

**GENERAL
INTRODUCTION
TO THE PESTICIDE RESIDUE
MINIMISATION
CROP GUIDES**

FOOD STANDARDS AGENCY

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Executive Summary

The Food Standards Agency (FSA) recognises that consumer preference is for reducing pesticide residues further than the current safe levels. In fulfilling its role to act in consumers' interests, the Agency has produced pesticide residue minimisation guides for five crops. They aim to offer a consolidated source of information on best agricultural practice, to raise awareness of the issue of pesticide residues and to encourage and assist the food industry to deliver existing pesticide residue minimisation initiatives.

The guides provide detailed information covering the description of the crop and its production and market; pesticides used and reasons for their use; pesticide residues found on the crop; approaches to reduce pesticide residues; research relevant to reducing residues; and knowledge and technology transfer initiatives.

The guides focus on five key crops that include staple diet foods and areas where progress has already been made to reduce pesticide residues. The Agency commissioned ADAS (an agricultural advisory service) to draft individual crop guides for cereals, apples, pears, potatoes and tomatoes, in consultation with the key industry stakeholders. The guides draw together examples of existing best agricultural practice and pesticide manufacturers' recommendations that could help reduce residues in the specific crops. The guides cover conventional crop production within the UK and are aimed at all those in the industry from production through to sale. Production outside of the UK is not within the scope of the guides, although it may be possible to apply the principles within the guides more widely.

The FSA hopes that the information and advice in the guides will be adopted widely and that pesticide residues will fall as a result. By highlighting the issue to the food production industry it is hoped to encourage existing initiatives to minimise levels of residues in foods and new technological advances and crop management systems. It is likely that the crop guides may have greatest impact if they are taken forward with food assurance schemes.

INTRODUCTION TO THE FOOD STANDARDS AGENCY'S GUIDES FOR PESTICIDE RESIDUE MINIMISATION IN SPECIFIC CROPS

1. The aim

The Food Standards Agency (FSA) has produced pesticide residue minimisation guides for five crops: apples; pears; tomatoes; potatoes and cereals. They aim to:

- **offer** a consolidated source of information on pesticide residue minimisation for the five crops, drawn from examples of best practice and pesticide manufacturers' recommendations;
- **raise** awareness of the issue of pesticide residues for those involved in the production, supply and marketing of the fresh produce; and
- **encourage** and assist the food industry to deliver existing pesticide residue minimisation initiatives.

2. The Structure of the Guides

The guides provide detailed information covering the following areas:

- Description of the crop and its production methods and market
- Pesticides used on the crop and reasons for their use
- Pesticide residues found on the crop
- Approaches to reduce pesticide residues
- Research relevant to reducing residues
- Knowledge and technology transfer initiatives.¹

The crop guides should be seen as a 'snap shot' in time. The guides offer general advice on the broad approaches that may be explored and a combined reference source of best practice and existing initiatives at the time

¹ Knowledge transfer is the translating of research results into clear advice to farmers and other users.

Technology transfer is the effective dissemination of best practice, advances in technology and research and development results.

of writing (2004 – 2005). They do not include detailed protocols that would require regular updating. Where possible, contact details and web-site addresses have been included so that up to date information can be easily found.

3. Background

The guides have been produced as part of an FSA action plan² to minimise pesticide residues in food. Although the FSA accepts the current risk-based approval system for pesticides and that food containing residues up to the legal Maximum Residue Level (MRL)³ is not harmful, the FSA also recognises that consumer preference is for reducing residues further than the current safe levels.

The FSA welcomes the fact that many producers and their customers are keen to address pesticide residue minimisation and that many industry initiatives already exist. Most UK retailers source produce from growers that comply with specific assurance schemes. Some employ a range of additional strategies to reduce pesticide use and residues in the foods they source.

The Agency considers that all stakeholders, particularly retailers and those operating assurance schemes, have an important role to play in minimising residues. The FSA's action plan therefore focuses on what the Agency can do to support the food industry in successfully delivering its existing pesticide residue minimisation initiatives. The Agency recognises the benefits of assurance schemes and sees encouragement of uptake of pesticide residue minimisation by assurance schemes as the most effective way of minimising pesticide residues in food.

² FSA Board paper FSA 04/05/02, 13 May 2004;
<http://www.food.gov.uk/aboutus/ourboard/boardmeetings/>

³ The Maximum Residue Level (MRL) is a trading (not health) standard that prescribes the maximum amount of pesticide residue legally permitted. MRLs are based on the level of pesticide expected if good agricultural practice is followed and are generally well below safety limits.

4. The development of the crop guides

The crop guides arose from two studies commissioned to provide supporting information for the Agency's action plan. An independent academic literature review⁴ looked at the impact on pesticide residues of various approaches including: crop management systems such as integrated crop management (ICM); tools such as decision support systems; and agricultural methods such as organic production systems. This was followed by a study that involved a wide range of stakeholders⁵ to capture opinions, discover initiatives already underway and highlight where the Agency could provide the most effective lead to reduce residues.

It was recognised, as a result of these studies, that approaches to pesticide residue minimisation would need to be taken on a focussed basis, targeted at specific crops and specific pesticides. It was decided by the Agency to focus on reducing residues in five specific crops: cereals, apples, pears, potatoes and tomatoes. These crops include staple diet foods and they present their own challenges. In addition, it was considered that UK tomatoes would provide an example of a crop where British growers have already made good progress towards their target of minimising and then eliminating pesticide use.

The Agency commissioned ADAS (an agricultural advisory service) to draft the individual guides for the five crops, in consultation with the key industry stakeholders. The guides draw together examples of existing best agricultural practice, and pesticide manufacturers' recommendations, that could help reduce pesticide residues in the specific crops.

⁴ Scottish Agricultural College (April 2003): The Minimisation of Pesticide Residues in Food: A Review of the Published Literature
[\[http://www.food.gov.uk/multimedia/pdfs/pesticideslitreview.pdf\]](http://www.food.gov.uk/multimedia/pdfs/pesticideslitreview.pdf)

⁵ ADAS (August 2003) [\[http://www.food.gov.uk/multimedia/pdfs/peststakeholdreport.pdf\]](http://www.food.gov.uk/multimedia/pdfs/peststakeholdreport.pdf)

5. Scope

The guides cover production within the UK using conventional methods. Organic farming and use of genetic modification are outside their scope. However, it is recognised that the transfer of methods of crop protection developed in organic farming to conventional systems may have an impact on pesticide residues. The non-professional use of pesticides, e.g. on gardens and allotments, is not covered by the guides.

6. Who the guides are aimed at

These guides are aimed at a broad audience within the industry, from production through to sale. Although the guides are not aimed at consumers, they have been made publicly available for those with an interest.

7. Imported foods

The crop guides are based on UK grown crops and best UK practice, although it may be possible to apply the principles within the guides more widely. The FSA recognises that a large proportion of foods consumed in the UK is imported, and that pesticide residue monitoring by the independent Pesticide Residues Committee (PRC)⁶ indicates that non-UK produce can be more likely to contain residues than domestic produce. However, the proportion of samples that exceed legal limits is still low at around 2% of imported produce compared with 1% of UK produce.

Action to minimise pesticide residues is less significant in other countries, although the FSA recognises this is an area that requires further work. At EU level the Commission's Pesticide Initiative Programme (PIP) seeks to educate growers based in African, Caribbean and Pacific countries to adopt good agricultural practices (GAP) and food safety management systems. The

⁶ Published by the Pesticides Residue Committee (PRC) - [<http://www.prc-uk.org>]
The Pesticide Residues Committee (PRC) replaced the Working Party on Pesticide Residues (WPPR) who organised the monitoring of pesticides residues in food from 1977 until 2000. The PRC was set up as an independent committee to advise the FSA and the Pesticides Safety Directorate (PSD) on the annual UK monitoring programme

primary aim of this initiative is to educate growers and ensure all produce conforms with existing EU MRLs and import tolerances, but alternative approaches to pesticides are also promoted.

UK retailers may also have some influence through their suppliers of imported foods. Retailers might work together in the future to develop a single European-wide standard. EUREPGAP (Global Partnership for Safe and Sustainable Agriculture) (www.eurepgap.org) membership may become a requirement for many UK and international retailers in the future – although it is not supported by all retailers at present.

The FSA will explore options for reducing residues in imported produce in liaison with relevant organisations.

8. Pesticide regulation and residue surveillance

PRC surveillance data are referred to in the crop guides. (Routine residue data are also collected by processors and retailers, but these data are not publicly available.) The PRC oversees a programme to monitor the UK food and drink supply for pesticide residues. About 4,000 food samples from retail/wholesale outlets are analysed each year for a wide range of pesticides. The annual surveillance programme covers a wide range of food and drink, including fruit, vegetables, bread, cereals, and animal products. All results are published on the PRC website (www.pesticides.gov.uk/prc_home.asp). Annex A gives information about the regulation of pesticides and the monitoring of residues.

9. Fluctuations in residue levels in foods

The percentage of samples with residues, or the level of residues in samples, tends to fluctuate year on year. This may be a result of many different factors:

for pesticide residues in food and drink. For more information on the PRC see their website - [\[http://www.pesticides.gov.uk/prc_home.asp\]](http://www.pesticides.gov.uk/prc_home.asp).

pest and disease pressure, weather; soil health; cultivar of crop; age and spacing of trees for orchard fruit. They may all impact on the need for pesticide use during a given growing season and on the resultant residues left on the crop.

10. The desired outcome and measurement of the success of the guides

The FSA hopes that the information and advice in the guides will be adopted widely and that pesticide residues in UK produce will fall as a result. We hope that both residue levels and the frequency of residues occurring will fall, but either outcome would be welcome. By raising awareness of the issue within the food production industry, and encouraging initiatives to minimise residues in foods, such as technological advances and the development of new crop management systems, the Agency hopes that farmers and growers will continue to seek to produce food in accordance with consumer wishes and expectations.

It is acknowledged that the crop guides will have greatest impact if they are taken forward with food assurance schemes. The success of the guides will be monitored by, for instance, assessing uptake of the initiative by assurance schemes.

The guides are not intended to be definitive protocols for growers. They offer general and specific principles to be built upon and a combined reference source of the various initiatives currently in place, as well as research being conducted, plus pointers to the future.

11. Diet and health

The Agency considers that pesticide residues in the UK food supply do not present a significant concern for consumer health. The benefits of eating a varied, balanced diet, including the consumption of fruit and vegetables as promoted by the 5-a-day campaign, are well established and far outweigh any

concern about pesticide residues. Further information on nutrition and diet is available on the Agency's website: www.food.gov.uk.

12. Approaches to pesticide best practice

There are a number of best practice approaches for pesticide use in agriculture. Whilst it is recognised that these may not primarily aim to reduce residues in food, strategies that reduce pesticide input could also have secondary effects that may affect food residue levels.

Techniques include Integrated Crop Management (ICM) that aim to conserve and enhance the environment whilst producing safe and wholesome food economically. Integrated Pest Management (IPM) is a part of ICM and involves developing a range of pest control strategies, including a combination of environmental control, biological control and the use of physical and chemical control agents.

Decision Support Systems (DSSs) are computer-based models that access central databases holding information on farms, local weather and pesticides. They allow the user to explore possible crop-management scenarios to compare their efficacy and profitability and can be used to warn growers of a potential disease or pest risk.

Alternative pest control methods provide substitutes for conventional pesticides. A recent Advisory Committee on Pesticides (ACP)⁸ report examines their scope for effective control of agricultural pests and diseases.

Organically produced food is generally produced without the use of conventional pesticides. However, in certain cases, specific plant protection

⁸ The ACP, which advises Ministers on all major issues relating to the control of pests, prepared a paper on 'Alternatives to conventional pest control techniques in the UK: A scoping study of the potential for their wider use'. (2003).

products may be used. All organic producers must be certified by one of the UK certification bodies⁹ that audit growers to the UK organic standards.

13. Assurance schemes

The primary objective of such schemes is to meet the concerns and requirements of consumers, retailers, processors and growers for good quality safe food at affordable prices. Some of the more widely adopted are listed below.

13.1 Assured Produce Scheme (APS) (www.assuredproduce.co.uk)

APS, a founder member of Assured Food Standards (AFS - the Red Tractor Scheme), is the primary assurance scheme for fresh fruit and vegetables in the UK. Members of the scheme are subject to both generic guidance and crop-specific protocols that include a wide range of advice and guidance on crop management embodying the principles of ICM.

In 2003 APS initiated a project to examine ways in which ICM strategies on specific crops could be adapted to reduce the level of pesticide residues on the final product without compromising crop quality or adversely affecting the environment. APS has now included best practice guidelines aimed at minimising pesticide residues in its generic crop protocols and in its specific crop protocols for all UK crops where residues occur.

⁹ UK certification bodies include: Organic Farmers and Growers, Organic Food Federation, Soil Association Certification Ltd, Bio-dynamic Agricultural Association, CMi Certification or Farm Verified Organic Inter Certification Service (GB) Ltd.

13.2 Assured Combinable Crops Scheme (ACCS)

(www.assuredcrops.co.uk)

ACCS, a member of AFS, is one of the principal assurance schemes for cereals, oilseed and protein crops in England and Wales. Its approach embodies the principles of ICM. ACCS has recently issued generic best practice on minimising pesticide residues and will shortly be issuing specific guidance for the few pesticides that may leave residues in grain.

13.3 Scottish Quality Cereals (SQC) (www.sqcereals.co.uk/)

SQC is the main Scottish assurance scheme for cereals, oilseed and pulses. Although it has not issued guidance on pesticide residue minimisation, its technical advisory committee is considering this issue.

13.4 Northern Ireland Farm Quality Assured Cereal Scheme (NIFQACS)

(Ulster Farmers' Union Tel: 028 90 370222)

The Ulster Farmers' Union sets a code of practice and standards for farmers, but there is no specific advice on pesticide residue minimisation.

13.5 LEAF Marque (www.leafuk.org/leaf)

The Linking Environment and Farming (LEAF) Marque Standard is additional and complementary to the assurance schemes mentioned above. It includes the standards of these schemes and offers assurance that food has been produced in an environmentally responsible way through the principles of Integrated Farm Management. The LEAF Audit includes the monitoring and justification of the targeted use of pesticides. There is also specific reference to documented post-harvest interval procedures, which is directly relevant to residues.

14. Industry initiatives

14.1 Crop protection industry (www.cropprotection.org.uk)

The Crop Protection Association (CPA) has issued general advice on pesticide residues, on behalf of the crop protection industry. A leaflet, 'Keeping residues well within the limits' is available on its website.

14.2 Voluntary Initiative (VI) (www.voluntaryinitiative.org.uk)

The VI, which began in April 2001, is a UK-wide package of measures, agreed with Government, designed to reduce the environmental impact of the use of pesticides. The specific measures adopted by the initiative, including the development of Crop Protection Management Plans (CPMP), improvements in spray technology, training for spray operators and spray retention research could have secondary effects on food residue levels. The incorporation of some VI measures into the requirements of assurance schemes is welcomed by the Agency.

14.3 Retailer initiatives

The major retailers expect growers to demonstrate that their management of pesticide use ensures that no illegal residues are left in the harvested crop. They often employ a range of additional strategies to reduce pesticide residues in the foods they source, such as restricting the use of some pesticides for certain crops. Retailers also monitor their growers through regular audits, where growers are required to demonstrate that they have systems in place to monitor and reduce pesticide use and residues.

Addendum: Pesticide Regulation

Why are pesticides used?

Pesticides are used by farmers and growers to protect crops from disease, weeds and damage. They can help to provide a plentiful supply of healthy

and affordable year-round food to meet the demands of consumers. However, pesticides also pose risks and so they are regulated to ensure that their appropriate use does not cause harm to health or the environment.

The authorisation and monitoring of pesticides

Before pesticides are approved they are rigorously assessed to ensure they do not pose an unacceptable risk to users of the pesticide, the environment and animals, and that any pesticide residues left in food will not be harmful to consumers. Pesticide residues in the food chain are also monitored to check they are within legal and safe limits.

Further information on consumer safety and the monitoring of pesticides can be found on the Pesticide Residues Committee (PRC) website at: [\[http://www.pesticides.gov.uk/prc.asp?id=952\]](http://www.pesticides.gov.uk/prc.asp?id=952).

Actions on PRC pesticide residue monitoring results

When residue levels are found to exceed the statutory MRL, or if no MRL has been set, or when a pesticide non-approved for use in the UK is detected, or if there is a potential concern for consumers, consumer risk assessments are carried out by the FSA and the Pesticides Safety Directorate (PSD) and reviewed by the PRC. Other follow-up actions include: notifying the brand owner; alerting the European Commission using the EU's Rapid Alert System for Food and Feed (RASFF) if there is a potential health concern; and undertaking an enforcement survey with a view to legal action if there are repeated excessive residues.

Safe levels and legal limits

Legal limits (MRLs) are based on good agricultural practice. They represent the maximum level that would be expected if the pesticide is applied correctly. MRLs are usually well below safety limits.

A safe level is based on guidance reference doses set by independent scientific committees. These reference doses, such as the acute reference dose (ARfD) and the acceptable daily intake (ADI), represent an amount of pesticide which can be consumed by humans over a short term (the ARfD) or a lifetime (the ADI) without appreciable risk to health. When MRLs are set, the possible residue doses to consumers are estimated, using high levels of food consumption, and compared with the above reference doses to ensure that the consumer is protected. The dose to a range of different consumers is estimated, from infants to the elderly, based on average bodyweights to account for differences in consumption (the young eat more per bodyweight).

Assessing the risk from mixtures of pesticides and similar substances

The Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) produced a report on assessing the risk from mixtures of pesticides. This concluded that the risk to people's health from mixtures of pesticide residues is likely to be small. The report made several recommendations and the Agency has a programme of work to take these forward. Further information can be found on the Agency's website at: <http://www.food.gov.uk/safereating/chemsafe/pesticides/pestmixbranch/>.