	Severity on F 14DAA2	BAS500(1) 2.3 % BAS1L(1) 1.2 % BAS250(2) 0.8 % Opus(2) 1.3 % Control 5.7 %	Good control by two label rates of BAS, both stat. equiv. to ind. std. Control by 500(1) rate less at 60 % and stat. inferior to ind. std.
12 48595	Werribee, Vic. Peracto 2010	Severity on F 14DAA2	BAS500(1) 2.6 % BAS250(2) 0.2 % Opus(2) 1.3 % Control 13.6 %	Good control by two label rates of BAS, both stat. equiv. to ind. std. (500(1) rate gave 81 % control this time)

Control of Spot Form of Net Blotch

TRIAL NO DATA NO	TRIAL LOCATION COMPANY DATE	ASSESSMENT (SEVERITY OR INCIDENCE AND TIMING)	RESULT (% SEVERITY OR % INCIDENCE)	CONCLUSION
5 48593	Naracoorte, South Aust. Peracto 2009	Severity on F 14DAA2	BAS500(1) 9.0 % BAS250(2) 3.0 % Opus(2) 41.0 % Control 73.0 %	Good control by two label rates of BAS, both stat. superior to ind. std.
8 48597	Arthurton, South Aust. Peracto 2010	Incidence on F-1 16DAA2	BAS(500) 5.0 % BAS250(2) 1.3 % Opus(2) 16.3 % Control 30.0 %	Good control by two label rates of BAS, both stat. superior to ind. std.

Control of Net Form of Net Blotch

TRIAL NO DATA NO	TRIAL LOCATION COMPANY DATE	ASSESSMENT (SEVERITY OR INCIDENCE AND TIMING)	RESULT (% SEVERITY OR % INCIDENCE)	CONCLUSION
7 48596	Toodyay, West Aust. Peracto 2009	Severity on F 12DAA2	BAS500(1) 2.4 % BAS250(2) 2.1.% Opus(2) 2.4 % Control 18.3 %	Good control by two label rates of BAS, both stat. equiv. to ind. std.
9 48598	Toodyay, West Aust. 2010	Severity on F-1 17DAA2	BAS500(1) 7.2 % BAS250(2) 10.1 % Opus(2) 15.9 % Control 37.7 %	Good control by two label rates of BAS, one stat. equiv. to ind. std., one stat. superior to ind. std.

Summary of efficacy against Rust, Scald, Net Form of Net Blotch and Spot Form of Net Blotch
The above tables show that for each of the four diseases the candidate fungicide in both single and double spray applications is demonstrated to give commercially acceptable levels of disease control and that these levels are equivalent to those obtained by using a fungicide currently registered for these uses.
In general control increased with increasing fungicide dose, and two sprays were superior to one where equivalent quantities of ai/ha were applied.

Control of Powdery Mildew

TRIAL NO DATA NO	TRIAL LOCATION COMPANY DATE	ASSESSMENT (SEVERITY OR INCIDENCE AND TIMING)	RESULT (% SEVERITY OR % INCIDENCE)	CONCLUSION
11 48589	Forth, Tas. Peracto 2010	Incidence on F 15DAA2	BAS500(1) 10.0 % BAS1L(1) 3.3 % BAS500(2) 3.3 % BAS1L(2) 1.7 % Opus(2) 0.0 % Control 21.7 %	Good control by three label rates of BAS, all stat. equiv. to ind. std. But BAS500(1) gave 54% control, stat. inferior to ind.std.
		Severity on F-1 15DAA2	BAS500(1) 5.1 % BAS1L(1) 2.3 % BAS500(2) 0.9 % BAS1L(2) 0.8 % Opus(2) 0.4 % Control 8.6 %	Good control by the two double applications of BAS, all stat. equiv. to ind. std. But BAS500(1) gave 41% control and BAS1L(1) gave 73% control, both stat. inferior to ind. std.

Summary of efficacy against Powdery Mildew

The single trial on this disease demonstrated that double applications of the candidate fungicide gave commercially acceptable levels of control, and this level was statistically equivalent to that obtained by using a commercial fungicide currently registered for this use.

Single applications were less effective, in particular the 500 mL/ha rate, whether assessed by incidence or disease severity, gave control levels inferior to that achieved with an industry standard.

Phytotoxicity

No symptoms of phytotoxicity were observed in 11 trials on four barley cultivars when application rates up to double the draft label rates were used.

8.3 General conclusions

The claims for control of Rust, Scald, Net Form of Net Blotch and Spot Form of Net Blotch are supported by the trial results. These trial data support the label directions to make two applications at the 250 mL/ha rate or one at 500mL – 1L/ha, repeating if infection persists.
The claim for control of Powdery Mildew is supported by results from a single trial. These trial data support the optional one application at 1L/ha, or repeat applications at 500 – 1L/ha. The data do not support the label recommendation for one application at 500 mL/ha as they demonstrate an inadequate level of reduction of disease incidence and severity, statistically less than that achieved with the industry standard. It is noted that in this one trial disease pressure was high and there was significant disease present before treatment commenced.

9 LABELLING REQUIREMENTS

CAUTION

KEEP OUT OF REACH OF CHILDREN
READ SAFETY DIRECTIONS BEFORE OPENING OR USING

MBREX FUNGICIDE

ACTIVE CONSTITUENT: 62.5 g/L FLUXAPYROXAD

GROUP	7	FUNGICIDE

For the control of specified fungal diseases of barley (except malting barley) as per the Directions for Use Table.

CONTENTS: 5, 10, 20 L

BASF Australia Ltd ABN 62 008 437 867
Level 12, 28 Freshwater Place Southbank VICTORIA 3006

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APVMA Approval No.: 64104/49905

STORAGE AND DISPOSAL

Store in the closed, original container in a cool, well-ventilated area out of direct sunlight. Triple or preferably pressure rinse containers before disposal. Add rinsings to spray tank. DO NOT dispose of undiluted chemicals on-site. If recycling, replace cap and return clean containers to recycler or designated collection point. If not recycling, break, crush, or puncture and bury empty containers in a local authority landfill. Empty containers and product should NOT be burnt.

SAFETY DIRECTIONS

May irritate the skin. Will damage the eyes. When opening the container, mixing and loading and using the prepared spray, wear cotton overalls (or equivalent clothing) buttoned to the neck and wrists and elbow-length chemical resistant gloves and face shield or goggles. Wash hands after use. After each day's use wash gloves and face shield or goggles and contaminated clothing.

FIRST AID

If poisoning occurs, contact a doctor or Poisons Information Centre. Phone Australia 131126. If in eyes, hold eyes open, flood with water for at least 15 minutes and see a doctor.

MATERIAL SAFETY DATA SHEET

Additional information is listed in the Material Safety Data Sheet.

CONDITIONS OF SALE

All conditions and warranties rights and remedies implied by law or arising in contract or tort whether due to the negligence of BASF Australia Ltd or otherwise are hereby expressly excluded so far as the same may legally be done provided however that any rights of the Buyer pursuant to non- excludable conditions or warranties of the Trade Practices Act 1974 or any relevant legislation of any State are expressly preserved but the liability of BASF Australia Ltd or any intermediate Seller pursuant thereto shall be limited if so permitted by the said legislation to the replacement of the goods sold or the supply of equivalent goods and all liability for indirect or consequential loss or damage of whatsoever nature is expressly excluded. This product must be used or applied strictly in accordance with the instructions appearing hereon. This product is solely sold for use in Australia and must not be exported without the prior written consent of BASF Australia Ltd.

APVMA Approval No: 64104/49905

Batch No:
Date of Manufacture:

BASF Australia Ltd
ABN 62 008 437 867
Level 12, 28 Freshwater Place
Southbank VICTORIA 3006

FOR SPECIALIST ADVICE IN AN EMERGENCY ONLY PHONE 1800 803 440 TOLL FREE-ALL HOURS-AUSTRALIA WIDE

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DIRECTIONS FOR USE

DO NOT apply more than 2 applications of MBREX Fungicide (or other Group 7 fungicide) in any one season on the same paddock with a minimum of 21 day interval between applications.

SPRAY DRIFT RESTRAINTS

DO NOT apply with spray droplets smaller than a MEDIUM spray droplet size category according to nozzle manufacturer specifications that refer to the ASAE S572 Standard or the BCPC Guideline.

DO NOT apply when wind speed is less than 3 or more than 20 kilometres per hour as measured at the application site.

DO NOT apply during surface temperature inversion conditions at the application site.

Users of this product **MUST make an accurate written record** of the details of each spray application within 24 hours following application and KEEP this record for a minimum of 2 years. The spray application details that must be recorded are: 1) date with start and finish times of application, 2) location address and paddock/s sprayed, 3) full name of this product, 4) amount of product used per hectare and number of hectares applied, 5) crop/situation and weed/pest, 6) wind speed and direction during application, 7) air temperature and relative humidity during application, 8) nozzle brand, type, spray angle, nozzle capacity and spray system pressure measured during application, 9) name and address of person applying the product. (Additional record details may be required by the state or territory where this product is used.)

CROP	DISEASE	RATE	CRITICAL COMMENTS
Barley (except malting barley)	Net form of net blotch (*Pyrenophora teres* f *teres*) Spot form of net blotch (*Pyrenophora teres* f *maculata*) Leaf scald (*Rhynchosporium secalis*) Leaf Rust (*Puccinia hordei*)	250 mL/ha	Apply when conditions favour disease development and prior to development of disease in the crop. Two applications at this rate are required for adequate disease control. Apply once at around stem elongation (Z32) and again before ear emergence (Z59). DO NOT apply later than Z59.
		500 mL to 1 L/ha	Apply when conditions favour disease development and prior to development of disease in the crop. A repeat application may be required if infection pressure persists. Regularly monitor the crop from 3-4 weeks after the first application for signs of reinfection. Apply the higher rate when the disease is present on the upper leaves or when conditions are favourable for disease development. DO NOT apply later than Z59.
	Powdery mildew (*Blumeria graminis* f. sp. *hordei)*	500 mL to 1 L/ha	Apply when conditions favour disease development and prior to development of disease in the crop. Two applications at 500 mL are required for control. A repeat application of 1 L may be required if infection pressure persists. Regularly monitor the crop from 3-4 weeks after the first application for signs of reinfection. Apply the higher rate when the disease is present on the upper leaves or when conditions are favourable for disease development. DO NOT apply later than Z59.

NOT TO BE USED FOR ANY PURPOSE, OR IN ANY MANNER, CONTRARY TO THIS LABEL UNLESS AUTHORISED UNDER APPROPRIATE LEGISLATION.

WITHHOLDING PERIODS:

GRAZING: DO NOT GRAZE OR CUT FOR STOCK FOOD FOR 14 DAYS AFTER APPLICATION

HARVEST: NOT REQUIRED WHEN USED AS DIRECTED

GENERAL INSTRUCTIONS

MBREX is a broad spectrum fungicide. It inhibits spores germination, mycelial growth and sporulation of the fungus on the leaf surface. MBREX can be applied in either pre- or post- infection situations. However, optimum disease control is achieved when MBREX is applied preventatively in a regularly scheduled spray program and is used in a rotational program with other fungicides. Thorough coverage of the crop is necessary for best results.

FUNGICIDE RESISTANCE WARNING

GROUP	7	FUNIGICIDE

MBREX FUNGICIDE is a member of the succinate dehydrogenase inhibitor (SDHI) group of fungicides. For fungicide resistance management the product is a Group 7 fungicide. Some naturally occurring individual fungi resistant to Mbrex and other Group 7 fungicides may exist through normal genetic variability in any fungal population. The resistant individuals can eventually dominate the fungal population if MBREX is used repeatedly. These resistant fungi may not be controlled by MBREX or other Group 7 fungicides, thus resulting in a reduction in efficacy and possible yield loss.
Since the occurrence of resistant fungi is difficult to detect prior to use, BASF Australia Ltd accepts no liability for any losses that may result from the failure of MBREX to control resistant fungi.

MIXING

MBREX is an emulsifiable concentrate formulation. The addition of a non-ionic surfactant is generally not required, although under certain environmental conditions and lower total application volumes, the addition of a non-ionic surfactant may assist in providing better coverage of sprayed surfaces. Add the product to the half filled spray tank while agitating. Continue to agitate while topping up the tank and during spraying.

APPLICATION

Ground application

Apply in a water volume of between 50 and 100 L/ha, using flat fan nozzles operating at around 50 cm above the top of the crop. Use the higher water volume in crops with heavier canopies.

Aerial application

Apply with suitable aircraft, set up and operated to apply fungicides to cereal crops in a minimum water volume of 20 L/ha.

RE-ENTRY PERIOD

DO NOT allow entry into treated areas until the spray has dried, unless wearing cotton overalls buttoned to the neck and wrist (or equivalent clothing) and chemical resistant gloves.

PRECAUTIONS

Avoid contact with eyes and skin. Protect eyes while using.

WARNING STATEMENT

Will damage eyes.

CAUTION

Export of treated cereals

Growers should note that Maximum Residue Limits (MRLs) or import tolerances do not exist in all markets for cereals treated with MBREX FUNGICIDE. Additionally, some export markets have established MRLs different to those in Australia. If you are growing cereals for export, please check with BASF Australia Ltd or your grain exporter for the latest information on MRLs and import tolerances BEFORE using MBREX FUNGICIDE.

LIVESTOCK DESTINED FOR EXPORT MARKETS

The grazing withholding period only applies to stock slaughtered for the domestic market. Some export markets apply different standards. To meet these standards, ensure that in addition to complying with the grazing withholding period, the Export Slaughter Interval is observed before stock are sold or slaughtered.

EXPORT SLAUGHTER INTERVAL (ESI):

AFTER OBSERVING THE WITHHOLDING PERIOD FOR GRAZING OR CUTTING FOR STOCKFOOD, LIVESTOCK THAT HAVE BEEN GRAZED ON OR FED TREATED CROPS SHOULD BE PLACED ON CLEAN FEED FOR 2 DAYS PRIOR TO SLAUGHTER.

PROTECTION OF CROPS, NATIVE AND OTHER NON-TARGET CROPS

DO NOT apply under weather conditions, or from spraying equipment, that may cause spray to drift onto nearby susceptible plants/crops, cropping lands or pastures.

PROTECTION OF WILDLIFE, FISH, CRUSTACEANS AND ENVIRONMENT

Very toxic to aquatic life. DO NOT contaminate wetlands or watercourses with this product or used containers

STORAGE AND DISPOSAL

Store in the closed, original container in a cool, well-ventilated area out of direct sunlight. Triple or preferably pressure rinse containers before disposal. Add rinsings to spray tank. DO NOT dispose of undiluted chemicals on-site. If recycling, replace cap and return clean containers to recycler or designated collection point. If not recycling, break, crush, or puncture and bury empty containers in a local authority landfill. Empty containers and product should NOT be burnt.

SAFETY DIRECTIONS

May irritate the skin. Will damage the eyes. When opening the container, mixing and loading and using the prepared spray, wear cotton overalls (or equivalent clothing) buttoned to the neck and wrists and elbow-length chemical resistant gloves and face shield or goggles. Wash hands after use. After each day's use wash gloves and face shield or goggles and contaminated clothing.

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If poisoning occurs, contact a doctor or Poisons Information Centre. Phone Australia 131126. If in eyes, hold eyes open, flood with water for at least 15 minutes and see a doctor.

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legally be done provided however that any rights of the Buyer pursuant to non- excludable conditions or warranties of the Trade Practices Act 1974 or any relevant legislation of any State are expressly preserved but the liability of BASF Australia Ltd or any intermediate Seller pursuant thereto shall be limited if so permitted by the said legislation to the replacement of the goods sold or the supply of equivalent goods and all liability for indirect or consequential loss or damage of whatsoever nature is expressly excluded. This product must be used or applied strictly in accordance with the instructions appearing hereon. This product is solely sold for use in Australia and must not be exported without the prior written consent of BASF Australia Ltd.

APVMA Approval No: 64104/49905
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BASF

The Chemical Company

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ABBREVIATIONS

ac	active constituent
ADI	Acceptable Daily Intake (for humans)
AHMAC	Australian Health Ministers Advisory Council
ai	active ingredient
ARfD	Acute Reference Dose
BBA	Biologische Bundesanalstalt fur Land – und forstwirschaft
bw	bodyweight
d	day
DAT	Days After Treatment
DT_{50}	Time taken for 50% of the concentration to dissipate
EA	Environment Australia
E_bC_{50}	concentration at which the biomass of 50% of the test population is impacted
EC_{50}	concentration at which 50% of the test population are immobilised
EEC	Estimated Environmental Concentration
E_rC_{50}	concentration at which the rate of growth of 50% of the test population is impacted
EI	Export Interval
EGI	Export Grazing Interval
ESI	Export Slaughter Interval
EUP	End Use Product
Fo	original parent generation
g	gram
GAP	Good Agricultural Practice
GCP	Good Clinical Practice
GLP	Good Laboratory Practice
GVP	Good Veterinary Practice

h	hour
ha	hectare
Hct	Heamatocrit
Hg	Haemoglobin
HPLC	High Pressure Liquid Chromatography *or* High Performance Liquid Chromatography
id	intradermal
im	intramuscular
ip	intraperitoneal
IPM	Integrated Pest Management
iv	intravenous
in vitro	outside the living body and in an artificial environment
in vivo	inside the living body of a plant or animal
kg	kilogram
K_{oc}	Organic carbon partitioning coefficient
L	Litre
LC_{50}	concentration that kills 50% of the test population of organisms
LD_{50}	dosage of chemical that kills 50% of the test population of organisms
LOD	Limit of Detection – level at which residues can be detected
LOQ	Limit of Quantitation – level at which residues can be quantified
mg	milligram
mL	millilitre
MRL	Maximum Residue Limit
MSDS	Material Safety Data Sheet
NDPSC	National Drugs and Poisons Schedule Committee
NEDI	National Estimated Daily Intake
NESTI	National Estimated Short Term Intake
ng	nanogram

NHMRC	National Health and Medical Research Council
NOEC/NOEL	No Observable Effect Concentration Level
OC	Organic Carbon
OM	Organic Matter
po	oral
ppb	parts per billion
PPE	Personal Protective Equipment
ppm	parts per million
Q-value	Quotient-value
RBC	Red Blood Cell Count
s	second
sc	subcutaneous
SC	Suspension Concentrate
SUSDP	Standard for the Uniform Scheduling of Drugs and Poisons
TGA	Therapeutic Goods Administration
TGAC	Technical grade active constituent
T-Value	A value used to determine the First Aid Instructions for chemical products that contain two or more poisons
µg	microgram
vmd	volume median diameter
WG	Water Dispersible Granule
WHP	Withholding Period
w/w	weight/weight

GLOSSARY

Active constituent	The substance that is primarily responsible for the effect produced by a chemical product (also referred to as active ingredient (a.i.))
Acute	Having rapid onset and of short duration.
Carcinogenicity	The ability to cause cancer
Chronic	Of long duration
Codex MRL	Internationally published standard maximum residue limit
Desorption	Removal of a material from or through a surface
Efficacy	Production of the desired effect
Formulation	A combination of both active and inactive constituents to form the end use product
Genotoxicity	The ability to damage genetic material
Hydrolysis	Breakdown of chemicals in the presence of water
Hydrophobic	Repels water
Immunotoxic	Toxic or damaging to the immune system
Leaching	Removal of a compound by use of a solvent
Log Pow	Log to base 10 of octanol water partitioning co-efficient, synonym KOW
Metabolism	The chemical processes that maintain living organisms
Metabolites	Breakdown products following metabolism
Parent	The original chemical as applied, i.e. prior to breakdown by metabolism
Photodegradation	Breakdown of chemicals due to the action of light
Photolysis	Breakdown of chemicals due to the action of light
Subcutaneous	Under the skin
Toxicokinetics	The study of the movement of toxins through the body
Toxicology	The study of the nature and effects of poisons

REFERENCES

Australian Pesticides and Veterinary Medicines Authority 2008, *Ag MORAG: Manual of Requirements and Guidelines*, APVMA, Canberra.