New Zealand Wine

Example Board Report

March 2023

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Summary

Introduction

Methodology

Substances are evaluated on three primary dimensions: toxicity, exposure, and emerging concern. Thirty-four toxicity parameters and nine exposure parameters are used, representative of key environmental and human health measures, and consistent with international standardised methodology for assessing environmental and human health risk. The tool also uses four parameters to express 'emerging concern'. The methodology is designed with sufficient coverage and inbuilt redundancy so that when data for some parameters are unavailable, a robust comparison can still be made, thus the tool can compare like-with-like even when different data points are available.

The toxicity parameters cover GHS classifications, data from reputable studies, and regulatory limits set by government bodies, relating to both human and environmental health. A user-changeable weighting scheme allows for preferred data sources to be prioritised. These parameters are also categorised as acute/chronic and mammalian/aquatic to refine the prioritisation process with respect to end-use scenarios, using relative weightings. In populating these parameters, priority is given to data gathered from common model species, to ensure uniformity among values for substances being compared. Exposure limits from multiple regulatory bodies enable the use of those most relevant to the user's locality.

The exposure dimension includes measures relating to degradability, mobility, bioaccumulation, volume of use, and recorded presence in water monitoring programmes.

Raw data are drawn from several reputable sources and appropriately transformed (by log-transformation and normalisation) to a scale from 0 (least concern, out of the substances within the group) to 1 (greatest concern).

Measures of emerging concern are derived from appearances in academic journals published by Taylor and Francis Publishing Group and reflect not only the number of references to a particular substance but also their change over time.

Default weightings in Appendix (Table A1).

Social media reporting tracks substance mentions in twitter in real-time, and has a sensativity component, so that HazEL reports/alerts when proucts in an analysis are mentioned in a positive, negative or neutral way.

Selection of chemicals for the analysis

A list of chemicals was provided by NZ Winegrowers Association.

Biological agents (e.g., bacteria) and chemical categories unable to be resolved to a single CAS RN (copper sprays, fatty acids, mineral oils, soya bean oil) were not included in the analysis, but biologically-derived compounds (e.g., Spinosad) were included. Available data for chitosan and pine tar were insufficient to produce one or more dimension scores and as a consequence, these substances have not been included in the results.

Results

The chemicals in the provided list were categorised by use as fungicides, insecticides and acaricides, herbicides, and wound dressings (mainly fungicidal agents). Two chemicals were assigned to more than one use category. A HazEL analysis was first performed using the complete list of chemicals, to provide insight into whether any category presented more of a hazard than the others (Figure 1).

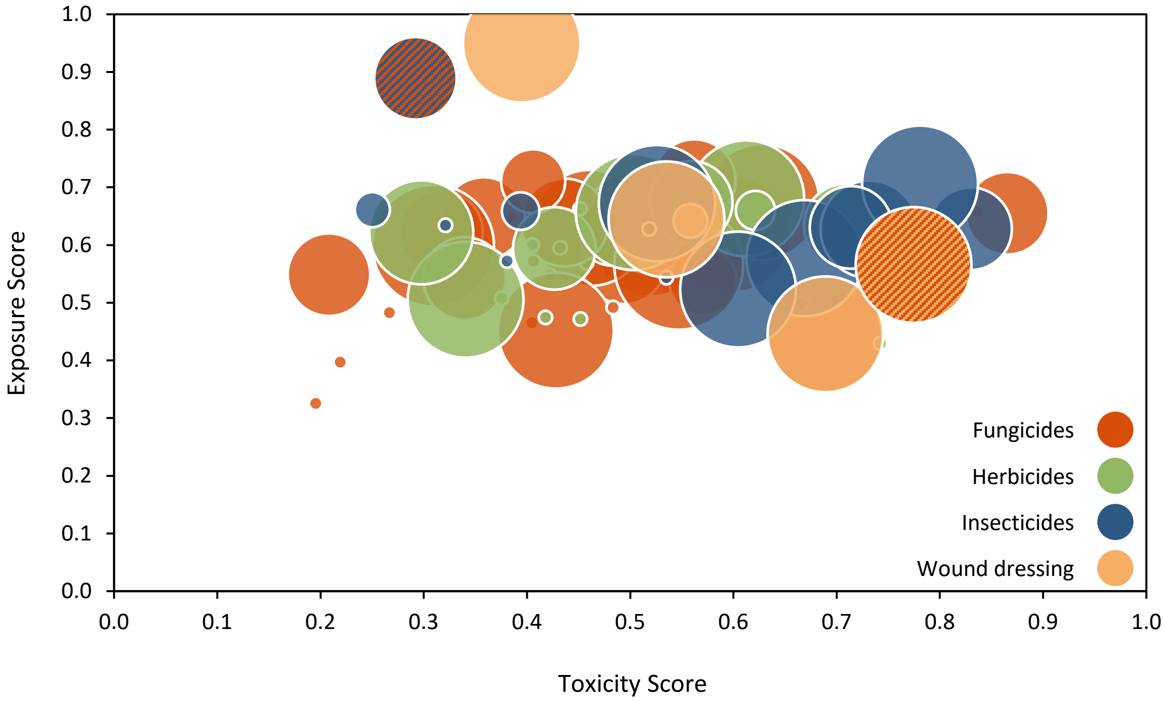

Figure 1 Results of the HazEL analysis for all the chemicals in the list provided. The bubble sizes indicate the relative magnitude of the Emerging Concern scores. Diagonal stripes indicate that the given chemicals were assigned to two use categories.

This analysis showed that there was considerable homogeneity on the Exposure dimension, with only two special use products (calcium polysulphide and boric acid) standing out from the group. The range of scores on the Toxicity dimension was higher than on the Exposure dimension but exhibited no clear patterns.

Since the purpose of HazEL is to allow for comparisons of chemical alternatives, separate analyses were conducted for each of the use types. The result of these analyses are shown in Figures 2 - 6.

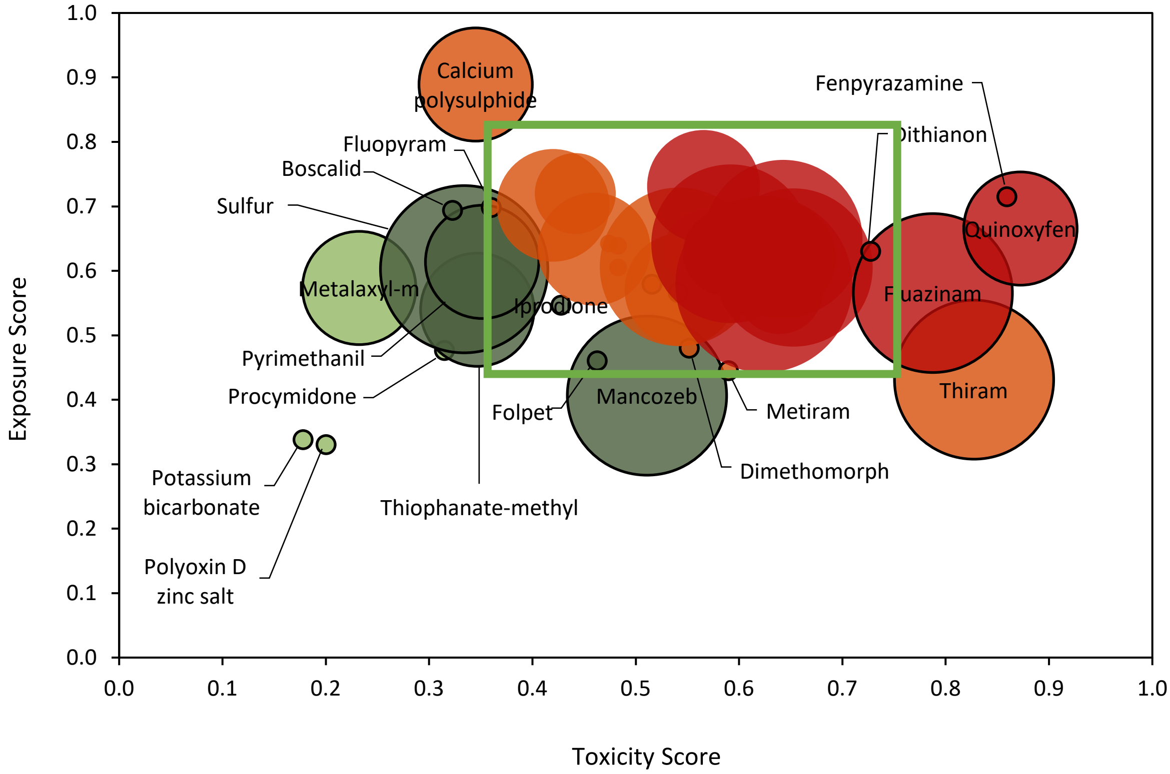

Figure 2 Results of the analysis for fungicides. See Figure 3 for enhancement within the square. Not shown: chitosan.

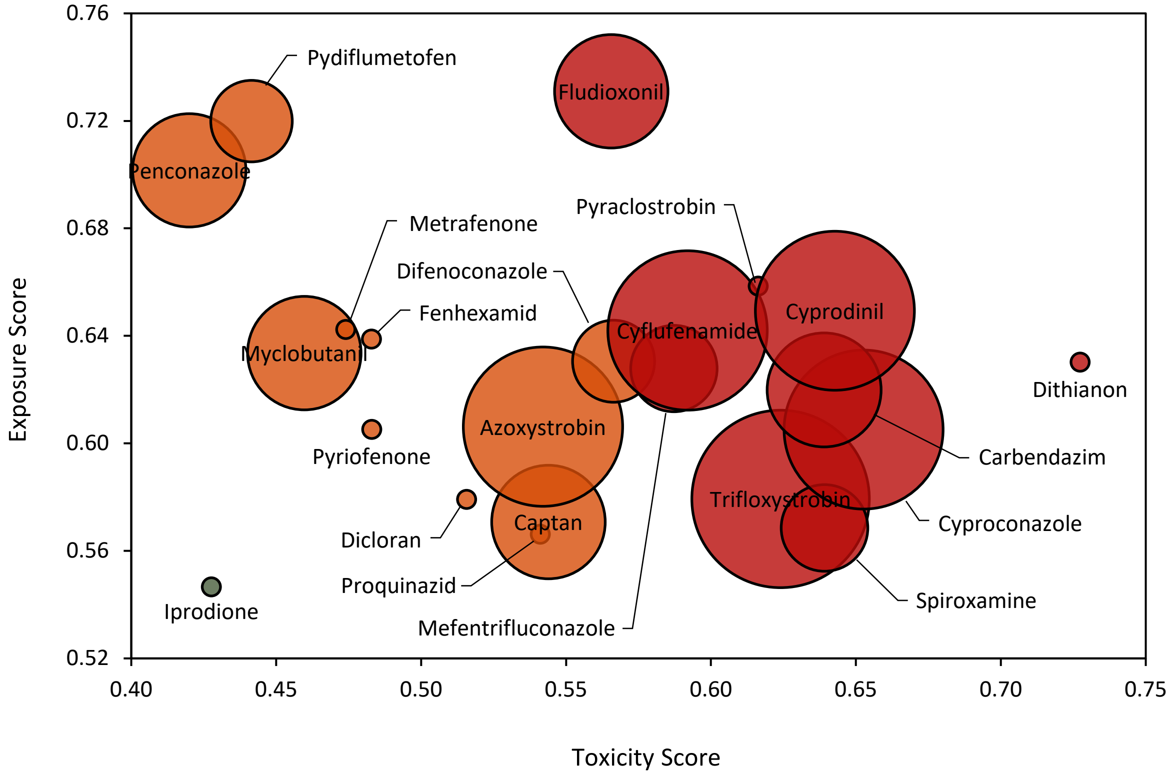

Figure 3 Enhanced results of the analysis for fungicides from within the square cut-out in Figure 2. Not shown: chitosan.

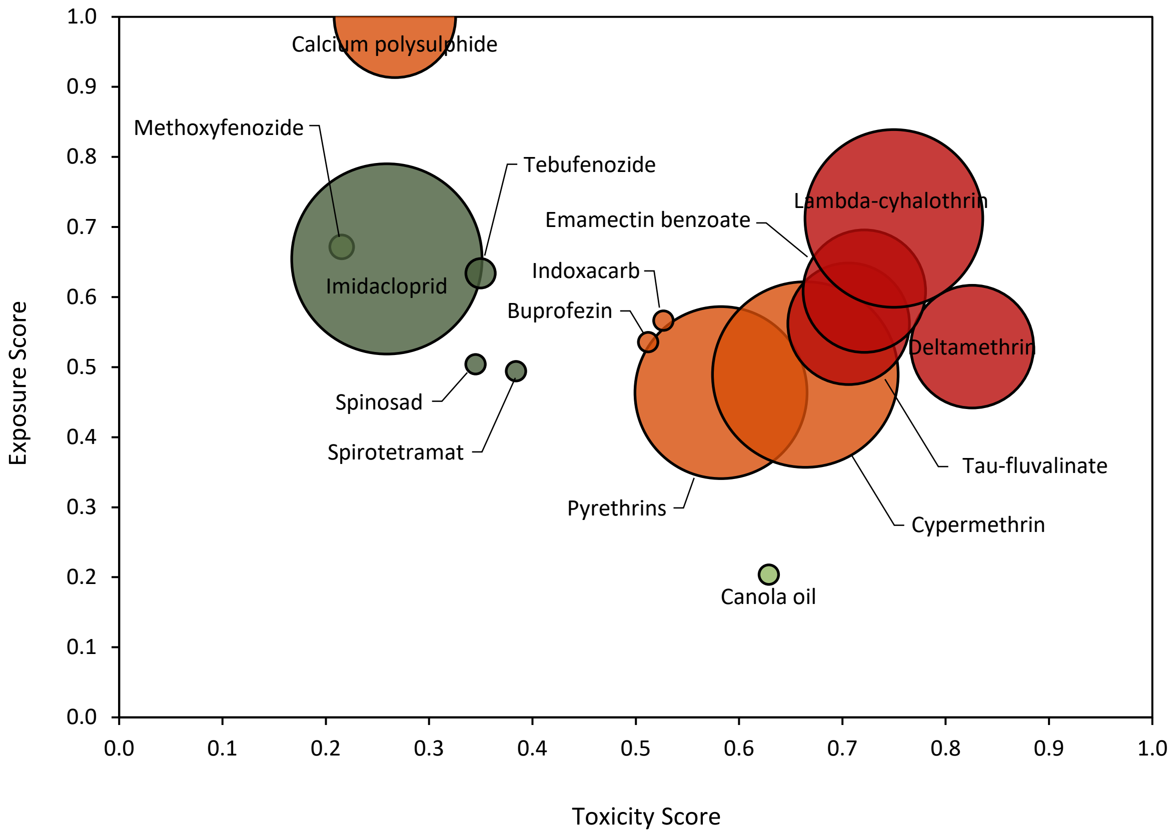

Figure 4 Results of the analysis for insecticides and acaricides.

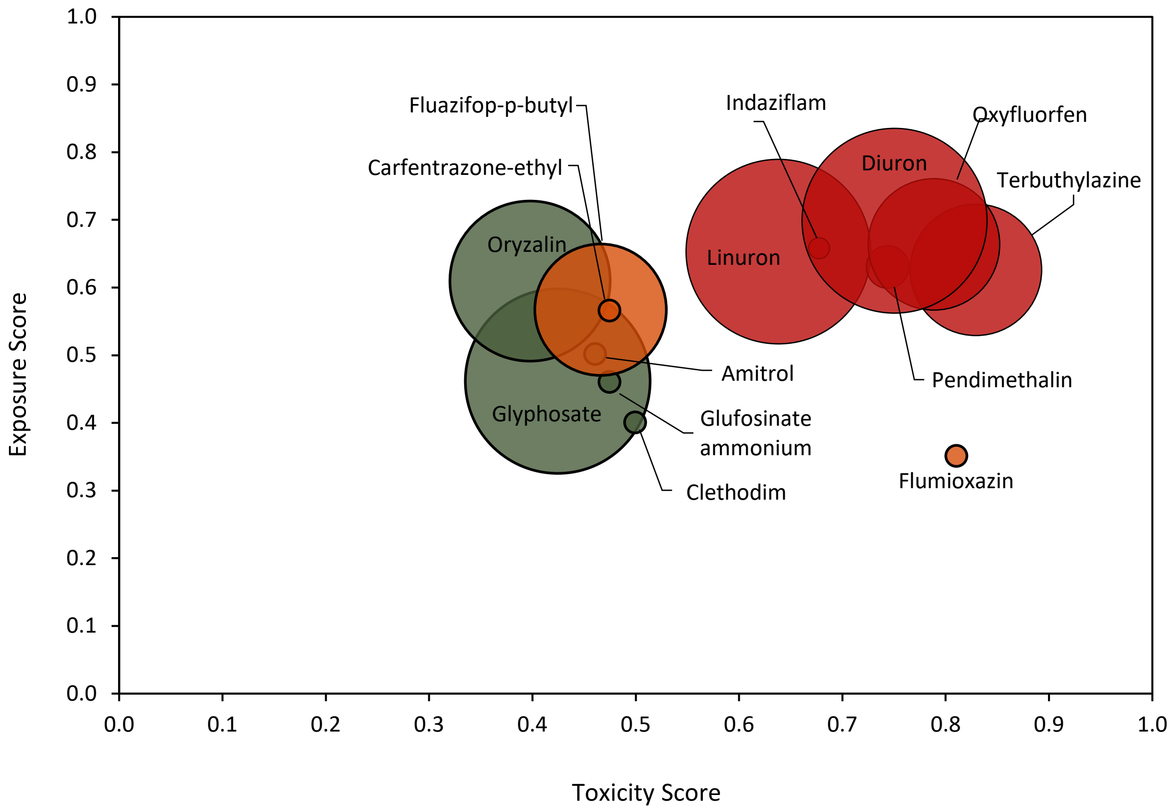

Figure 5 Results of the analysis for herbicides.

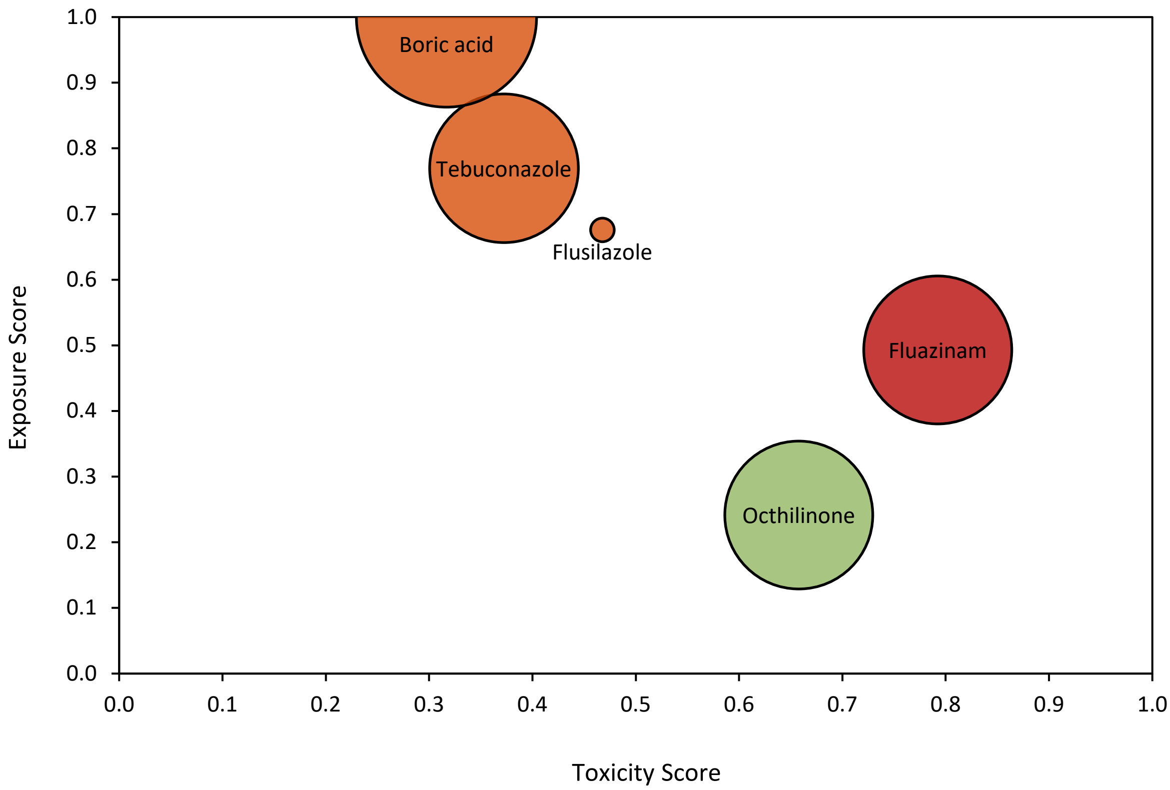

Figure 6 Results of the analysis for wound dressings. Not shown: pine tar.

Social Media Mentions

Substances and products which are mentioned in social media are shown over the past 12-months. Since December 2022, there has been consistent mention of Boscalid.

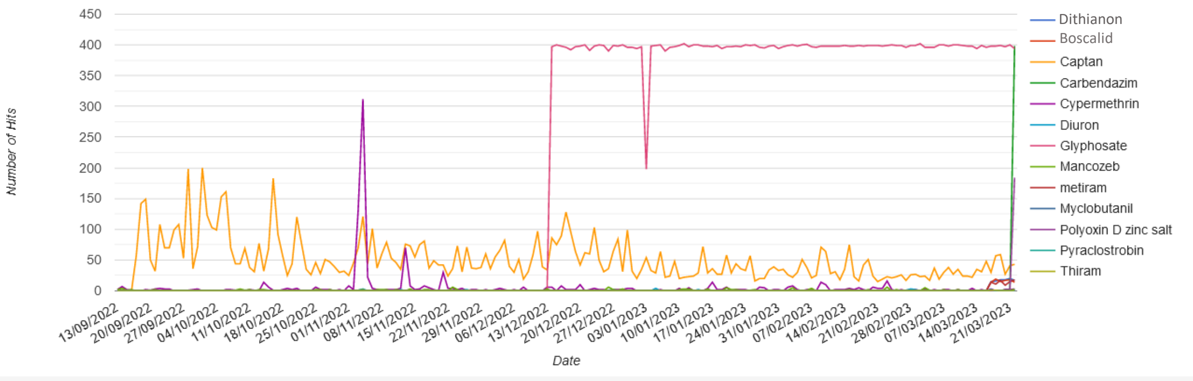

Figure 7 Social media trending over the past 12 months.

Discussion

Conclusions

References

Appendix

Table A1. Default weightings.

Parameter	Weighting (%)
Toxicity data sources	
GHS classifications	10
End-point data	30
Exposure limits	60
Toxicity components	
Acute mammalian toxicity	15
Chronic mammalian toxicity	35
Acute aquatic toxicity	15
Chronic aquatic toxicity	35
Exposure components	
Degradability	25
Mobility	25
Bioaccumulation	25
Detected in drinking water	10
Volume	15
Emerging concern components	
Toxicology research	50
Environmental studies research	50
Dimensions (contributions to ranking)	
Toxicity	25
Exposure	18
Emerging concern	57

Table A2. Chemicals used in the analysis.

Name	CASRN
Fungicides	
azoxystrobin	131860-33-8
boscalid	188425-85-6
calcium polysulphide*	1344-81-6
captan	133-06-2
carbendazim	10605-21-7
chitosan	9012-76-4
cyproconazole	94361-06-5
cyprodinil	121552-61-2
dicloran	99-30-9
difenoconazole	119446-68-3
dimethomorph	110488-70-5
dithianon	3347-22-6
fenhexamid	126833-17-8
fenpyrazamine	473798-59-3
fluazinam*	79622-59-6
fludioxonil	131341-86-1
fluopyram	658066-35-4
folpet	133-07-3
iprodione	36734-19-7
mancozeb	8018-01-7
metalaxyl-m	70630-17-0
mefentrifluconazole	1417782-03-6
metiram	9006-42-2
metrafenone	220899-03-6
myclobutanil	88671-89-0
penconazole	66246-88-6
polyoxin D zinc salt	146659-78-1
potassium bicarbonate	298-14-6
procymidone	32809-16-8
proquinazid	189278-12-4
pydiflumetofen	1228284-64-7
pyraclostrobin	175013-18-0
pyrimethanil	53112-28-0

pyriofenone	688046-61-9
quinoxyfen	124495-18-7
spiroxamine	118134-30-8
sulfur (elemental)	7704-34-9
thiophanate-methyl	23564-05-8
thiram	137-26-8
trifloxystrobin	141517-21-7
Insecticides and acaricides	
buprofezin	69327-76-0
calcium polysulphide*	1344-81-6
canola oil	120962-03-0
cypermethrin	52315-07-8
deltamethrin	52918-63-5
emamectin benzoate	155569-91-8
imidacloprid	138261-41-3
indoxacarb	173584-44-6
lambda-cyhalothrin	91465-08-6
methoxyfenozide	161050-58-4
pyrethrins	8003-34-7
spinosad	168316-95-8
spirotetramat	203313-25-1
tau-fluvalinate	102851-06-9
tebufenozide	112410-23-8
Herbicides	
amitrole	61-82-5
carfentrazone-ethyl	128639-02-1
clethodim	99129-21-2
diuron	330-54-1
fluazifop-p-butyl	79241-46-6
flumioxazin	103361-09-7
glufosinate ammonium	77182-82-2
glyphosate	1071-83-6
indaziflam	950782-86-2
linuron	330-55-2
oryzalin	19044-88-3
oxyfluorfen	42874-03-3
pendimethalin	40487-42-1

terbuthylazine	5915-41-3
Wound dressing	
boric acid	10043-35-3
fluazinam*	79622-59-6
flusilazole	85509-19-9
octhilinone	26530-20-1
pine tar	8011-48-1
tebuconazole	107534-96-3