

Chemical residues and maximum residue limits (MRLs) – impact, understanding and potential trade issues

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Keywords

- chemicals, maximum residue limits, MRLs, market access, domestic marketing, export marketing.

Take home messages

- It is a legal requirement to follow all label directions when applying any chemical.
- There are different perceptions and legal/contractual requirements of key domestic and export markets for chemical residues.
- There are market access implications when using chemicals; applying a chemical according to label directions does **not** necessarily mean that grain will meet market requirements.
- There is a need for advisers and growers to understand market requirements and seek advice on the MRLs that apply. Talk to your marketer if possible, before you intend to apply chemicals to a crop.

What is a maximum residue limit (MRL)?

A range of different types of chemicals are applied to crops for varying reasons. Chemicals may be used prior to planting, during the crop growth stage or following harvest. Only those chemicals registered in Australia for use on a particular crop may be applied. All chemicals registered in Australia must be used according to label directions (for example; Crop type, application rates, withholding periods, etc.). This is a legal requirement in Australia.

When using these chemicals, residues may arise in the harvested grain. Residues may also arise when moving that grain using equipment such as augers and trucks that have previously held grain containing chemical residues.

The nature of residues arising are considered by the Australian Pesticides and Veterinary Medicines Authority (APVMA) and if necessary, an MRL is set for that chemical and crop commodity combination.

An MRL is the maximum concentration of a residue resulting from the registered use of an agricultural chemical which is legally permitted or recognised as acceptable to be present in or on a food, agricultural commodity or animal feed.

What are market requirements?

Chemical residues on imported food and food safety in general are arguably the key focus for markets at present.

When marketing grain in Australia or in an overseas country, residue levels must meet the regulated MRL and customer contract specifications of the destination country. These may differ to the Australian MRL.

Each market, whether it be in Australia or overseas, is responsible for ensuring the food that is imported and subsequently consumed is safe to eat in terms of chemical residues. Each market has



their own chemical legislation based on their own particular chemical usage and consumption patterns. Hence different MRLs for the same chemical and commodity may apply in different markets.

There is a trend towards markets developing their own chemical regulations and not relying as previously implied on international standards, such as Codex Alimentarius. There is a trend towards requiring lower (or nil) residues on grain supplied. Markets are also increasing their level of monitoring of imported grain via sampling and testing to check compliance with their needs.

The increase in grain traded internationally may cause a market access issue for Australian grain where:

- The market has no MRL (missing MRL).
- The market doesn't apply a Codex MRL (divergent MRL).
- There is no Codex MRL for those markets that follow or default to Codex.
- The market does not have a default policy and hence a zero limit applies.
- The market applies a low level of detection (LOD).
- In some instances, contracts do not state the MRLs that apply. It is the responsibility of the supplier or the marketer of the grain to ensure that they know the regulations and that the grain supplied meets those requirements.

Implications for advisers and growers

Even though a grower may apply a chemical correctly and in accordance with label directions, the resulting grain residues may not meet market requirements.

In addition, there is the concern that in many situations the adviser/grower does not know the market requirement before they use the chemical?

All grain trading standards have wording in relation to chemical use that growers must comply with.

An example for the Grain Trade Australia Wheat Trading Standards is outlined as follows:

Chemicals not approved for Wheat – a nil tolerance applies, and this refers to the following:

- *Chemicals used on the growing crop in the State or Territory where the wheat was grown in contravention of the label*
- *Chemicals used on stored wheat in contravention of the label*
- *Chemicals not registered for use on wheat*
- *Wheat containing any artificial colouring, pickling compound or marker dye commonly used during crop spraying operations that has stained the wheat*
- *Wheat treated with or contaminated by Carbaryl, Organochloride chemicals, or diatomaceous earth*
- *Chemical residues in excess of Australian Commonwealth, State or Territory legal limits*

Residue testing is done either by the marketer or by the National Residue Survey on domestic grain and export grain shipments, the latter funded via a grower levy. If residues arise that exceed the market MRL, price penalties may occur, or the shipment may be rejected and returned to Australia. Costs may be passed from the marketer to the supplier of that grain where there is evidence of chemical misuse or false chemical use declarations. Sampling and testing of future grower loads and shipments

Table 1. Some key Australian markets and their chemical MRL regulations.

Market	Codex	Australia	China	EU	Indonesia	Japan	South Korea	Taiwan	Thailand	Vietnam
Regulation applied	Not adopted by all markets	Own MRL Standard	Own MRL Standard	Own MRL Standard	Own MRL Standard	Own MRL Standard	Own MRL Standard	Own MRL Standard	Own MRL Standard	Own MRL Standard
Default MRL	No default	No default	No default	Default system	No Default	Default system	Default system	No default	Default system is complex	No default
If no MRL	ZERO	ZERO	ZERO	0.01	CRA / ZERO	0.01	0.01	ZERO	0.01	ZERO
MRL Updates	Yearly	Monthly – 6 weeks	Bi-annually	Often	Rarely	Often	Often	Approx. twice/year	Rarely	Rarely

Note: Above is as at 6 January 2020, variations exist for specific chemicals. MRLs quoted in mg/kg. CRA refers to a Country Recognition Agreement where Indonesia may accept Australian MRLs for some commodities



may increase or additional segregations may need to be created, which all create extra costs. These increased costs may be passed onto the grower through the purchase price offered for the grain.

The post-farm gate sector expects that growers apply chemicals follow legal requirements. Sampling and testing of all deliveries for all possible chemicals used on-farm is not conducted due to the expense. Rather, targeted sampling and testing is conducted based on market risk. Thus, growers must provide accurate information on chemicals used on that crop. Growers are encouraged to complete Commodity Vendor Declarations correctly when details of chemicals used are sought by the trade. Failure to do so risks the supply of grain that fails to meet market requirements, a loss in reputation of Australian grain and increased costs for all along the supply chain.

Tools to assist with meeting market requirements

On behalf of industry, the NWPGP is the body responsible for providing management and leadership to industry in the areas of chemical use, post-harvest storage, market requirements and monitoring changing chemical regulations and their impact on market access.

The NWPGP is the linkage between Government and the industry providing:

- Feedback on issues of concern with chemicals.
- Advice on whether government to government submissions are required.
- Strategies for dealing with changing market requirements and actions by all in industry to address these.

An annual 2-day conference is held providing participants with the latest research and developments in the area of chemical usage, post-harvest storage and hygiene and outturn tolerances, international and domestic market requirements, and regulations. The outcomes are provided to industry to assist with market access compliance.

A greater focus has been placed in the last two years on providing industry with knowledge of market requirements. This has involved significant communication and liaison with the pre- and post-farm gate sector. The gap between knowledge of the market requirements and what happens on-farm was recognised and communication to the pre-farm gate sector has increased through development of Fact Sheets and presentations to a range of stakeholders throughout Australia.

This has occurred via NWPGP, GRDC and various government departments. Further communication with the grower and the adviser sector will continue to benefit all in the industry.

Conclusion

Given the changing nature of market regulations, all stakeholders along the supply chain need to be aware of market requirements in relation to MRLs. Given the implications of incorrect chemical use, there is a need for greater transparency and understanding by growers and advisers of the impact of chemical use on market access.

Going forward there will be a focus on ensuring all supply chain participants understand the risks of non-compliance with label directions and removing the gaps in networking; including chemical registrants, re-sellers, agronomists, growers and their advisers.

Growers need to talk to their adviser/agronomist and storage agent/marketer and where needed other experts, when seeking advice on market requirements.

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Useful resources

On-farm Stewardship Guide 'Growing Australian Grain' <http://grainsguide.grainproducers.com.au>

National Working Party on Grain Protection
www.graintrade.org.au/nwpgp

National Residue Survey <https://www.agriculture.gov.au/ag-farm-food/food/nrs>

APVMA <https://apvma.gov.au>

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