



FOOD CHAIN TECHNICAL BROCHURE

Spinetoram / Radiant™

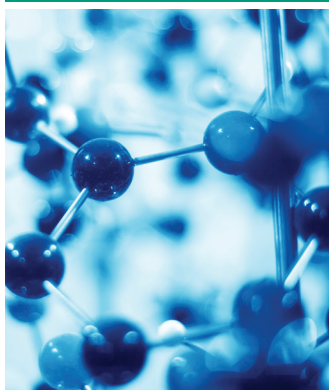
INSECTICIDE



Dow AgroSciences

Solutions for the Growing World

Introduction



Spinetoram is an insecticide derived through a fermentation process from a naturally occurring bacterium. It is used in agriculture and horticulture for the control of a variety of insect pests.

It is comprised of two closely related complex multi-ring molecules each with a different sugar attached to the central ring structure. These two molecules are very similar in composition and are referred to as spinosyn J (primary factor) and spinosyn L (minor factor) in a ratio of approximately 3:1. There is a further synthetic step in the production of spinetoram during which these natural spinosyns J and L are slightly modified, so that their intrinsic toxicity to insects and their duration of activity are improved.

Spinetoram is a new active substance which has been approved in the EU.

Spinetoram is currently registered in many countries around the world, including USA, Canada, Australia, Morocco, South Africa, Turkey, Kenya, Israel, Egypt among others.

Uses



Formulated products containing spinetoram, a spinosyn insecticide, are used for the control of a variety of insect pests on a wide range of crops.

Spinetoram provides robust and commercially acceptable control on a variety of insect pests from diverse insect taxa. The results of extensive studies show that spinetoram controls Lepidopterans (fruit or stem borers, leaf miners, leaf rollers, external feeders), thrips, Hemipterans (Psyllids) in a variety of environments and crops such as pome and stone fruit, olives, grapes, vegetables, ornamentals and row crops.

Mode of action and resistance management



Spinetoram causes the death of larvae of a variety of pests when these pests ingest or come into contact with plant material sprayed with spinetoram. It is a new spinosyn insecticide. As such, it shares the same mode of action as spinosad. Spinosyns act at a novel site in the insect central nervous system known as Dm α 6-nAChR.

In order to help prevent or delay the incidence of resistance, the Insecticide Resistance Action Committee (IRAC) promotes the use of a classification scheme of insecticides according to their Mode of Action (MoA). In practice, alternations, sequences or rotations of compounds from different MoA groups provide sustainable and effective Insecticide Resistance Management. Spinetoram has a unique MoA and can be used as an alternative to other chemical classes in Insecticide Resistance Management strategies.

IRAC MoA Group 5	5
Group name	nicotinic acetylcholine receptor allosteric activators
Chemical sub-group	spinosyns
Molecules in IRAC group	spinosad and spinetoram
Cross-resistance with other classes	None observed

Classification and labelling

Information on hazard classification of active substance and formulated product can be found on the product safety data sheet.

It is a legal obligation of all plant protection products suppliers to provide updated safety data sheets for the products they put on the market.

Safety data sheets can be consulted on Dow AgroSciences web sites:

<http://www.dowagro.com>



Dow AgroSciences

Solutions for the Growing World

Plant Metabolism

Degradation occurs through 2 major pathways for both spinosyn J and L, along with a minor pathway for spinosad J (based on apple data).

Degradation occurs initially by conversion of the sugar components of the molecule. The products formed tend to be short-lived, and further degrade to components that cannot be readily extracted from the plant.

These products are then converted by the plant into very small units which can then help to form the building blocks of the plant itself such as sugars and starches. This is termed incorporation into natural products.

Definition of the Residue

The definition of the residue for monitoring purposes is given as the sum of XDE-175-J and XDE-175-L, expressed as spinetoram.

Limit of Quantification of the Residue Method

The limit of quantification of the residue analytical method most commonly used for monitoring is 0.01 mg/kg (for each XDE-175-J and XDE-175-L).

Global MRLs

European Union	✓
http://ec.europa.eu/sanco_pesticides/public/	
CODEX	✓
http://www.codexalimentarius.net/pestres/data/index.html	
USA	✓
http://ecfr.gpoaccess.gov/cgi/t/text/textidx?c=ecfr&tpl=/ecfrbrowse/Title40/40cfr180_main_02.tpl	
Canada	✓
http://www.hc-sc.gc.ca/cps-spc/pest/part/protect-proteger/food-nourriture/mrl-lmr-eng.php	
Japan	✓
http://www.ffcr.or.jp/zaidan/FFCRHOME.nsf/pages/MRLs-p	

✓ MRLs established ✗ MRLs not established

EU* MRLs for key crops

The EU maximum residue limits (MRLs) are summarised below:

Crop	EU MRL (mg/kg)	Pre-harvest interval* (days)
Grapes (table and wine)	0,5	7
Pome fruits (apple, pear)	0,2	7
Stone fruits: Peaches	0,3	7
Apricots	0,2	7
Cherries**	0,05	7
Raspberries	0,8	3
Strawberries, blueberries	0,2	3
Olives	0,05	21

*EU information, for non EU countries, follow local label.

**new EU MRL proposed for cherry: 0,1 mg/kg

Additional EU MRLs

EU MRLs have been established for spinetoram in more than 20 crops.

Final level of residue

With extended pre-harvest intervals, residue levels will be further reduced.

Effects of Industrial Processing on Residues

Independent MRLs are not established in the EU for processed products. The MRL is established for the raw agricultural commodity.

In general, industrial processing reduces the concentration of active ingredient in commodities.

However if the commodity is a concentrate (e.g. tomato puree) it is likely that some residues will still be present. Residues on both the raw agricultural commodity and the processed products are considered for risk assessment. If the raw commodity complies with the MRL, potential residues in processed products have been proved to constitute a no health risk for consumers.

Residue summary



**Contact
Dow AgroSciences
for more detailed
information
on residues.**



Formulation



Environmental information summary



Product registration information

Radiant: This formulated product is registered in many countries around the world, including Africa and Middle-East countries, under different trademarks. In order to check the authorization of a spinetoram based product in a given country, please contact Dow AgroSciences in the country of interest and/or consult our website: <http://www.dowagro.com>
Tel: +33 493 956 000. <http://www.dowagro.com/foodchain>

[™] Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow.

The information herein is given in good faith and to the best of our knowledge. However Dow AgroSciences sole warranty is limited to the Product compliance with its chemical description and essential information, as printed on its label.

This document is intended for the exclusive use of the food supply chain.

Use plant protection products safely. Always read the label and product information before use.

Radiant is a 120 g/L suspension concentrate containing spinetoram, a spinosyn insecticide.

Radiant is a selective insecticide registered in many countries in the world including some Middle-East and Africa countries for use in a variety of crops such as pome fruit, stone fruit, olives, grapes, citrus, vegetables, ornamentals and row crops, for the control of pest caterpillars (moth, fruit borers, stem borers, leaf miners, leaf rollers, external feeders), thrips, Hemipterans (Psyllids) and Dipterans (leaf miners, fruit flies, root/seed maggots).

Product labels should be followed in each country of registration.

Information based on guidance document for the preparation of Environmental Information Sheets in the United Kingdom produced by the Crop protection Association.

1 WILDLIFE: Mammals and Birds

Radiant is not classified as "harmful to game, wild birds and animals". No risk management is necessary to protect mammals and birds.

Radiant has a low toxicity to mammals and birds. It poses a low risk to birds and mammals living and feeding in treated areas.

2 BEES

When **Radiant** spray deposits are dry there is a very low risk to bees and pollinating insects. The risk management precautions specified on the label should be taken to avoid any contact of bees with direct spray.

3 NON TARGET INSECTS AND OTHER ARTHROPODS

Radiant presents a risk to non-target arthropods or other arthropods.

Initial adverse effects on some non-target populations may be observed in the treated area, but with the potential for recovery after use, long-term adverse effects are unlikely.

Risk management is advised on the label.

4 AQUATIC LIFE

Radiant is of moderate toxicity to fish and highly toxic to algae and aquatic invertebrates

(e.g. water flea). Care must be taken to ensure that surface waters or ditches are not contaminated with the product or used container.

Risk management is advised on the label.

5 SOIL AND GROUNDWATER

Spinetoram is not persistent, and whilst breakdown products range from low persistence to very persistent; all are of low mobility in soil. When **Radiant** is used as recommended there is a low risk of groundwater contamination.

• Earthworms

When **Radiant** is used as recommended the risk to earthworms is low. No risk management is necessary.

• Soil micro-organisms

Spinetoram is of low toxicity to soil micro-organisms. No risk management is necessary.

6 NON-TARGET PLANTS

Radiant is an insecticide. When used as recommended **Radiant** is not expected to have adverse effects on non-target plants.

¹This classification is provisional; evaluation under EU procedures is not yet complete.



Dow AgroSciences

Solutions for the Growing World

Last update: January 2016