



농약의 급성어독성과 노출시간에 따른 독성 변화

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Acute Toxicity of Pesticides to Carp (*Cyprinus carpio*) and Changes of Toxicity to the Exposure Time

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Abstract The 48 hr-LC₅₀ and 96 hr-LC₅₀ of 1,483 pesticides to carp (*Cyprinus carpio*) were classified into three grades and compared. And the values of 48 hr-LC₅₀ divided by 96 hr-LC₅₀ were calculated to detect changes in toxicity due to differences in exposure time. Based on Korea's criterion, the acute toxicity for fish were classified using 48hr-LC₅₀. As a result, 237 pesticides were grade I (LC₅₀ < 0.5 mg/l), 203 pesticides were grade II (0.5 ≤ LC₅₀ < 2 mg/l) and 1,043 pesticides were grade III (LC₅₀ ≥ 2 mg/l) among the 1,483 pesticides. As toxicity classification by crop type, 83 (12.9%) pesticides were grade II and 560 (87.1%) pesticides were grade III among 643 paddy field pesticides, and for 840 gardening pesticides, 237 (28.2%), 116 (13.8%) and 487 (58.0%) pesticides were classified as grade I, II and III. By dividing 48 hr-LC₅₀ into 96 hr-LC₅₀ to detect changes in toxicity due to differences in exposure time, in case of 831 pesticides (56%), there were no toxic variation over time since toxic expressions were completed within 48 hours. However the ratio of LC₅₀ values of 48 h and 96 h for 612 pesticides (41.3%) were 1.01~1.99 times and 40 pesticides (2.7%) were more than 2 times due to the continued toxic expressions as the exposure time increases.

Key words pesticide, acute toxicity, fish, carp (*Cyprinus carpio*), exposure time

서 론

농약은 병·해충·잡초를 방제하는 약제로서 정도의 차이는 있으나 독성을 지니고 있으므로 사용과 취급에는 각별한 주의가 요구된다. 즉, 농약의 독성정도에 따라 독성을 구분하여 취급제한 기준을 정하고 포장지(병)나 사용설명서에 경고문구나 주의사항 또는 그림문자를 표시하여 사용자나 취급자의 안전과 수생생태계를 보호할 필요가 있다.

논이나 밭, 과수원 같은 농경지에 살포된 농약은 비산이나 유출 등을 통해 비표적 환경생물(육상 및 수생)에 나쁜 영향을 미칠 수 있다. 따라서 농약 등록을 위해서 환경생물에 대한 위해성 평가는 필수적이다. 특히, 논에 농약사용은

농약의 유효성분이 논물에 녹아 관개수와 직접 연결된 하천이나 호수에 유입될 수 있으므로 우리나라와 같이 벼 재배용 농약 사용량이 많은 경우에는 수생생물에 대한 위해성 평가는 매우 중요하다.

우리나라 농약관리법에서는 농약등록신청 서류 검토 후 해당 농약이 다량으로 사용될 경우 수생생물에 해를 줄 우려가 있을 때 또는 공공수역의 수질이 오염되어 수생 생태계를 파괴할 우려가 있거나 그 물을 이용하는 사람과 가축에 해를 줄 우려가 있을 때는 등록신청서류를 반려하거나 보완을 요구하게 되어있다(PCA 2017). 그러나 실제로는 제출된 등록 신청농약의 급성독성과 등록 신청농약의 사용으로 수생생물이 노출될 수 있는 환경 중 추정농도를 산출하여 비교함으로써 위해성평가를 수행하게 된다. 농약등록 시 제출해야 할 수생생물에 대한 위해성 평가 관련 시험성적서는 등록신청자가 제출토록하고 있다. 제출된 시험성적서는

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단계적 검토 방법으로 검토하되 제1단계에서 제출된 시험성적으로 검토하여 안전성이 인정되면 검토를 종료한다. 그러나 제1단계에서 안전성이 인정되지 않으면 제2단계, 제3단계 검토를 수행하고, 검토에 필요한 자료는 등록신청자가 추가로 제출하게 되어있다. 제1단계 검토 시 필수적으로 제출해야 할 시험성적서는 어류에 대한 급성독성시험 성적서이다.

어류에 대한 급성독성 시험성적은 등록신청 농약의 다음 단계 평가 결정과 독성구분에 중요하다. 어류에 대한 급성독성 시험은 농약에 따라 어류의 감수성이 달라지므로 농약계통에 따라 적합한 어종을 선택해야 한다는 보고(Luciano and Giovanna 1991, Lorraine et al. 2005, Bae et al. 2012)와 같이 농약별 시험 어종에 따라 독성값 차이가 있을 수 있으므로(Johnson and Finley 1980) 국가별 등록 시험 어종을 추천하고 있다. 우리나라에서는 잉어 또는 송사리 등 온수어종에 대한 시험성적을 요구하고 있으나 미국, 유럽 등에서는 냉수어와 온수어에 대한 성적을 요구하고 있다.

실제 자연 환경에서는 농약이 수계로 유입되더라도 낮은 농도로 장시간 이동 없이 존재하는 것이 보통이다(Connell and Yu 2008, Connell et al. 2016). 이런 노출시간에 따라 독성이 달라지는 문제를 해결하기 위해 미국, 유럽 등에서는 급성 위해성 평가에 96시간 LC_{50} 를 이용하고 있다(EPA 1996, OECD 1992). 그러나 우리나라에서는 48시간 LC_{50} 값을 어류에 대한 위해성 평가에 이용하고 어독성도 구분하고 있다(PCA. 2017). 어독성 구분은 48시간 LC_{50} 이 0.5 mg/L 미만이면 어독성 I급, 0.5 mg/L 이상 2 mg/L 미만이면 어독성 II급, 2 mg/L 이상이면 어독성 III급으로 한다. 특히, 비재배용 농약으로서 어독성 I급으로 분류되는 농약은 사용량, 제제의 형태, 사용방법, 이화학적 특성 등을 고려하여 평가한 결과 안전성이 인정되지 않으면 등록을 보류할 수 있도록 규정하고 있다(PCA. 2017).

이에 본 연구에서는 농약의 급성 어독성과 노출시간에 따른 독성변화를 알아보기 위하여 우리나라에 등록되어 있는 1,483품목에 대해 잉어에 대한 48시간과 96시간 LC_{50} 값에 따라 각각 독성 등급을 구분하였다. 그리고 48시간 LC_{50} 값과 96시간 LC_{50} 값을 비교하여 노출시간의 차이에 따른 독성변화를 알아보았다.

재료 및 방법

「농약 및 원제의 등록 기준(농촌진흥청 고시)」의 담수어류 급성독성시험 기준과 방법에 따라 수행한 농촌진흥청 농약품목고시 시험사업보고서('93~'96)와 국립농업과학원 농약안전성 전문위원회 심의자료('97~'16)를 모아 정리한 국립농업과학원 농자재평가과 위해성평가실의 환경생물 독성데이터베이스를 이용하였다. 우리나라에 등록된 1,917품목

(KCPA 2016, 2017)중에서 48시간 LC_{50} 값만 있고 96시간 LC_{50} 값이 없는 농약을 제외한 1,483품목에 대해 잉어에 대한 48시간과 96시간 LC_{50} 값으로 I, II 그리고 III급으로 어독성을 구분하였고, 48시간 LC_{50} 을 96시간 LC_{50} 으로 나누는 값으로 노출시간 경과에 따른 독성의 변화를 알아보았다.

결과 및 고찰

농약 1,483품목의 잉어에 대한 48시간과 96시간 LC_{50} 값은 Table 1과 같다. 1,483품목에서 비 재배용은 643품목(43.4%) 이었고 원예용은 840품목(56.6%)를 차지하였다. 대상 병·해충 잡초별로는 살균제는 480품목, 살충·살균제는 81품목, 살충제는 418 품목, 제초제는 467품목, 생장조정제는 31품목 기타 6품목 이었다. 살균제 480품목 중 비 재배용은 113품목(23.5%) 원예용은 367품목(76.5%)를 차지하였고, 살충제 418품목 중 비 재배용은 90품목(21.5%)이었고 원예용은 328품목(78.5%)으로 살균제와 살충제는 원예용이 비 재배용 보다 많았다. 그러나 살균·살충제 81품목 중 비 재배용은 66품목(81.5%), 원예용은 15품목(18.5%)이었고, 제초제 467품목 중 비 재배용은 375품목(80.3%) 원예용은 92품목(19.7%)로 살균·살충제와 제초제는 비 재배용이 원예용보다 더 많았다. 생장조정제 31품목 중 비재배용은 2품목(6.5%) 원예용은 29품목(93.5%)으로 원예용이 비재배용보다 많았다.

우리나라 어독성 분류기준인 48시간 LC_{50} 값으로 어독성을 구분한 결과, 1,483품목 중 어독성 I급($LC_{50}<0.5$ mg/l)은 237품목(16.0%) II급($0.5\leq LC_{50}<2$ mg/l)은 203품목(13.7%), 그리고 III급($LC_{50}\geq 2$ mg/l)은 1,043품목(70.3%)이었다.

적용 작물별로 독성 등급을 구분하면 비 재배용 농약 643품목 중 I급은 없고 II급은 83품목(12.9%), 그리고 III급은 560품목(87.1%)이었다. 원예용 농약 840품목 중 I급이 237품목(28.2%) II급이 116품목(13.8%), 그리고 III급이 487품목(58.0%) 이었다. 대상 병·해충, 잡초별로 독성 등급을 구분하면, 살균제 480품목 중 I급은 96품목, II급은 80품목, 그리고 III급은 304품목이었고, 살충제 418품목 중 I급은 131품목 II급은 61품목 그리고 III급은 226품목이었다. 살충·살균제 81품목 중 I급은 6품목 II급은 20품목 그리고 III급은 55품목이었다. 제초제 467품목 중 I급은 3품목 II급은 37품목 그리고 III급은 427품목이었다. 생장조정제 31품목 중 II급은 4품목 그리고 III급은 27품목이었다. 기타 6품목은 I급은 1품목 II급은 1품목 그리고 III급은 4품목이었다. 독성 등급별로 순위를 보면 어독성 I급은 살충제(131품목)>살균제(96품목)>살충·살균제(6품목)>제초제(3품목)>기타(1품목) 순이었고, 어독성 II급은 살균제(80품목)>살충제(61품목)>제초제(37품목)>살균·살충제(20품목)>생장조정제(4품목)>기타(1품목) 순이었다. 그리고 어독성 III급은 제초제(427품

Table 1. LC₅₀ of 48 hour and 96 hour for pesticide products to carp (*Cyprinus carpio*)

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Abamectin DC	Insecticide	Orange, etc.	1.8	0.0051	0.0049
Abamectin EC	Insecticide	Apple, etc.	1.8	0.006	0.005
Abamectin GR	Insecticide	Melon, etc.	1	0.0113	0.0066
Abamectin ME	Insecticide	Red pepper, etc.	1.8	0.01	0.0091
Abamectin SC	Insecticide	Melon, etc.	1.68	0.016	0.0087
Abamectin·Acetamiprid ME	Insecticide	Orange, etc.	8.6	0.078	0.057
Abamectin·Chlorantraniliprole SC	Insecticide	Apple, etc.	6	0.0309	0.0236
Abamectin·Chlorfenapyr SC	Insecticide	Persimmon, etc.	10.5	0.074	0.074
Abamectin·Cyflumetofen DC	Insecticide	Orange, etc.	10.8	0.1227	0.1227
Abamectin·Fenazaquin SC	Insecticide	Apple, etc.	10.6	0.019	0.016
Abamectin·Spinetoram SC	Insecticide	Red pepper, Cucumber	4.9	0.063671	0.030104
Abamectin·Spirodiclofen SC	Insecticide	Melon, etc.	22.23	0.322	0.244
Abamectin·Spirodiclofen SC	Insecticide	Orange, etc.	29.2	0.23	0.161
Abamectin·Sulfoxaflor SC	Insecticide	Red pepper, etc.	7.7	0.03	0.023
Abamectin·Thiamethoxam SC	Insecticide	Pear	16.87	0.1485	0.1221
Acephate CG	Insecticide	Pine, etc.	97	>10	>10
Acephate WP	Insecticide	Rice, Chinese cabbage, etc.	50	>10	>10
Acephate·Diazinon DP	Insecticide	Potato	4	6.51	5.5
Acequinocyl SC	Insecticide	Orange, etc.	15	>10	>10
Acetamiprid AL	Insecticide	Rose, etc.	0.004	>9.923	>9.923
Acetamiprid DC	Insecticide	Peach, etc.	8	5.187	3.467
Acetamiprid GR	Insecticide	Red pepper, etc.	1.5	>10	>10
Acetamiprid ME	Insecticide	Pine	10	3.79	3.61
Acetamiprid SG	Insecticide	Grape, etc.	8	>10	>10
Acetamiprid SL	Insecticide	Red pepper, etc.	5	>10	>10
Acetamiprid SL	Insecticide	Pine, etc.	10	4.33	3.23
Acetamiprid SP	Insecticide	Orange, etc.	8	>10	>10
Acetamiprid WG	Insecticide	Eggplant, etc.	8	3.066	2.013
Acetamiprid WP	Insecticide	Rice, Apple, etc.	8	>10	>10
Acetamiprid·Bifenthrin WG	Insecticide	Persimmon, etc.	9	0.026	0.022
Acetamiprid·Buprofezin EC	Insecticide	Orange, etc.	19	1.61	1.56
Acetamiprid·Buprofezin SC	Insecticide	Persimmon, etc.	25	>10	>10
Acetamiprid·Buprofezin SC	Insecticide	Persimmon, etc.	19	>16.0	4.981
Acetamiprid·Buprofezin WP	Insecticide	Orange, etc.	24	>10	>10
Acetamiprid·Chlorfenapyr WP	Insecticide	Water melon, etc.	5.5	0.511	0.511
Acetamiprid·Diflubenzuron WP	Insecticide	Apple, Pear	9	>10	>10
Acetamiprid·Diflubenzuron WP	Insecticide	Orange, etc.	19	21.35	20.07
Acetamiprid·Emamectin benzoate SL	Insecticide	Persimmon, etc.	10	0.531	0.377
Acetamiprid·Emamectin benzoate WG	Insecticide	Red pepper, etc.	8	1.012	0.754
Acetamiprid·Etofenprox EP	Insecticide	Grape	13	7.106	1.298
Acetamiprid·Etofenprox WP	Insecticide	Rice, Apple, etc.	10.5	>10	>10
Acetamiprid·Flubendiamide WG	Insecticide	Rice, Red pepper, etc.	13	>10	>10

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Acetamiprid·Flufenoxuron WP	Insecticide	Red pepper, etc.	13	>10	>10
Acetamiprid·Indoxacarb SC	Insecticide	Orange, etc.	9	7.254	6.487
Acetamiprid·Indoxacarb WP	Insecticide	Red pepper, etc.	9	3.27	2.87
Acetamiprid·Lufenuron SC	Insecticide	Orange, etc.	13	>10	>10
Acetamiprid·Lufenuron WG	Insecticide	Red pepper, etc.	13	>10	>10
Acetamiprid·Lufenuron WP	Insecticide	Red pepper, etc.	13	>10	>10
Acetamiprid·Metaflumizone SC	Insecticide	Peach, Apple	20	6.005	6.005
Acetamiprid·Methoxyfenozide WG	Insecticide	Strawberry, etc.	13	>10	>10
Acetamiprid·Pyrifluquinazon WG	Insecticide	Orange, etc.	12	>10	>10
Acetamiprid·Spinetoram SC	Insecticide	Chinese cabbage, etc.	10	11.954	7.937
Acetamiprid·Sulfoxaflor WG	Insecticide	Red pepper, etc.	10.2	>9.30	>9.30
Acetamiprid·Tebufenozide SC	Insecticide	Rice	12	>11.538	>11.538
Acetamiprid·Tebufenozide WP	Insecticide	Rice	12	>10	>10
Acetamiprid·Novaluron EC	Insecticide	Orange, etc.	16	>10	>10
Acibenzolar-S-methyl·Chlorotalonil SC	Fungicide	Apple, etc.	45.92	0.056	0.054
Acibenzolar-S-methyl·Mancozeb WP	Fungicide	Red pepper, etc.	49	2.8	2.5
Acibenzolar-S-methyl·Thiamethoxam GR	Insecti-Fungicide	Rice	2.8	3.638	1.975
Acrinathrin·Spiromesifen SC	Insecticide	Strawberry, etc.	36	0.04	0.033
Alachlor EC	Herbicide	Bean, etc.	43.7	1.18	1.15
Alachlor GR	Herbicide	Bean, etc.	5	4.85	3.4
Alpha-cypermethrin EC	Insecticide	Persimmon, etc.	2	0.002	0.002
Alpha-cypermethrin WG	Insecticide	Red pepper, etc.	15	0.0007	0.0007
Alpha-cypermethrin·Chlorfenapyr EC	Insecticide	Chinese cabbage, etc.	2.2	0.012	0.012
Alpha-cypermethrin·Flufenoxuron EC	Insecticide	Leek, etc.	4	0.2	0.04
Alpha-cypermethrin·Tebufenozide SC	Insecticide	Red pepper, Apple	6.8	0.027173	0.025777
Ametoctradin·Dimethomorph SC	Fungicide	Red pepper, etc.	47	3.97	3.15
Amisulbrom SC	Fungicide	Red pepper, etc.	13.5	0.16	0.14
Amisulbrom WG	Fungicide	Chinese cabbage, etc.	50	0.14	0.12
Amisulbrom·Chlorothalonil SC	Fungicide	Red pepper, etc.	41	0.059	0.057
Amisulbrom·Cymoxanil WG	Fungicide	Red pepper, etc.	35	>10	>10
Amitraz·Buprofezin EC	Insecticide	Orange, etc.	25	1.68	1.67
Asulam sodium SG	Herbicide	Lawn	87.6	>10	>10
Asulam sodium SL	Herbicide	Lawn	37	>10	>10
Azadirachtin GR	Insecticide	Rice, Garlic, etc.	0.15	>20	>20
Azimsulfuron·Benfuresate GR	Herbicide	Rice	1.55	17.56	17.14
Azimsulfuron·Benfuresate·Carfentrazone-ethyl GR	Herbicide	Rice	1.8	>8.9	>8.9
Azimsulfuron·Benfuresate·Fentrazamide GR	Herbicide	Rice	2.55	>9.7	>9.7
Azimsulfuron·Bensulfuron-methyl·Fentrazamide GR	Herbicide	Rice	0.91	>10	>10
Azimsulfuron·Bensulfuron-methyl·Indanofan GR	Herbicide	Rice	0.54	4.31	3.9
Azimsulfuron·Bensulfuron-methyl·Mefenacet GR	Herbicide	Rice	3.61	>10	>10
Azimsulfuron·Bensulfuron-methyl·Pretilachlor GR	Herbicide	Rice	1.12	2.93	2.14
Azimsulfuron·Bensulfuron-methyl·Thiobencarb GR	Herbicide	Rice	7.11	2.97	2.3

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Azimsulfuron·Benzobicyclon WG	Herbicide	Rice	54	>10	>10
Azimsulfuron·Benzobicyclon·Fentrazamide GR	Herbicide	Rice	1.75	>10	>10
Azimsulfuron·Benzobicyclon·Fentrazamide UG	Herbicide	Rice	17.1	>8.63	>8.63
Azimsulfuron·Benzobicyclon·Ipencarbazone GG	Herbicide	Rice	9.3	>12.703	>12.703
Azimsulfuron·Benzobicyclon·Metamifop GR	Herbicide	Rice	1.05	>10	>10
Azimsulfuron·Benzobicyclon·Metamifop·Pretialchl or GR	Herbicide	Rice	6.35	2.93	2.09
Azimsulfuron·Benzobicyclon·Oxaziclomefone GR	Herbicide	Rice	1.02	>9.49	>9.49
Azimsulfuron·Benzobicyclon·Oxaziclomefone UG	Herbicide	Rice	9.7	>7.454	>7.454
Azimsulfuron·Benzobicyclon·Penoxsulam DT	Herbicide	Rice	4.8	>9.6	>9.6
Azimsulfuron·Benzobicyclon·Penoxsulam GR	Herbicide	Rice	0.83	>10	>10
Azimsulfuron·Benzobicyclon·Pyriminobac-methyl GR	Herbicide	Rice	2.55	>8.5	>8.5
Azimsulfuron·Bromobutide·Fenoxsulam GR	Herbicide	Rice	2.62	>10	>10
Azimsulfuron·Bromobutide·Mefenacet GR	Herbicide	Rice	9.83	>5.896	>5.896
Azimsulfuron·Carfentrazone-ethyl GR	Herbicide	Rice	0.2	>10	>10
Azimsulfuron·Carfentrazone-ethyl·Fentrazamide GR	Herbicide	Rice	1.3	>10	>10
Azimsulfuron·Carfentrazone-ethyl·Flucetosulfuron GR	Herbicide	Rice	0.34	3.89	3.65
Azimsulfuron·Carfentrazone-ethyl·Penoxsulam GR	Herbicide	Rice	0.38	>10	>10
Azimsulfuron·Carfentrazone-ethyl·Pyriminobac-methyl GR	Herbicide	Rice	0.28	>10	>10
Azimsulfuron·Carfentrazone-ethyl·Pyriminobac-methyl UG	Herbicide	Rice	2.4	2.27	2.27
Azimsulfuron·Fentrazamide UG	Herbicide	Rice	5.1	8.75	7.45
Azimsulfuron·Flucetosulfuron DT	Herbicide	Rice	0.7	5.44	4.71
Azimsulfuron·Flucetosulfuron·Mesotrione DT	Herbicide	Rice	2.52	>9.927	>9.927
Azimsulfuron·Indanofan GR	Herbicide	Rice	0.45	>10	>10
Azimsulfuron·Mefenacet GR	Herbicide	Rice	3.05	>10	>10
Azimsulfuron·Mefenacet UG	Herbicide	Rice	21.3	>10	>10
Azimsulfuron·Mefenacet·Mesotrione GR	Herbicide	Rice	3.85	>8.724	>8.724
Azimsulfuron·Mefenacet·Simetryn GR	Herbicide	Rice	4.05	>10	>10
Azimsulfuron·Metamifop GR	Herbicide	Rice	0.35	2.977	2.14
Azimsulfuron·Oxaziclomefone GR	Herbicide	Rice	0.25	>10	>10
Azimsulfuron·Penoxsulam GR	Herbicide	Rice	0.12	>10	>10
Azimsulfuron·Penoxsulam WG	Herbicide	Rice	6.6	>10	>10
Azimsulfuron·Penoxsulam WP	Herbicide	Rice	13	>10	>10
Azimsulfuron·Penoxsulam·Simetryn GR	Herbicide	Rice	0.42	>10	>10
Azocyclotin SC	Insecticide	Orange, etc.	28	0.012	0.011
Azocyclotin WP	Insecticide	Apple, etc.	25	0.011	0.005
Azocyclotin·Bifenthrin SC	Insecticide	Pear, etc.	26	0.0047	0.0024
Azocyclotin·Chlorfenapyr SC	Insecticide	Peach, etc.	26	0.008	0.007
Azocyclotin·Etoxazole SC	Insecticide	Orange, etc.	30	0.0035	0.002
Azocyclotin·Pyridaben WP	Insecticide	Orange, Apple	26	0.0096	0.0096
Azoxystrobin ME	Insecticide	Apple, etc.	10	0.52	0.52
Azoxystrobin SC	Fungicide	Cucumber, etc.	21.7	0.269	0.255

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Azoxystrobin WP	Fungicide	Rice, Apple, etc.	10	1.97	1.51
Azoxystrobin·Chlorotalonil SC	Fungicide	Red pepper, etc.	44.8	0.07	0.062
Azoxystrobin·Chlorotalonil SC	Fungicide	Lawn	48	0.062	0.062
Azoxystrobin·Cyproconazole SC	Fungicide	Lawn	25.27	0.747	0.72
Azoxystrobin·Difenoconazole SC	Fungicide	Persimmon, etc.	28.7	1.572	1.572
Azoxystrobin·Difenoconazole WG	Fungicide	Persimmon, etc.	18	1.79	1.79
Azoxystrobin·Dimethomorph SC	Fungicide	Potato, etc.	25	5.400	4.942
Azoxystrobin·Dimethomorph WG	Fungicide	Red pepper, etc.	23	1.06	0.99
Azoxystrobin·Ferimzone SC	Fungicide	Rice	21.5	3.19	2.44
Azoxystrobin·Fipronil FG	Insecti-Fungicide	Rice	6.6	3.387	3.264
Azoxystrobin·Fipronil GR	Insecti-Fungicide	Rice	6.6	1.33	0.8
Azoxystrobin·Fluazinam SC	Fungicide	Potato, etc.	42	0.48	0.44
Azoxystrobin·Fludioxonil SC	Fungicide	Orange, etc.	30	1.556	1.556
Azoxystrobin·Fludioxonil WP	Fungicide	Red pepper	50	2.503	2.503
Azoxystrobin·Hexaconazole SC	Fungicide	Rice, Cucumber, etc.	13	0.795	0.754
Azoxystrobin·Isoprothiolane EC	Fungicide	Rice	21	1.636	1.636
Azoxystrobin·Isopyrazam SC	Fungicide	Rose, etc.	30.09	0.075	0.075
Azoxystrobin·Metalaxyl-M SE	Fungicide	Rose, etc.	39.07	0.814	0.692
Azoxystrobin·Propiconazole EC	Fungicide	Rice, Rose, etc.	15.2	1.539	1.282
Azoxystrobin·Propiconazole SE	Fungicide	Rice, Soybean	18.71	1.676	1.338
Azoxystrobin·Tebuconazole SC	Fungicide	Persimmon, etc.	29.5	1.06	1.01
Azoxystrobin·Tebuconazole SC	Fungicide	Red pepper, Pear	22	15.37	14.09
Azoxystrobin·Tetraconazole SE	Fungicide	Red pepper, Cucumber	28	0.71	0.685
Azoxystrobin·Thiophanate-methyl SC	Fungicide	Persimmon, etc.	25	2.71	2.71
Azoxystrobin·Tricyclazole SC	Fungicide	Rice	21	2.58	2.29
Azoxystrobin·Validamycin-A SC	Fungicide	Rice	11	1.596	1.596
Azoxystrobin·Validamycin-A·Etofenprox SE	Insecti-Fungicide	Rice	21	0.867	0.716
Benalaxyl-M GR	Fungicide	Red pepper, etc.	1	2.93	2.5
Benalaxyl-M·Ethaboxam SC	Fungicide	Red pepper, etc.	15	10.41	8.07
Benfluralin·Isoxaben WP	Herbicide	Rice	54.5	>10	>10
Benfuracarb WG	Insecticide	Apple, etc.	30	0.24	0.24
Benfuracarb·Buprofezin WG	Insecticide	Orange, etc.	40	0.54	0.49
Benfuracarb·Fosthiazate GR	Insecticide	Watermelon, etc.	6.35	3.972	3.86
Benfuresate·Bensulfuron-methyl GR	Herbicide	Rice	1.6	>10	>10
Benfuresate·Bensulfuron-methyl·Fentrazamide GR	Herbicide	Rice	2.47	>10	>10
Benfuresate·Benzobicyclon·Fentrazamide SE	Herbicide	Rice	21	6.57	6.57
Benfuresate·Bifenox GR	Herbicide	Rice	6.5	>10	>10
Benfuresate·Bromobutide·Penoxsulam GR	Herbicide	Rice	6.87	>5.588	>5.588
Benfuresate·Carfentrazone-ethyl·Penoxsulam GR	Herbicide	Rice	1.83	>8.184	>8.184
Benfuresate·Cyclosulfamuron·Fentrazamide GR	Herbicide	Rice	2.47	>10	>10
Benfuresate·Fentrazamide·Halosulfuron-methyl GR	Herbicide	Rice	2.48	>10	>10
Benfuresate·Fentrazamide·Pyrazosulfuron-ethyl GR	Herbicide	Rice	2.37	>10	>10
Benfuresate·Halosulfuron-methyl·Indanofan GR	Herbicide	Rice	1.88	>10	>10
Benfuresate·Imazosulfuron·Mefenacet GR	Herbicide	Rice	4.23	>10	>10

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Benfuresate·MCPA·Penoxsulam GR	Herbicide	Rice	2.4	>10	>10
Benfuresate·Mesotrione·Penoxsulam GR	Herbicide	Rice	1.68	>10	>10
Benfuresate·Pyrimisulfan GR	Herbicide	Rice	1.72	>10	>10
Benomyl·Chlorothalonil WP	Fungicide	Red pepper, Watermelon	70	0.54	0.54
Bensulfuron-methyl·Benzobicyclon·Fentrazamide GR	Herbicide	Rice	1.87	>10	>10
Bensulfuron-methyl·Benzobicyclon·Fentrazamide SC	Herbicide	Rice	11.02	9.388	9.388
Bensulfuron-methyl·Benzobicyclon·Fentrazamide UG	Herbicide	Rice	18.3	>7.873	>7.873
Bensulfuron-methyl·Benzobicyclon·Mefenacet SC	Herbicide	Rice	24.52	>10	>10
Bensulfuron-methyl·Benzobicyclon·Metamifop SC	Herbicide	Rice	7	3.69	3.34
Bensulfuron-methyl·Benzobicyclon·Penoxsulam DT	Herbicide	Rice	10.96	>4.851	>4.851
Bensulfuron-methyl·Benzobicyclon·Penoxsulam GG	Herbicide	Rice	5.68	>10	>10
Bensulfuron-methyl·Benzobicyclon·Penoxsulam SC	Herbicide	Rice	5.52	>10	>10
Bensulfuron-methyl·Benzobicyclon·Pyriminobac-methyl SC	Herbicide	Rice	5.8	>9.4	>9.4
Bensulfuron-methyl·Bromobutide·Fentrazamide GR	Herbicide	Rice	12.51	>8.2	>8.2
Bensulfuron-methyl·Bromobutide·Mefenacet SC	Herbicide	Rice	40.02	57.72	24.84
Bensulfuron-methyl·Bromobutide·Penoxsulam SC	Herbicide	Rice	19.5	>10	>10
Bensulfuron-methyl·Carfentrazone-ethyl·Metamifop GR	Herbicide	Rice	0.72	10.595	9.479
Bensulfuron-methyl·Carfentrazone-ethyl·Penoxsulam GG	Herbicide	Rice	3.18	6.94	6.281
Bensulfuron-methyl·Carfentrazone-ethyl·Thiobencarb GR	Herbicide	Rice	7.32	3.06	2.46
Bensulfuron-methyl·Fentrazamide SC	Herbicide	Rice	7	5.97	5.97
Bensulfuron-methyl·Fentrazamide·Mesotrione GR	Herbicide	Rice	1.5	>10	>10
Bensulfuron-methyl·MCPA·Mefenacet SC	Herbicide	Rice	28	>10	>10
Bensulfuron-methyl·Mefenacet SC	Herbicide	Rice	22.02	>10	>10
Bensulfuron-methyl·Mefenacet·Metamifop SC	Herbicide	Rice	18.3	3.76	3.76
Bensulfuron-methyl·Mefenacet·Oxadiargyl SC	Herbicide	Rice	21.6	9.7	6.62
Bensulfuron-methyl·Mefenacet·Pretilachlor SE	Herbicide	Rice	23.02	>10	>10
Bensulfuron-methyl·Mefenacet·Thiobencarb GR	Herbicide	Rice	6.67	2.4	2.4
Bensulfuron-methyl·Mesotrione·Penoxsulam GR	Herbicide	Rice	0.55	>10	>10
Bensulfuron-methyl·Mesotrione·Pretilachlor·Pyrifthalid GR	Herbicide	Rice	2.37	4.596	3.822
Bensulfuron-methyl·Penoxsulam SC	Herbicide	Rice	1.5	>10	>10
Bensulfuron-methyl·Pretilachlor·Pyrifthalid SC	Herbicide	Rice	15.8	2.636	1.923
Bentazone SL	Herbicide	Rice, Barley, etc.	40	>10	>10
Bentazone·Cyhalofop-butyl ME	Herbicide	Rice	19.5	4.07	4.07
Bentazone·Flucetosulfuron·Simetryn GR	Herbicide	Rice	7.8	>10	>10
Bentazone·MCPA GR	Herbicide	Rice	12.2	>20	>20
Bentazone·MCPA WG	Herbicide	Lawn	35.6	>10.39	>10.39
Bentazone·MCPA·Propanil ME	Herbicide	Rice	14.8	6.085	5.882
Bentazone·MCPB ME	Herbicide	Rice	24.5	>10	>10

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Bentazone·Metamifop ME	Herbicide	Rice	17	1.524	1.324
Bentazone·Penoxsulam GR	Herbicide	Rice	11.12	>8.563	>8.563
Bentazone·Penoxsulam SC	Herbicide	Rice	19.2	28.46	19.69
Bentazone·Propanil ME	Herbicide	Rice	17	12.144	10.345
Bentazone-sodium GR	Herbicide	Rice	10	>94.5	>94.5
Bentazone-sodium·Fenoxaprop-p-ethyl ME	Herbicide	Rice	31	>10	>10
Bentazone-sodium·Glufosinate-ammonium SL	Herbicide	Orange, etc.	24	9.637	9.637
Bentazone-sodium·Glyphosate-isopropylamine SL	Herbicide	Noncropland	30	>12.382	>12.382
Bentazone·Tefuryltrione GR	Herbicide	Rice	11.67	>99.6	>99.6
Benthiavaliarb-isopropyl WG	Fungicide	Tomato, etc.	15	>9.266	>9.266
Benthiavaliarb-isopropyl·Chlorothalonil WG	Fungicide	Red pepper, etc.	51.75	0.1	0.1
Benthiavaliarb-isopropyl·Copper oxychloride WP	Fungicide	Grape, etc.	38.5	>10	>10
Benthiavaliarb-isopropyl·Propineb WP	Fungicide	Onion, etc.	59.5	1.83	1.83
Benzobicyclon SC	Herbicide	Rice	3.5	7.384	5.684
Benzobicyclon·Cafenstrole·Pyrazosulfurn-ethyl GR	Herbicide	Rice	1.47	3.26	3.09
Benzobicyclon·Carfentrazone-ethyl·Flucetosulfuron GR	Herbicide	Rice	1.02	26.16	11.31
Benzobicyclon·Carfentrazone-ethyl·Penoxsulam GR	Herbicide	Rice	1.05	>8.3	>8.3
Benzobicyclon·Carfentrazone-ethyl·Penoxsulam ZC	Herbicide	Rice	5.98	>11.1	>11.1
Benzobicyclon·Cyclosulfamuron·Fentrazamide SC	Herbicide	Rice	11.2	8.28	8.28
Benzobicyclon·Cyclosulfamuron·Flucetosulfuron GG	Herbicide	Rice	5.62	>10	>10
Benzobicyclon·Cyclosulfamuron·Mefenacet SC	Herbicide	Rice	26.2	>8.4	>8.4
Benzobicyclon·Cyclosulfamuron·Penoxsulam GR	Herbicide	Rice	0.85	>10	>10
Benzobicyclon·Cyclosulfamuron·Penoxsulam SC	Herbicide	Rice	5	>10	>10
Benzobicyclon·Cyclosulfamuron·Pyrminobac-methyl DT	Herbicide	Rice	5.62	>5.65	>5.65
Benzobicyclon·Fentrazamide SC	Herbicide	Rice	5.5	8.84	8.21
Benzobicyclon·Fentrazamide·Imazosulfuron GR	Herbicide	Rice	1.95	>10	>10
Benzobicyclon·Fentrazamide·Imazosulfuron SC	Herbicide	Rice	11.5	5.428	4.346
Benzobicyclon·Fentrazamide·Penoxsulam DT	Herbicide	Rice	15.4	>10	>10
Benzobicyclon·Fentrazamide·Penoxsulam SC	Herbicide	Rice	6.48	5.09	4.92
Benzobicyclon·Fentrazamide·Pyrazosulfuron-ethyl UG	Herbicide	Rice	10.42	7.45	7.03
Benzobicyclon·Flucetosulfuron DT	Herbicide	Rice	3.92	>10	>10
Benzobicyclon·Flucetosulfuron·Halosulfuron-methyl DT	Herbicide	Rice	4.48	>10	>10
Benzobicyclon·Flucetosulfuron·Pyrazosulfuron-ethyl GR	Herbicide	Rice	2.42	>9.9	>9.9
Benzobicyclon·Halosulfuron-methyl·Pyrminobac-methyl WG	Herbicide	Rice	56.8	>10	>10
Benzobicyclon·Imazosulfuron·Ipfencarbazone SC	Herbicide	Rice	10.5	>10.21	>10.21
Benzobicyclon·Imazosulfuron·Metamifop SC	Herbicide	Rice	7.3	2.17	1.89
Benzobicyclon·Imazosulfuron·Mefenacet SC	Herbicide	Rice	24.5	>10	>10
Benzobicyclon·Imazosulfuron·Oxaziclomefone SC	Herbicide	Rice	7.1	>8.26	>8.26
Benzobicyclon·Imazosulfuron·Penoxsulam DT	Herbicide	Rice	12	>5.944	>5.944
Benzobicyclon·Imazosulfuron·Penoxsulam GG	Herbicide	Rice	5.98	>10	>10

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Benzobicyclon·Imazoxulfuron·Penoxsulam SC	Herbicide	Rice	5.42	>10	>10
Benzobicyclon·Imazosulfuron·Pyriminobac-methyl SC	Herbicide	Rice	6.1	>10	>10
Benzobicyclon·Mefenacet·Penoxsulam SC	Herbicide	Rice	21.5	>10	>10
Benzobicyclon·Mefenacet·Propyrisulfuron SC	Herbicide	Rice	26.5	>9.733	>9.733
Benzobicyclon·Mefenacet·Pyrazosulfuron-ethyl GG	Herbicide	Rice	29.5	>9.823	>9.823
Benzobicyclon·Mefenacet·Pyrazosulfuron-ethyl SC	Herbicide	Rice	25.42	151.6	74.24
Benzobicyclon·Metamifop·Pretilachlor·Pyrazosulfuron-ethyl GR	Herbicide	Rice	6.41	2.76	2.21
Benzobicyclon·Metamifop·Pyrazosulfuron-ethyl GR	Herbicide	Rice	1.07	>10	>10
Benzobicyclon·Metazosulfuron DT	Herbicide	Rice	5.5	>10	>10
Benzobicyclon·Orthosulfamuron·Penoxsulam DT	Herbicide	Rice	5.48	>10	>10
Benzobicyclon·Orthosulfamuron·Penoxsulam GR	Herbicide	Rice	0.98	>9.2	>9.2
Benzobicyclon·Oxaziclomefone SC	Herbicide	Rice	3.5	>10	>10
Benzobicyclon·Pendimethalin SE	Herbicide	Rice	6.5	1.06	0.94
Benzobicyclon·Penoxsulam DT	Herbicide	Rice	4.48	>10	>10
Benzobicyclon·Penoxsulam GR	Herbicide	Rice	0.68	>10	>10
Benzobicyclon·Penoxsulam·Pretilachlor SE	Herbicide	Rice	9.48	3.31	2.67
Benzobicyclon·Penoxsulam·Pyraclozil SC	Herbicide	Rice	4.98	1.61	1.61
Benzobicyclon·Penoxsulam·Pyrazolate GR	Herbicide	Rice	3.68	>10	>10
Benzobicyclon·Penoxsulam·Pyrazosulfuron-ethyl DT	Herbicide	Rice	10.2	>10	>10
Benzobicyclon·Penoxsulam·Pyrazosulfuron-ethyl GR	Herbicide	Rice	0.85	>10	>10
Benzobicyclon·Penoxsulam·Pyrazosulfuron-ethyl SC	Herbicide	Rice	4.9	>10	>10
Benzobicyclon·Pretilachlor SE	Herbicide	Rice	12	2.47	2.47
Benzobicyclon·Propyrisulfuron SC	Herbicide	Rice	5.5	>9.8	>9.8
Benzobicyclon·Pyraclozil GR	Herbicide	Rice	1	>10	>10
Benzobicyclon·Pyrazosulfuron-ethyl·Pyriminobac-methyl GG	Herbicide	Rice	10.04	>10	>10
Benzobicyclon·Pyrazosulfuron-ethyl·Pyriminobac-methyl SC	Herbicide	Rice	5.02	>10	>10
Benzobicyclon·Pyriminobac-methyl WG	Herbicide	Rice	50.2	>10	>10
Benzobicyclon·Pyrimisulfan GR	Herbicide	Rice	0.92	>9.2	>9.2
Benzobicyclon·Pyrimisulfan SC	Herbicide	Rice	4.5	>10	>10
Benzobicyclon·Thiobencarb SE	Herbicide	Rice	32.5	2.44	2.19
6-Benzyl aminopurine SL	Plant growth regulator	Bean sprouts	0.3	>10	>10
6-Benzyl aminopurine SL	Plant growth regulator	Orange, Chrysanthemum	3	>10	>10
Beta-cyfluthrin DP	Insecticide	Chinese cabbage, etc.	0.2	0.002744	0.002744
Beta-cyfluthrin EC	Insecticide	Orange, etc.	2.5	0.0024	0.0024
Bifenazate·Chlorfenapyr SC	Insecticide	Pear, etc.	24	0.83	0.7
Bifenazate·Etoxazole SC	Insecticide	Orange, Apple	23	0.6	0.56
Bifenazate·Fenbutatin-oxide SC	Insecticide	Strawberry, Pear	38	0.158	0.077
Bifenazate·Flufenoxuron WG	Insecticide	Apple	23	0.855	0.766
Bifenazate·Pyridaben SC	Insecticide	Apple, etc.	22	0.03	0.03
Bifenox·Flucetosulfuron WG	Herbicide	Lawn	30	>10	>10

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Bifenox·Glyphosate-isopropylamine ME	Herbicide	Noncropland	40	2.781	2.781
Bifenthrin DP	Insecticide	Red pepper, etc.	0.2	0.049	0.029
Bifenthrin EC	Insecticide	Chinese cabbage, etc.	1	0.00069	0.00069
Bifenthrin EW	Insecticide	Persimmon, etc.	10	0.002	0.002
Bifenthrin GR	Insecticide	Potato, etc.	0.2	0.0013	0.0013
Bifenthrin SC	Insecticide	Apple, etc.	2	0.026	0.004
Bifenthrin SC	Insecticide	Red pepper, Lawn	17.15	0.0055	0.0027
Bifenthrin WP	Insecticide	Apple, etc.	2	0.084	0.073
Bifenthrin·Chlorfenapyr FW	Insecticide	Red pepper, etc.	12	0.0329	0.0253
Bifenthrin·Chlorfenapyr WP	Insecticide	Leek, etc.	3	0.03	0.03
Bifenthrin·Chromafenozide EC	Insecticide	Peach	6.5	0.007	0.007
Bifenthrin·Clothianidin SC	Insecticide	Strawberry, etc.	4.5	0.008	0.006
Bifenthrin·Diflubenzuron SE	Insecticide	Peach, Apple	16	0.023	0.022
Bifenthrin·Etoxazole ME	Insecticide	Peach, etc.	3.5	0.004275	0.004275
Bifenthrin·Imidacloprid DC	Insecticide	Red pepper, Apple	5	0.014	0.0065
Bifenthrin·Imidacloprid GR	Insecticide	Potato, etc.	1.2	0.0054	0.0032
Bifenthrin·Imidacloprid WP	Insecticide	Orange, etc.	10	0.135	0.106
Bifenthrin·Methoxyfenozide SC	Insecticide	Persimmon, etc.	10	0.052	0.038
Bifenthrin·Phoxim GR	Insecticide	Potato, etc.	1.6	0.0047	0.00311
Bifenthrin·Pyridaben SC	Insecticide	Orange	16.5	0.07	0.06
Bifenthrin·Sulfoxaflor SC	Insecticide	Orange, etc.	7.7	0.012425	0.011431
Bifenthrin·Terbufos GR	Insecticide	Potato, etc.	1.6	0.27	0.23
Bispyribac-sodium SL	Herbicide	Rice, Lawn, etc.	2	0.64	0.64
Bistrifluron EC	Insecticide	Chinese cabbage, etc.	10	0.94	0.94
Bistrifluron·Chlorfenapyr SC	Insecticide	Red pepper, etc.	13	0.13	0.12
Bistrifluron·Emamectin-benzoate WG	Insecticide	Red pepper, etc.	8.85	2.48	1.63
Bistrifluron·Etofenprox SE	Insecticide	Apple, etc.	25	1.442	0.383
Bistrifluron·Flubendiamide SC	Insecticide	Red pepper, etc.	23	>10	>10
Bistrifluron·Flufenoxuron SC	Insecticide	Chinese cabbage, etc.	7	>10	>10
Bitertanol WP	Fungicide	Pear, etc.	25	6.73	6.73
Blad SL	Fungicide	Strawberry, Grape	20	>10	>10
Blend of alkylaryl polyethoxylate and sodium salt of alkyl sulfonated alkylate SL	Others	Rice	60	>2	>2
Boscalid WT	Fungicide	Orange, etc.	47	>3.14	>3.14
Boscalid·Fludioxonil SC	Fungicide	Grape, etc.	28.5	5.27	5.27
Boscalid·Metrafenone SC	Fungicide	Red pepper, etc.	30	>10	>10
Boscalid·Metrafenone WG	Fungicide	Cucumber, etc.	30	>7.29	>7.29
Boscalid·Pyraclostrobin GR	Fungicide	Garlic, etc.	1.05	0.153	0.135
Boscalid·Pyraclostrobin SC	Fungicide	Pear, etc.	21.6	0.05	0.05
Boscalid·Pyraclostrobin WG	Fungicide	Apple, etc.	20.4	0.128	0.108
Boscalid·Pyriofenone SC	Fungicide	Melon, etc.	23	22.7	14.28
Boscalid·Triflumizole WP	Fungicide	Cucumber, etc.	30	3.41	3.38
Bromobutide·Cafenstrole·Imazosulfuron GR	Herbicide	Rice	3.75	6.344	3.781
Bromobutide·Carfentrazone-ethyl·Penoxsulam GR	Herbicide	Rice	4.99	>10	>10
Bromobutide·Fentrazamide GR	Herbicide	Rice	7	>9.685	>9.685

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Bromobutide·Fentrazamide·Flucetosulfuron GR	Herbicide	Rice	4.07	>10	>10
Bromobutide·Fentrazamide·Imazosulfuron GR	Herbicide	Rice	4.25	>10	>10
Bromobutide·Fentrazamide·Imazosulfuron SC	Herbicide	Rice	25.5	>10	>10
Bromobutide·Fentrazamide·Halosulfuron-methyl GR	Herbicide	Rice	4.18	>9.460	>9.460
Bromobutide·Flucetosulfuron·Imazosulfuron GR	Herbicide	Rice	3.35	>10	>10
Bromobutide·Halosulfuron-methyl· Oxaziclomefone GR	Herbicide	Rice	3.45	>10	>10
Bromobutide·Halosulfuron-methyl· Pyriminobac-methyl GG	Herbicide	Rice	19.68	>10	>10
Bromobutide·Imazosulfuron·Mefenacet GR	Herbicide	Rice	6.25	>10	>10
Bromobutide·Imazosulfuron·Metamifop SC	Herbicide	Rice	21.3	2.14	1.83
Bromobutide·Imazosulfuron·Penoxsulam GG	Herbicide	Rice	19.98	>10	>10
Bromobutide·Imazosulfuron·Penoxsulam GR	Herbicide	Rice	3.33	>10	>10
Bromobutide·Imazosulfuron·Penoxsulam SC	Herbicide	Rice	19.98	>10	>10
Bromobutide·Imazosulfuron·Penoxsulam UG	Herbicide	Rice	19.98	>10	>10
Bromobutide·Imazosulfuron·Pyraclo-nil GG	Herbicide	Rice	23.1	>10.702	>10.702
Bromobutide·Imazosulfuron·Pyraclo-nil GR	Herbicide	Rice	3.85	>8.7	>8.7
Bromobutide·Imazosulfuron·Pyriminobac-methyl GR	Herbicide	Rice	3.35	>10	>10
Bromobutide·Imazosulfuron·Thiobencarb GR	Herbicide	Rice	9.75	3.54	1.77
Bromobutide·MCPA·Orthosulfufamuron· Penoxsulam GR	Herbicide	Rice	3.83	>9.299	>9.299
Bromobutide·Oxadiargyl SC	Herbicide	Rice	9.4	>10	>10
Bromobutide·Oxaziclomefone·Pyrazosulfuron- ethyl GR	Herbicide	Rice	10.02	>4.09	>4.092
Bromobutide·Penoxsulam SC	Herbicide	Rice	18.48	>9.40	>9.40
Bromobutide·Penoxsulam·Pyraclo-nil SC	Herbicide	Rice	19.98	>10	>10
Bromobutide·Pretilachlor·Simetryn EC	Herbicide	Rice	24	4.307	3.582
Bromobutide·Propyrisulfuron GR	Herbicide	Rice	3.25	>10	>10
Bromobutide·Propyrisulfuron SC	Herbicide	Rice	19.5	>10.245	>10.415
Bromobutide·Propyrisulfuron·Thiobencarb GR	Herbicide	Rice	8.25	3.281	2.997
Bromobutide·Pyraclo-nil SC	Herbicide	Rice	13.5	9.76	7.38
Bromobutide·Pyraclo-nil·Pyrazosulfuron-ethyl GR	Herbicide	Rice	3.4	>3.467	>3.467
Bromobutide·Pyrazosulfuron-ethyl·Pyriminobac- methyl GG	Herbicide	Rice	38.04	>10	>10
Bromobutide·Pyrazosulfuron-ethyl·Pyriminobac- methyl GR	Herbicide	Rice	3.17	>10	>10
Bromobutide·Thiobencarb SC	Herbicide	Rice	57.5	1.86	1.74
Bromobutide·Thiobencarb SE	Herbicide	Rice	24	2.535	2.333
Buprofezin SC	Insecticide	Pine	40	>10	>10
Buprofezin WP	Insecticide	Pear, etc.	20	5.621	5.621
Buprofezin·Chromafenozide SC	insecticide	Rice, Pear, etc.	29	14.495	14.495
Buprofezin·Clothianidin SC	Insecticide	Orange, etc.	13	>10	>10
Buprofezin·Dinotefuran WP	Insecticide	Persimmon, etc.	35	10.2	9.607
Buprofezin·Etofenprox WG	Insecticide	Pear, etc.	23	3.638	0.574
Buprofezin·Etofenprox WP	Insecticide	Rice	13	5.63	3.5

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Buprofezin·Flubendiamide SC	Insecticide	Rice	13	1.81	1.62
Buprofezin·Imidacloprid GR	Insecticide	Rice, Red pepper, etc.	2	>10	>10
Buprofezin·Imidacloprid SC	Insecticide	Orange, etc.	23	9.1	6.04
Buprofezin·Imidacloprid WG	Insecticide	Chrysanthemum	19	>8.762	>8.762
Buprofezin·Imidacloprid WP	Insecticide	Apple, Watermelon	10	>10	>10
Buprofezin·Isoprocarb WP	insecticide	Rice	25	>2	>2
Buprofezin·Lambda-cyhalothrin EC	Insecticide	Orange, etc.	11	0.0043	0.0028
Buprofezin·Methoxyfenozide WP	Insecticide	Rice, Cucumber, etc.	15	12.386	9.988
Buprofezin·Pyridaben SC	Insecticide	Cucumber, etc.	33	0.00553	0.00442
Buprofezin·Pyrifluquinazon SC	Insecticide	Persimmon, etc.	25	8.942	8.354
Buprofezin·Spinetoram SC	Insecticide	Red pepper, etc.	24	27.522	4.187
Buprofezin·Sulfoxaflor SC	Insecticide	Orange, etc.	15.1	8.97	7.88
Buprofezin·Tebufenozide WP	Insecticide	Rice, Tomato, etc.	17	7.19	6.95
Buprofezin·Thiacloprid SC	Insecticide	Rice, Pear, etc.	25	>10	>10
Buprofezin·Thiamethoxam SC	Insecticide	Persimmon, etc.	23.3	3.802	2.653
Butachlor CS	Herbicide	Rice	33	4.915	2.311
Butachlor·Carfentrazone-ethyl GR	Herbicide	Rice	2.75	0.76	0.56
Butachlor·Cyclosulfamuron GR	Herbicide	Rice	2.65	0.78	0.67
Butachlor·Dichlobenil GR	Herbicide	Lawn	3.5	3.363	1.847
Butachlor·Ethoxysulfuron GR	Herbicide	Rice	3.08	1.44	0.67
Butralin EC	Plant growth regulator	Tobacco	36	1	0.8
Butralin·Decyl alcohol EC	Plant growth regulator	Tobacco	56	2.954	2.08
Cadusafos GR	Insecticide	Watermelon, etc.	3	0.21	0.08
Cafenstrole SC	Herbicide	Lawn	40	2.14	1.84
Cafenstrole·Imazosulfuron GR	Herbicide	Rice	0.95	3.17	3.17
Cafenstrole·Pyrazosulfuron-ethyl GR	Herbicide	Rice	1.07	5.75	4.29
Captan WG	Fungicide	Apple	80	0.23	0.23
Captan WP	Fungicide	Apple, etc.	50	0.28	0.28
Captan WT	Fungicide	Strawberry, Tomato	50	0.16	0.08
Captan·Polyoxin-B WP	Fungicide	Apple	65	0.33	0.33
Carbaryl WP	Insecticide	Potato, etc.	50	1.18	0.849
Carbendazim SC	Fungicide	Apple	41.5	>10	>10
Carbendazim WP	Fungicide	Apple, etc.	60	0.115	0.072
Carbendazim·Chlorothalonil DP	Fungicide	Chinese cabbage	10	0.305	0.257
Carbendazim·Chlorothalonil SC	Fungicide	Red pepper, etc.	43	0.109	0.109
Carbendazim·Diethofencarb WP	Fungicide	Red pepper, etc.	50	>10	>10
Carbendazim·Difenoconazole WG	Fungicide	Persimmon, etc.	15	1.7	1.54
Carbendazim·Hexaconazole WP	Fungicide	Red pepper, etc.	51	1.54	1.21
Carbendazim·Iprodione SC	Fungicide	Rice	25	>10	>10
Carbendazim·Kasugamycin WP	Fungicide	Red pepper, etc.	43.45	>10	>10
Carbendazim·Kresoxim-methyl WP	Fungicide	Orange, etc.	60	1.123	1.123
Carbendazim·Mepanipyrim SC	Fungicide	Red pepper, etc.	30	5.97	4.24
Carbendazim·Metalaxyl WP	Fungicide	Rice, Sesame, etc.	62.5	>2	>2

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Carbendazim·Metalaxyl-M WP	Fungicide	Rice, Sesame, etc.	54	>10	>10
Carbendazim·Polyoxin-D WP	Fungicide	Red pepper, etc.	51.5	>10	>10
Carbendazim·Sulfur SC	Fungicide	Cucumber, Rose	40	>10	>10
Carbendazim·Tebuconazole SC	Fungicide	Red pepper, etc.	25	>10	>10
Carbendazim·Tebuconazole WP	Fungicide	Apple, etc.	25	6.956	6.723
Carbendazim·Trifloxystrobin WG	Fungicide	Persimmon, etc.	56	0.062993	0.062392
Carbofuran GR	Insecticide	Rice, Carrot, etc.	3	0.72	0.72
Carbosulfan GR	Insecticide	Rice, Cucumber, etc.	3	>2	>2
Carbosulfan GR	Insecticide	Rice, Garlic	5	>10	>10
Carbosulfan WP	Insecticide	Rice, Grape, etc.	20	1.69	1.25
Carbosulfan·Halosulfuron-methyl·Mefenacet GR	Insecti- Herbicide	Rice	7.68	1.28	1.08
Carbosulfan·Tefluthrin GR	Insecticide	Potato, etc.	2.4	0.00128	0.00114
Carboxin WS	Fungicide	Rice	20	1.604	1.298
Carfentrazone-ethyl EW	Herbicide	Lawn	21.3	3.22	3.032
Carfentrazone-ethyl·Cyclosulfamuron· Fentrazamide GR	Herbicide	Rice	1.45	>10	>10
Carfentrazone-ethyl·Cyclosulfamuron·Mefenacet GR	Herbicide	Rice	3.92	>10	>10
Carfentrazone-ethyl·Cyclosulfamuron·Pyriftalid GR	Herbicide	Rice	0.92	>10	>10
Carfentrazone-ethyl·Cyclosulfamuron· Pyriminobac-methyl GR	Herbicide	Rice	0.52	>10	>10
Carfentrazone-ethyl·Fentrazamide·Imazosulfuron GR	Herbicide	Rice	1.5	>10	>10
Carfentrazone-ethyl·Fentrazamide·Pyrazosulfuron- ethyl GR	Herbicide	Rice	1.32	>10	>10
Carfentrazone-ethyl·Fentrazamide·Pyrazosulfuron- ethyl UG	Herbicide	Rice	7.92	4.01	3.55
Carfentrazone-ethyl·Flucetosulfuron·Imazosulfuron GR	Herbicide	Rice, Lawn	0.57	>10	>10
Carfentrazone-ethyl·Glyphosate-isopropylamine ME	Herbicide	Apple, etc.	20.5	8.73	8.73
Carfentrazone-ethyl·Halosulfuron-methyl· Pyriminobac-methyl GR	Herbicide	Rice	0.53	>10	>10
Carfentrazone-ethyl·Imazosulfuron·Mefenacet SE	Herbicide	Rice	23.1	8.5	5.13
Carfentrazone-ethyl·Imazosulfuron·Penoxsulam GR	Herbicide	Rice	0.43	>10	>10
Carfentrazone-ethyl·Imazosulfuron·Pyriminobac- methyl DT	Herbicide	Rice	7.2	>10	>10
Carfentrazone-ethyl·Imazosulfuron·Pyriminobac- methyl GR	Herbicide	Rice	0.6	>10	>10
Carfentrazone-ethyl·Mefenacet·Pyrazosulfuron- ethyl GR	Herbicide	Rice	3.65	>10	>10
Carfentrazone-ethyl·Penoxsulam GR	Herbicide	Rice	0.33	>10	>10
Carfentrazone-ethyl·Penoxsulam·Pyrazosulfuron- ethyl GR	Herbicide	Rice	0.3	4.92	4.92
Carfentrazone-ethyl·Pretilachlor·Pyrazosulfuron- ethyl GR	Herbicide	Rice	1.17	3.964	3.539
Carfentrazone-ethyl·Pyrazosulfuron-ethyl· Pyriftalid GR	Herbicide	Rice	0.82	>10	>10

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Carfentrazone-ethyl·Pyrazosulfuron-ethyl·Pyriminobac-methyl GR	Herbicide	Rice	0.42	>10	>10
Carfentrazone-ethyl·Pyrazosulfuron-ethyl·Thiobencarb GR	Herbicide	Rice	7.32	1.81	1.74
Carfentrazone-ethyl·Thiobencarb GR	Herbicide	Rice	7.25	3.46	3.24
Carpropamid SC	Fungicide	Rice	15	>10	>10
Carpropamid SC	Fungicide	Rice	30	>10	>10
Carpropamid·Fludioxonil·Imidacloprid WS	Insecti-Fungicide	Rice	63	>10	>10
Carpropamid·Iminoctadine triacetate SC	Fungicide	Rice	12	13	7.76
Carpropamid·Prochloraz-manganese·Imidacloprid WS	Insecti-Fungicide	Rice	62.5	>10	>10
Carpropamid·Thiacloprid GR	Insecti-Fungicide	Rice	3	>10	>10
Chlorantraniliprole GR	Insecticide	Rice	0.4	>10	>10
Chlorantraniliprole SC	Insecticide	Rice	2.7	38.866	22.679
Chlorantraniliprole WG	Insecticide	Rice, Apple, etc.	5	>10	>10
Chlorantraniliprole WP	Insecticide	Rice, Orange, etc.	4	7.538	6.654
Chlorantraniliprole WT	Insecticide	Rice	20	>4.5	>4.5
Chlorantraniliprole·Clothianidin GR	Insecticide	Rice	0.65	>10	>10
Chlorantraniliprole·Clothianidin SC	Insecticide	Rice	4.7	>10	>10
Chlorantraniliprole·Flonicamid WG	Insecticide	Orange	10	>8.5	>8.5
Chlorantraniliprole·Indoxacarb WG	Insecticide	Rice, Apple, etc.	7	1.326	1.326
Chlorantraniliprole·Lambda-cyhalothrin SC	Insecticide	Apple, etc.	13.89	0.002	0.001786
Chlorantraniliprole·Thiacloprid SC	Insecticide	Rice	10.7	>10	>10
Chlorantraniliprole·Thiametoxam SC	Insecticide	Rice, Chinese cabbage, etc.	24.5	>10	>10
Chlorfenapyr SC	Insecticide	Pear, etc.	10	0.062	0.062
Chlorfenapyr·Clothianidin EC	Insecticide	Red pepper, etc.	5.5	0.17	0.17
Chlorfenapyr·Clothianidin SC	Insecticide	Red pepper, etc.	12	0.18	0.17
Chlorfenapyr·Cyenopyrafen SC	Insecticide	Orange, etc.	24	0.37	0.31
Chlorfenapyr·Cyflumetofen DC	Insecticide	Orange, etc.	11.5	0.17	0.13
Chlorfenapyr·Etofenprox SE	Insecticide	Pear, Apple	11	0.222	0.222
Chlorfenapyr·Flufenoxuron DC	Insecticide	Chinese cabbage, Apple	4.5	0.070	0.070
Chlorfenapyr·Imidacloprid SC	Insecticide	Red pepper, etc.	12	0.24	0.18
Chlorfenapyr·Metaflumizone EC	Insecticide	Red pepper, etc.	16	0.114	0.067
Chlorfenapyr·Pyridaben SC	Insecticide	Apple, etc.	13	0.04	0.04
Chlorfenapyr·Thiamethoxam SC	Insecticide	Red pepper, etc.	6	0.22	0.2
Chlorfluazuron SC	Insecticide	Apple, etc.	10	>10	>10
Chlorfluazuron·Indoxacarb SC	Insecticide	Persimmon, etc.	7	1.111	1.111
Chlorothalonil SC	Fungicide	Peach, etc.	53	0.079	0.079
Chlorothalonil WG	Fungicide	Apple, etc.	82.5	0.04	0.03
Chlorothalonil WP	Fungicide	Apple, etc.	75	0.19	0.17
Chlorothalonil·Cymoxanil WP	Fungicide	Grape, etc.	46	0.095	0.094
Chlorothalonil·Difenoconazole WG	Fungicide	Red pepper, etc.	24	0.191	0.182
Chlorothalonil·Dithianon SC	Fungicide	Persimmon, etc.	35	0.102	0.092

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Chlorothalonil·Kasugamycin SC	Fungicide	Red pepper, Watmelon	35	0.13	0.11
Chlorothalonil·Mandipropamid SC	Fungicide	Potato, etc.	36.63	0.068	0.055
Chlorothalonil·Metalaxyl-M SC	Fungicide	Potato, etc.	34.5	0.019	0.018
Chlorothalonil·Oxine-copper WP	Fungicide	Apple	60	0.318	0.303
Chlorothalonil·Propamocarb hydrochloride SC	Fungicide	Potato, etc.	62	0.153	0.13
Chlorothalonil·Pyrimethanil SC	Fungicide	Eggplant, etc.	43.4	0.073	0.065
Chlorothalonil·Tebuconazole WP	Fungicide	Persimmon, etc.	50	0.34	0.34
Chlorothalonil·Thiram SC	Fungicide	Orange	70	0.027	0.008
Chlorothalonil·Trifloxystrobin SC	Fungicide	Red pepper, etc.	35	0.14	0.14
Chlorpropham EC	Plant growth regulator	Potato	45.8	>2	>2
Chlorpyrifos EC	Insecticide	Apple, etc.	20	0.019	0.016
Chlorpyrifos GR	Insecticide	Tobacco, etc.	2	0.084	0.059
Chlorpyrifos ME	Insecticide	Orange	21	10.51	7.16
Chlorpyrifos WP	Insecticide	Apple, etc.	25	0.024	0.018
Chlorpyrifos·Cypermethrin EC	Insecticide	Apple	12.5	0.024	0.022
Chromafenozide EC	Insecticide	Rice, Red pepper, etc.	5	2.09	1.68
Chromafenozide SC	Insecticide	Apple, etc.	5	4.19	3.674
Chromafenozide·Clothianidin EC	Insecticide	Rice	3.5	0.64	0.61
Chromafenozide·Etofenprox EC	Insecticide	Rice, Persimmon, etc.	13	1.402	0.114
Chromafenozide·Fenitrothion EC	Insecticide	Rice	37.5	4.432	4.047
Clomazone GR	Herbicide	Bean	2	>10	>10
Clomazone·Pentoxazone EC	Herbicide	Rice	7.5	0.62	0.58
Clomazone·Fentrazamide EC	Herbicide	Rice	5	0.86	0.86
Clomazone·Pretilachlor EC	Herbicide	Rice	15.6	1.43	1.04
Clomazone·Pretilachlor EW	Herbicide	Rice	15.6	3.94	2.87
Clothianidin GR	Insecticide	Rice	0.5	>10	>10
Clothianidin GR	Insecticide	Red pepper, etc.	1.8	>10	>10
Clothianidin SC	Insecticide	Rice, Orange, etc.	8	>10	>10
Clothianidin SG	Insecticide	Persimmon, etc.	8	>10	>10
Clothianidin SL	Insecticide	Rice, Rose, etc.	20	>10	>10
Clothianidin UG	Insecticide	Rice	1.5	>10	>10
Clothianidin WP	Insecticide	Apple, etc.	8	5.56	4.93
Clothianidin WS	Insecticide	Rice	21	>10	>10
Clothianidin·Diflubenzuron SC	Insecticide	Red pepper, etc.	20	>10	>10
Clothianidin·Fenitrothion GR	Insecticide	Potato, etc.	5.3	4.62	4.56
Clothianidin·Flubendiamide SC	Insecticide	Rice	6	>10	>10
Clothianidin·Flufenoxuron SC	Insecticide	Strawberry, Melon	10	>10	>10
Clothianidin·Indoxacarb WP	Insecticide	Rice	9	1.36	1.36
Clothianidin·Methoxyfenozide SC	Insecticide	Rice, Orange, etc.	15	>10	>10
Clothianidin·Priproxyfen SE	Insecticide	Cucumbrer, Tomato	15	3.41	1.61

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Clothianidin·Pyridalyl SC	Insecticide	Orange, etc.	24	>10	>10
Clothianidin·Spinetoram SC	Insecticide	Cucumbrer, etc.	10	2.43	2.04
Clothianidin·Tebufenozide SC	Insecticide	Rice	9	>10	>10
Copper hydroxide WG	Fungicide	Red pepper, etc.	46.1	0.353	0.300
Copper hydroxide WP	Fungicide	Tomato, etc.	77	2.15	2.15
Copper hydroxide·Oxadixyl WP	Fungicide	Sesame, etc.	70	>2	>2
Copper hydroxide·Streptomycin WP	Fungicide	Orange, etc.	60	3.84	3.28
Copper oxychloride·Dithianon WP	Fungicide	Orange, etc.	55	>2	>2
Copper oxychloride·Kasugamycin WP	Fungicide	Orange, etc.	50.75	>10	>10
Copper oxychloride·Metalaxyl GR	Fungicide	Ginger	6.7	>10	>10
Copper oxychloride·Metalaxyl-M GR	Fungicide	Ginger, etc.	5.7	>10	>10
Copper oxychloride·Metalaxyl-M WP	Fungicide	Chinese, cabbage, etc.	42.5	>10	>10
Copper sulfate basic WP	Fungicide	Orange, etc.	58	>10	>10
4-CPA SL	Plant growth regulator	Tomato, etc.	0.15	6.575	5.332
4-CPA·Gibberellic SP	Plant growth regulator	Melon	3.75	>10	>10
Cuprous oxide·Streptomycin WP	Fungicide	Orange, etc.	38	3.411	2.837
Cyantraniliprole DC	Insecticide	Red pepper, etc.	5	3.668	2.728
Cyantraniliprole EC	Insecticide	Red pepper, etc.	5	0.927	0.803
Cyantraniliprole OD	Insecticide	Red pepper, etc.	10.26	2.91	2.11
Cyantraniliprole SC	Insecticide	Chinese cabbage, etc.	18.66	>8.3	>8.3
Cyantraniliprole·Pymetrozine WG	Insecticide	Rice, Radish, etc.	60	>60	>60
Cyantraniliprole·Thiamethoxam WG	Insecticide	Red pepper, etc.	40	>40	>40
Cyazofamid SC	Fungicide	Potato, etc.	10	>10	>10
Cyazofamid·Fluopicolide SC	Fungicide	Potato, etc.	13	3.3	2.9
Cyazofamid·Valifenalate SC	Fungicide	Onion, etc.	8	>9.659	>9.659
Cyclaniliprole SL	Insecticide	Apple, etc.	4.5	41.5	36.2
Cyclosulfamuron WP	Herbicide	Lawn	10	>10	>10
Cyclosulfamuron·Fentrazamide SC	Herbicide	Rice	7.2	3.553	3.24
Cyclosulfamuron·Mefenacet GR	Herbicide	Rice	3.17	>10	>10
Cyclosulfamuron·Mefenacet SC	Herbicide	Rice	22.2	>10	>10
Cyclosulfamuron·Penoxuram SC	Herbicide	Lawn	1.68	9.82	8.95
Cyclosulfamuron·Pyrinobac-methyl GR	Herbicide	Rice	0.27	>10	>10
Cyclosulfamuron·Pyrinobac-methyl DT	Herbicide	Rice	1.62	8.319	8.134
Cyenoxyrafen SC	Insecticide	Apple, etc.	25	>10	>10
Cyenoxyrafen·Etoazole SC	Insecticide	Red pepper, etc.	23	>7.73	>7.73
Cyenoxyrafen·Flufenoxuron SC	Insecticide	Orange, etc.	25	12.64	11.06
Cyenoxyrafen·Pyridaben SC	Insecticide	Pear, etc.	16.5	0.2	0.16
Cyflufenamid·Difenaconazole SC	Fungicide	Apple, etc.	11.5	1.28	1.02
Cyflufenamid·Simeconazole SE	Fungicide	Persimmon, etc.	13.5	8.12	7.45
Cyflufenamid·Triflumizole EC	Fungicide	Pear, etc.	9.5	0.62	0.62
Cyflumetofen DC	Insecticide	Apple, etc.	10	0.401	0.401

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Cyflumetofen SC	Insecticide	Orange, etc.	20	4.65	4.65
Cyflumetofen·Fenpyfoximate SC	Insecticide	Persimmon, etc.	16.5	0.023	0.021
Cyfluthrin EC	Insecticide	Apple, etc.	2	0.013	0.013
Cyfluthrin·Tebupyrifos GR	Insecticide	Potato, etc.	2.1	>10	>10
Cyhalofop-butyl·Imazosulfuron·Pretilachlor SE	Herbicide	Rice	11.1	2.17	1.55
Cyhalofop-butyl·Propanil EC	Herbicide	Rice	44.5	11.309	11.309
Cymoxanil·Ethaboxam WP	Fungicide	Tomato, etc.	19	0.53	0.53
Cymoxanil·Famoxadone SC	Fungicide	Cucumber, etc.	21	2.48	1.56
Cymoxanil·Famoxadone WG	Fungicide	Grape, etc.	52.5	5.39	4.671
Cymoxanil·Mancozeb WP	Fungicide	Cucumber, etc.	56	>10	>10
Cymoxanil·Mandipropamid SC	Fungicide	Potato, etc.	20	>10	>10
Cymoxanil·Zoxamide WP	Fungicide	Red pepper, etc.	22	>10	>10
Cypermethrin EC	Insecticide	Apple, etc.	5	0.007	0.007
Cyproconazole SL	Fungicide	Apple, etc.	4.5	>2	>2
Cyproconazole WG	Fungicide	Lawn	40	>10	>10
Cyprodinil WG	Fungicide	Ginseng, etc.	50	2.969	2.095
Cyprodinil·Difenoconazole EW	Fungicide	Pear, etc.	32.52	2.03	1.831
Cyprodinil·Fludioxonil WG	Fungicide	Strawberry, etc.	62.5	0.89	0.671
2,4-D SL	Herbicide	Rice	40	>2	>2
2,4-D ethylester WP	Herbicide	Rice	18	>2	>2
Daimuron·Mefenacet·Pyrazosulfuron-ethyl GR	Herbicide	Rice	5.07	>10	>10
Daimuron·Imazosulfuron·Oxaziclomefone SC	Herbicide	Rice, Lawn	11.5	>10	>10
Daminozide WP	Plant growth regulator	Poinsettia	85	>10	>10
Dazomet GR	Fungicide	Red pepper, etc.	50	32.77	23.23
DBEDC AL	Fungicide	Rose, etc.	0.04	6.07	5.17
DBEDC EC	Fungicide	Tobacco, etc.	20	9.18	4.82
Decyl alcohol EC	Plant growth regulator	Tobacco	78	4.53	4.53
Deltamethrin EC	Insecticide	Apple, etc.	1	0.00025	0.00016
Deltamethrin EW	Insecticide	Persimmon, etc.	2.7	0.0019	0.0017
Deltamethrin·Lambda-cyhalothrin WP	Insecticide	Persimmon	1.5	0.0015	0.0014
Deltamethrin·Methoxyfenozide SC	Insecticide	Pear, Apple	9.6	0.496	0.496
Deltamethrin·Profenofos EC	Insecticide	Red pepper, etc.	15.6	0.025	0.021
Deltamethrin·Tebupirifos GR	Insecticide	Potato, etc.	2.1	0.22	0.2
Deltamethrin·Thiacloprid SC	Insecticide	Persimmon, etc.	9.6	0.013	0.013
Deltamethrin·Thiodicarb SC	Insecticide	Peach, etc.	31	0.43	0.26
Diafenthiuron SC	Insecticide	Cucumber	23.3	5.419	0.739
Diazinon CS	Insecticide	Lawn	25	>10	>10
Diazinon DP	Insecticide	Chinese cabbage	2	1.876	1.398
Diazinon EC	Insecticide	Chinese cabbage, etc.	34	5.63	5.45
Diazinon GR	Insecticide	Chinese cabbage, etc.	3	8.78	7.17
Diazinon·Etofenprox WP	Insecticide	Lawn	33	1.61	1.13

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Diazinon·Imidacloprid GR	Insecticide	Red pepper	3	16.287	14.365
Diazinon·Phorate GR	Insecticide	Potato, Garlic	5	>10	9.54
Diazinon·Phoxim DP	Insecticide	Potato	3.5	3.67	3.09
Diazinon·Terbufos GR	Insecticide	Potato, Chinese cabbage	4.5	0.117	0.081
Diazinon·Thiamethoxam GR	Insecticide	Red pepper, etc.	6	20.735	19.991
Dicamba SL	Herbicide	Lawn, etc.	48.2	>10	>10
Dichlobenil GR	Herbicide	Pear, etc.	2.65	>10.928	>10.928
Dichlobenil·Imazaquin GR	Herbicide	Lawn, etc.	4.5	>10	>10
Dichloprop triethanol amine SL	Plant growth regulator	Apple	5	>2	>2
Dichlorvos·Etofenprox EC	Insecticide	Chinese cabbage, Leek	30	1.48	1.36
Dichlorvos·Lambda-cyhalothrin DC	Insecticide	Persimmon, etc.	20.8	0.011	0.011
Diethofencarb·Thiophanate-methyl WP	Fungicide	Red pepper, etc.	55	19.88	13.68
Difenoconazole DC	Fungicide	Apple, etc.	5	0.392	0.348
Difenoconazole EC	Fungicide	Melon, etc.	10	0.519	0.505
Difenoconazole EC	Fungicide	Watermelon, etc.	20	1.176	1.135
Difenoconazole EW	Fungicide	Apple, etc.	5	1.27	1.27
Difenoconazole ME	Fungicide	Apple, etc.	8	0.57	0.47
Difenoconazole SC	Fungicide	Apple, etc.	10	1.27	1.15
Difenoconazole WP	Fungicide	Apple, etc.	10	1.06	1.06
Difenoconazole·Diniconazole SC	Fungicide	Pear	9.5	1.843	1.422
Difenoconazole·Dithianon WG	Fungicide	Red pepper, etc.	34	0.117	0.117
Difenoconazole·Fludioxonil WP	Fungicide	Eggplant, etc.	18	1.329	1.329
Difenoconazole·Fluxapyroxad SC	Fungicide	Persimmon, etc.	11.7	0.42	0.37
Difenoconazole·Iminoctadin-triacetate ME	Fungicide	Apple, etc.	18	4.35	4.16
Difenoconazole·Kresoxim-methyl SC	Fungicide	Pear, etc.	26	0.652	0.553
Difenoconazole·Metrafenone SC	Fungicide	Strawberry, etc.	17	1.77	1.77
Difenoconazole·Polyoxin B WP	Fungicide	Persimmon, etc.	18	2.29	1.68
Difenoconazole·Polyoxin D WP	Fungicide	Persimmon, etc.	6.5	2.2	2.11
Difenoconazole·Pyraclostrobin SC	Fungicide	Persimmon, etc.	12	0.032	0.032
Difenoconazole·Pyribencarb SC	Fungicide	Persimmon, etc.	16	2.378	2.378
Difenoconazole·Pyriofenone SC	Fungicide	Red pepper, etc.	15	2.03	1.97
Difenoconazole·Tebuconazole DC	Fungicide	Persimmon, etc.	9	2.14	1.98
Difenoconazole·Tebuconazole SC	Fungicide	Persimmon, etc.	21	2.84	2.84
Difenoconazole·Thiophanate-methyl SC	Fungicide	Persimmon, etc.	24	>10	>10
Difenoconazole·Thiophanate-methyl WP	Fungicide	Persimmon, etc.	40	11.57	11.16
Difenoconazole·Triflumizole ME	Fungicide	Watermelon, etc.	7.5	1.36	1.26
Diflubenzuron SC	Insecticide	Apple, etc.	14	>10	>10
Diflubenzuron WG	Insecticide	Peach, etc.	50	>10	>10
Diflubenzuron WP	Insecticide	Apple, etc.	25	>10	>10
Diflubenzuron·Etofenprox SE	Insecticide	Persimmon, etc.	15	9.18	6.74
Diflubenzuron·Imidacloprid WP	Insecticide	Strawberry, Rose	15	>10	>10
Diflubenzuron·Lambda-cyhalothrin WP	Insecticide	Orange, Apple	19	0.018	0.018

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Diflubenzuron·Sulfoxaflor WG	Insecticide	Red pepper, Apple	26.2	>10	>10
Diflufenican·Glyphosate-isopropylamine SC	Herbicide	Noncropland	30.8	>9.8	>9.8
Dimethametryn GR	Herbicide	Rice	0.3	>9.022	>9.022
Dimethametryn·Esprocarb·Pyrazosulfuron-ethyl GR	Herbicide	Rice	5.77	2.3	2.3
Dimethametryn·Halosulfuron-methyl·Penocsulram GR	Herbicide	Rice	0.98	5.109	5.109
Dimethametryn·Halosulfuron-methyl·Pyriminobac-methyl GR	Herbicide	Rice	0.98	5.32	4.8
Dimethametryn·Mefenacet·Pyrazosulfuron-ethyl GR	Herbicide	Rice	4.07	>10	>10
Dimethametryn·Metazosulfron GR	Herbicide	Rice	0.63	5.19	4.7
Dimethametryn·Penoxsulam·Pyrazosulfuron-ethyl GR	Herbicide	Rice	0.85	4.91	4.15
Dimethametryn·Pyrazosulfuron-ethyl·Pyriminobac-methyl GR	Herbicide	Rice	0.47	>10	>10
Dimethametryn·Pyrazosulfuron-ethyl·Thiobencarb GR	Herbicide	Rice	7.42	1.87	1.84
Dimethenamid GR	Herbicide	Bean, etc.	2.5	6.59	4.49
Dimethenamid-P EC	Herbicide	Potato, etc.	62.3	5.891	4.557
Dimethenamid-P·Pendimethalin EC	Herbicide	Corn, etc.	25	0.67	0.5
Dimethoate EC	Insecticide	Garlic, etc.	46	7.107	6.212
Dimethoate GR	Insecticide	Garlic	5	>8.777	>8.777
Dimethomorph SC	Fungicide	Cucumber, etc.	50	10.341	9.723
Dimethomorph WG	Fungicide	Red pepper, etc.	74.2	>10	>10
Dimethomorph WP	Fungicide	Potato, etc.	25	>10	>10
Dimethomorph WP	Fungicide	Red pepper, etc.	18	>10	>10
Dimethomorph·Ethaboxam SC	Fungicide	Potato, etc.	63	>10	>10
Dimethomorph·Mancozeb WP	Fungicide	Red pepper, etc.	19.5	>10	>10
Dimethomorph·Metalaxyl-M WP	Fungicide	Potato, etc.	25	8.29	0.54
Dimethomorph·Picarbutrazox SC	Fungicide	Potato, etc.	18	9.175	8.685
Dimethomorph·Propineb WP	Fungicide	Potato, Onion	34.6	0.24	0.24
Dimethomorph·Pyraclostrobin SC	Fungicide	Orange, etc.	25.5	0.052	0.052
Dimethomorph·Pyraclostrobin WG	Fungicide	Potato, etc.	18.7	0.039	0.022
Dimethyl disulfide AL	Insecti-Fungicide	Watermelon, etc.	99.55	37.973	36.796
Dimethyl disulfide EC	Insecti-Fungicide	Watermelon, etc.	94.56	11.671	10.844
Dinotefuran SG	Insecticide	Rice, Persimmon, etc.	50	>10	>10
Dintefuran SL	Insecticide	Rice, Red pepper, etc.	10	6.23	4.82
Dinotefuran WG	Insecticide	Rice, Cucumber, etc.	20	5.73	5.06
Dinotefuran WP	Insecticide	Rice, Red pepper, etc.	10	>10	>10
Dinotefuran WS	Insecticide	Rice	70	>10	>10
Dinotefuran·Etofenprox ME	Insecticide	Rice, Grape	13	2.78	2.35
Dinotefuran·Etofenprox WP	Insecticide	Rice, Persimmon, etc.	13	>10	>10
Dithianon SC	Fungicide	Apple, etc.	43	0.04	0.04
Dithianon WG	Fungicide	Apple, etc.	66	0.228	0.174

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Dithianon·Fluxapyroxad SC	Fungicide	Peach, etc.	28	0.023858	0.023858
Dithianon·Kasugamycin WG	Fungicide	Red pepper, etc.	37.5	0.048	0.048
Dithianon·Metalaxyl-M WP	Fungicide	Red pepper, etc.	35	0.197	0.19
Dithianon·Metconazole WG	Fungicide	Orange, etc.	35	0.057	0.057
Dithianon·Pyraclostrobin SE	Fungicide	Persimmon, etc.	32	0.035356	0.035356
Dithianon·Pyraclostrobin WG	Fungicide	Red pepper, etc.	16	0.0576	0.0554
Dithianon·Simeconazole WG	Fungicide	Watermelon	43	0.0573	0.0528
Dinotefuran DP	Insecticide	Chinese cabbage, etc.	0.7	>10	>10
Dinotefuran GR	Insecticide	Red pepper, etc.	1	>10	>10
Dinotefuran GR	Insecticide	Red pepper, etc.	2	>10	>10
Dinotefuran·Etofenprox FG	Insecticide	Potato, Ginseng	1.24	4.216	3.967
Dinotefuran·Methoxyfenozide WG	Insecticide	Persimmon, etc.	28	>10.4	>10.4
Dinotefuran·Spinetoram SC	Insecticide	Cucumber, etc.	10	>10	>10
Dinotefuran·Spinetoram WG	Insecticide	Red pepper, etc.	20	>9.5	>9.5
Dinotefuran·Spinosad WG	Insecticide	Orange, etc.	25	>10	>10
Dinotefuran·Zetacypermethrin DC	Insecticide	Grape	14.8	0.00384	0.00323
Dithiopyr EW	Insecticide	Lawn	23.9	0.98	0.93
Dithiopyr·Penoxsulam WP	Herbicide	Lawn	11.5	5.967	5.967
Emamectin benzoate EW	Insecticide	Chinese cabbage, etc.	2.2	0.094	0.054
Emamectin benzoate ME	Insecticide	Red pepper, etc.	2.15	0.08	0.072
Emamectin benzoate SG	Insecticide	Chinese cabbage, etc.	5	0.182	0.172
Emamectin benzoate SL	Insecticide	Red pepper, etc.	2	0.457	0.304
Emamectin benzoate WG	Insecticide	Red pepper, etc.	5	0.147	0.057
Emamectin benzoate·Lufenuron WG	Insecticide	Chinese cabbage, etc.	3.2	0.706	0.443
Emamectin benzoate·Flonicamid WG	Insecticide	Red pepper, etc.	9	1.919	1.084
Emamectin benzoate·Indoxacarb WP	Insecticide	Red pepper, etc.	9.7	1.32	0.733
Epoxyconazole SC	Herbicide	Garlic, etc.	11.5	0.431	0.306
Epoxyconazole·Orysastrobin SC	Fungicide	Rice	13	3.8	3.43
Esprocarb·Pyrazosulfuron-ethyl GR	Herbicide	Rice	5.07	>10	>10
Ethaboxam DP	Fungicide	Chinese cabbage	0.35	>10	>10
Ethaboxam SC	Fungicide	Potato, etc.	15	0.43	0.39
Ethaboxam·Famoxadone WP	Fungicide	Potato, etc.	16	0.24	0.24
Ethaboxam·Propineb WP	Fungicide	Potato, etc.	63.5	9.42	6.6
Ethalfuralin EC	Herbicide	Bean, etc.	35	0.78	0.78
Ethalfuralin·Linuron GR	Herbicide	Potato, etc.	4	5.52	4.77
Ethephon SL	Plant growth regulator	Persimmon	19.5	>10	>10
Ethephon SL	Plant growth regulator	Persimmon, etc.	39	>10	>10
Ethoprophos GR	Insecticide	Tobacco, etc.	5	2.23	1.96
Ethoprophos·Terbufos GR	Insecticide	Potato, etc.	5.5	0.111053	0.087446
Etofenprox CS	Insecticide	Rice, Peach, etc.	20	>10	>10

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Etopenprox EC	Insecticide	Rice, Cucumber, etc.	20	6.99	6.99
Etopenprox GR	Insecticide	Rice	0.5	>10	>10
Etopenprox SO	Insecticide	Rice	4	>10	>10
Etopenprox WP	Insecticide	Persimmon, etc.	10	>10	>10
Etopenprox·Fenobucarb EC	Insecticide	Rice	25	3.72	1.07
Etopenprox·Flubendiamide WP	Insecticide	Red pepper, etc.	14	3.99	3.13
Etopenprox·Imidacloprid SE	Insecticide	Orange	8	0.243	0.216
Etopenprox·Indoxacarb WP	Insecticide	Rice, Apple, etc.	11.5	4.32	3.79
Etopenprox·Metaflumizone SE	Insecticide	Rice, Apple, etc.	11	0.99	0.744
Etopenprox·Methoxyfenozide SE	Insecticide	Rice, Chestnut, etc.	11.2	13.47	7.12
Etopenprox·Methoxyfenozide WP	Insecticide	Rice, Apple, etc.	11.2	>10	>10
Etopenprox·Pyridalyl ME	Insecticide	Red pepper, etc.	15.5	0.83	0.3
Etopenprox·Sulfoxaflor SE	Insecticide	Persimmon, etc.	11.1	6.627	2.879
Etopenprox·Tebufenozide EC	Insecticide	Rice, Lawn, etc.	14	2.16	2.02
Etopenprox·Terbufos GR	Insecticide	Garlic, etc.	3.5	0.13	0.13
Etioazole SC	Insecticide	Apple, etc.	10	>10	>10
Etridiazole ME	Fungicide	Lawn, Ginseng	20	>10	>10
Etridiazole WP	Fungicide	Lawn	35	>10	>10
Etridiazole·Flutolanil EC	Fungicide	Lawn, etc.	24	2.569	2.569
Etridiazole·Hexaconazole EC	Fungicide	Rice, Lawn, etc.	23	3.41	3.28
Etridiazole·Polyoxin-D zinc salt WP	Fungicide	Lawn, etc.	12.25	>10	>10
Etridiazole·Thifluzamid EC	Fungicide	Lawn, etc.	22	1.067	0.753
Famoxadone SC	Fungicide	Potato, etc.	17.5	33.71	12.77
Famoxadone·Mancozeb WG	Fungicide	Potato, Cucumber	68.75	1.003	1.003
Famoxadone·Mandipropamid SC	Fungicide	Red pepper, etc.	16	4.485	4.485
Famoxadone·Metalaxyl-M DC	Fungicide	Red pepper, etc.	15	0.15	0.15
Famoxadone·Zoxamide WG	Fungicide	Grape, etc.	17	1.83	1.2
Fenamidon·Fluopicolide SC	Fungicide	Red pepper, Cucumber	10	2.18	1.71
Fenarimol EC	Fungicide	Grape, etc.	12.5	1.09	1.055
Fenarimol WP	Fungicide	Apple, etc.	12	2.78	2.78
Fenazaquin EC	Insecticide	Orange, etc.	10	0.02	0.02
Fenazaquin·Hexythiazox SC	Insecticide	Orange, etc.	32	0.21	0.19
Fenbuconazole SC	Fungicide	Strawberry, etc.	6	0.76	0.7
Fenbuconazole WP	Fungicide	Persimmon, etc.	12	5.3	5.3
Fenbuconazol·Kresoxim-methyl SC	Fungicide	Apple, etc.	27	0.42	0.28
Fenbuconazole·Thianidil·Benfuracarb GR	Insecti-Fungicide	Rice	12.6	1.341	1.341
Fenbuconazole·Thifluzamide SC	Fungicide	Rice, Lawn, etc.	4	0.58	0.56
Fenbuconazole·Tiadinil·Clothianidin WS	Insecti-Fungicide	Rice	46	5.212	4.608
Fenhexamid SC	Fungicide	Strawberry, etc.	42	7.7	7.7
Fenhexamid WP	Fungicide	Tomato, etc.	50	8.462	5.586
Fenhexamid·Iminoctadin trisalbesilate WP	Fungicide	Strawberry, etc.	50	4.05	3.71
Fenhexamid·Prochloraz-manganes WP	Fungicide	Ginseng, etc.	40	3.18	3.03
Fenhexamid·Tebuconazole SC	Fungicide	Grape, etc.	36.3	5.7	5.29
Fenitrothion EC	Insecticide	Rice, Lawn, etc.	50	3.57	3.24

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Fenitrothion WP	Insecticide	Grape, etc.	40	4.96	4.58
Fenitrothion·Fenvalerate WP	Insecticide	Apple, etc.	40	0.008	0.008
Fenobucarb DP	Insecticide	Rice	2	8.976	8.976
Fenobucarb EC	Insecticide	Rice	50	>10	>10
Fenoxanil GR	Fungicide	Rice	4	>10	>10
Fenoxanil SC	Fungicide	Rice	20	>10	>10
Fenoxanil·Iprobenfos EC	Fungicide	Rice	30	4.55	4.38
Fenoxanil·Isoprothiolane EC	Fungicide	Rice	35	2.657	2.23
Fenoxanil·Kasugamycin SC	Fungicide	Rice	22	5.54	5.21
Fenoxanil·Phthalide SC	Fungicide	Rice	25	>10	>10
Fenoxaprop-P-ethyl DC	Herbicide	Red pepper, etc.	7	6.96	6.96
Fenoxasulfone·Pyrimisulfan GG	Herbicide	Rice	4	>7.771	>7.771
Fenoxasulfone·Pyrimisulfan SC	Herbicide	Rice	4	>10	>10
Fenpropathrin FW	Insecticide	Rose, Tomato	10	0.0014	0.001
Fenpropathrin WP	Insecticide	Orange, etc.	5	0.268	0.268
Fenpyrazamine SC	Fungicide	Peach, etc.	30	5.634	5.585
Fenpyrazamine WG	Fungicide	Cucumber, etc.	60	5.001	5.001
Fenthion EC	Insecticide	Rice, Tree, etc.	50	1.68	1.68
Fentrazamide EC	Herbicide	Rice	1.9	2.5	2.4
Fentrazamide·Halosulfuron-methyl GR	Herbicide	Rice	0.98	>10	>10
Fentrazamide·Imazosulfuron GR	Herbicide	Rice	1.25	>10	>10
Fentrazamide·Imazosulfuron SC	Herbicide	Rice	7.5	5.64	5.55
Fentrazamide·Imazosulfuron SC	Herbicide	Rice	3.75	6.46	5.48
Fentrazamide·Mesotrione·Pyrazosulfuron-ethyl GR	Herbicide	Rice	1.37	>10	>10
Fentrazamide·Metazosulfuron DT	Herbicide	Rice	15.2	8.725	7.61
Fentrazamide·Metazosulfuron GR	Herbicide	Rice	1.33	5.44	5.44
Fentrazamide·Oxadiazon EC	Herbicide	Rice	3.3	1.42	1.42
Fentrazamide·Oxadiazon EC	Herbicide	Rice	8	2.49	2.3
Fentrazamide·Pretilachlor EC	Herbicide	Rice	13.5	3	3
Fentrazamide·Pyrazosulfuron-ethyl GR	Herbicide	Rice	1.07	>10	>10
Fentrazamide·Pyrimisulfan DT	Herbicide	Rice	7	>9.802	>9.802
Fentrazamide·Pyrimisulfan SC	Herbicide	Rice	5.5	15.75	11.42
Fentrazamide·Simetryn EC	Herbicide	Rice	4.5	2.04	1.42
Fentrazamide·Tefuryltrione SC	Herbicide	Rice	12	>7.542	>7.542
Fenvalerate EC	Insecticide	Orange, etc.	5	0.053	0.053
Ferimzone SC	Fungicide	Rice	40	>10.64	>10.64
Ferimzone·Isoprothiolane WP	Fungicide	Rice	45	>10	>10
Ferimzone·Isothianil SC	Fungicide	Rice	20	14.58	13.17
Ferimzone·Kasugamycin SC	Fungicide	Rice	22.5	>12.081	>11.923
Ferimzone·Phthalide SC	Fungicide	Rice	30	>10	>10
Ferimzone·Prochloraz·Dinotefuran WS	Insecti-Fungicide	Rice	55	6.19	5.51
Ferimzone·Thiadinil WP	Fungicide	Rice	40	6.23	4.78
Ferimzone·Thifluzamide SC	Fungicide	Rice	33	16.015	13.418
Ferimzone·Thifluzamide·Metaflumizone SC	Insecti-Fungicide	Rice	38	6.935	6.152

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Ferimzone·Thiophanate-methyl SC	Fungicide	Rice	40	>12.006	>12.006
Ferimzone·Tricyclazole SC	Fungicide	Rice	23	>10	>10
Ferimzone·Tricyclazole WP	Fungicide	Rice	40	>10	>10
Ferimzone·Validamycin-A SC	Fungicide	Rice	35	>7.48	>7.48
Ferimzone·Validamycin-A WP	Fungicide	Rice	35	>10	>10
Fipronil FG	Insecticide	Rice, Potato	0.6	0.51	0.27
Flazasulfuron GR	Herbicide	Lawn	0.15	1.33	0.53
Flazasulfuron WG	Herbicide	Lawn	25	>10	>10
Flazasulfuron WP	Herbicide	Lawn	10	>2	>2
Flazasulfuron·Imazaquin WG	Herbicide	Lawn	32.5	>10	>10
Flazasulfuron·MCPA WG	Herbicide	Lawn	37.5	>10	>10
Flonicamid GR	Insecticide	Red pepper, etc.	2	>10	>10
Flonicamid SG	Insecticide	Orange, etc.	50	>519	>519
Flonicamid WG	Insecticide	Rice, Apple, etc.	10	>10	>10
Flonicarmid·Sulfoxaflor WG	Insecticide	Rice, Red pepper, etc.	10	>10	>10
Flonicamid·Thiacloprid WG	Insecticide	Red pepper, Apple	15	>7.49	>7.49
Fluazifop-P-butyl EC	Herbicide	Garlic, etc.	17.5	1.42	1.34
Fluazinam DP	Fungicide	Chinese cabbage, etc.	1	0.08	0.06
Fluazinam SC	Fungicide	Apple, etc.	50	0.099	0.099
Fluazinam SC	Fungicide	Potato, etc.	41	0.0014	0.0011
Fluazinam WG	Fungicide	Onion, etc.	50	0.35	0.28
Fluazinam WP	Fungicide	Persimmon, etc.	50	0.043	0.043
Fluazinam·Acetamiprid GR	Fungicide	Red pepper, etc.	1.3	0.166	0.14
Fluazinam·Propineb WP	Fungicide	Orange, Apple	50	1.071	1.071
Fluazinam·Tebuconazole SC	Fungicide	Orange, etc.	41.6	0.21	0.19
Flubendiamide EC	Insecticide	Rice, Corn	2	2.1	1.9
Flubendiamide SC	Insecticide	Rice, Apple, etc.	20	>10	>10
Flubendiamide·Flufenoxuron SC	Insecticide	Peach, etc.	20	>8.8	>8.8
Flubendiamide·Teflubenzuron SC	Insecticide	Red pepper, etc.	20	>10	>10
Flubendiamide·Thiacloprid SC	Insecticide	Rice, Red pepper, etc.	20	>10	>10
Flucetosulfuron DT	Herbicide	Rice	0.5	2.83	2.68
Flucetosulfuron GR	Herbicide	Rice	0.07	0.638	0.609
Flucetosulfuron GR	Herbicide	Lawn	0.5	>10	>10
Flucetosulfuron WG	Herbicide	Rice	10	>10	>10
Flucetosulfuron WP	Herbicide	Rice, Lawn	50	>10	>10
Flucetosulfuron·Halosulfuron-methyl DT	Herbicide	Rice	1.5	7.83	7.51
Flucetosulfuron·Halosulfuron-methyl·Mesotrione DT	Herbicide	Rice	3.3	>10	>10
Flucetosulfuron·imazaquin GR	Herbicide	Lawn	2.3	>10	>10
Flucetosulfuron·Imazaquin WG	Herbicide	Lawn	15	>10	>10
Flucetosulfuron·Imazosulfuron GG	Herbicide	Rice	1.8	10.19	8.86
Flucetosulfuron·Mesotrione·Pretilachlor GR	Herbicide	Rice	0.97	3.538	2.568
Flucetosulfuron·Pyrazosulfuron-ethyl GR	Herbicide	Rice	0.12	>10	>10

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Flucetosulfuron·Pyrazosulfuron-ethyl WG	Herbicide	Rice, Lawn	7	>10	>10
Flucetosulfuron·Pyrazolate·Simetryn GR	Herbicide	Rice	3.77	>10	>10
Fludioxonil DC	Fungicide	Rice	20	0.841	0.841
Fludioxonil FS	Fungicide	Rice, Potato, etc.	10	>10	>10
Fludioxonil FW	Fungicide	Strawberry, etc.	20	>10	>10
Fludioxonil SC	Fungicide	Cucumber, etc.	20	2.17	1.97
Flidioxoni WG	Fungicide	Rice, Cucumber, etc.	20	1.684	0.827
Fludioxonil WP	Fungicide	Lawn, etc.	50	0.507	0.466
Fludioxonil·Metalaxyl-M SC	Fungicide	Red pepper, Cucumber	3.4	1.114	0.915
Fludioxonil·Iminocadine triacetate SC	Fungicide	Rice	20	1.739	1.739
Fludioxonil·Isotianil·Imidacloprid WS	Insecti-Fungicide	Rice	43	>8.91	>8.91
Fludioxonil·Penthiopyrad SC	Fungicide	Cucumber	18	0.552	0.552
Fludioxonil·Prochloraz FS	Fungicide	Rice	13.77	2.002	1.859
Fludioxonil·Prochloraz SC	Fungicide	Rice	33	1.551	1.434
Fluensulfone EC	Insecticide	Melon, etc.	40	2.843	2.72
Flufenoxuron EC	Insecticide	Strawberry, Melon	5	0.66	0.6
Flufenoxuron·Indoxacarb WP	Insecticide	Red pepper, etc.	4.5	3.152	3.039
Flufenoxuron·Metaflumizone SC	Insecticide	Chinese cabbage, etc.	8.5	1.111	0.585
Flufenoxuron·Sulfoxaflor SC	Insecticide	Apple, etc.	10.2	>10	>10
Flumioxazin·Glyphosate isopropylamine SC	Herbicide	Orange, Apple	29.5	>10	>10
Fluopicolide·Iprovalicarb SC	Fungicide	Red pepper, etc.	16	6.72	4.83
Fluopicolide·Propamocarb hydrochloride SC	Fungicide	Red pepper, etc.	55	>10	>10
Fluopyram SC	Fungicide	Watermelon, etc.	40	>9.9	>9.9
Fluopyram·Tebuconazole SC	Fungicide	Pear, Apple	35.4	7.863	7.863
Fluopyram·Trifloxystrobin SC	Fungicide	Cucumber, etc.	42.6	0.12	0.102
Fluopyram GR	Insecticide	Cucumber, etc.	0.5	4.78	4.25
Flupoxam WG	Herbicide	Lawn	50	2.1	2.1
Flupyradifurone SL	Insecticide	Red pepper, etc.	17.09	>100	>100
Fluquinconazole WP	Fungicide	Apple, etc.	25	>10	>10
Fluquinconazole GR	Fungicide	Garlic, etc.	2	5.81	4.68
Fluquinconazole·Tebuconazole GR	Fungicide	Garlic, etc.	3	>10	>10
Fluquinconazole·Tetraconazole SE	Fungicide	Persimmon, etc.	21	7.26	6.33
Fluquinconazole·Trifloxystrobin SC	Fungicide	Persimmon, etc.	28	0.04	0.04
Fluquinconazole·Prochloraz manganese PA	Fungicide	Apple, Watermelon	2.4	1.896	1.726
Fluquinconazole·Prochloraz manganese WP	Fungicide	Persimmon, etc.	30	2.804	2.339
Fluquinconazole·Propineb WP	Fungicide	Persimmon, etc.	66	>10	>10
Fluquinconazole·Primethanil SC	Fungicide	Apple, etc.	35	>10	>10
Fluroxypyr-mepthyl EC	Herbicide	Lawn	20	2.9	2.69
Fluroxypyr-mepthyl·Triclopyr TEA ME	Herbicide	Noncropland, Lawn	32.5	>9.111	>9.111
Flusilazole·Kresoxim-methyl SC	Fungicide	Persimmon, etc.	11.5	0.256	0.241
Flusulfamide DP	Fungicide	Chinese cabbage, leaf mustard	0.3	0.19	0.18
Flusulfamide FG	Fungicide	Chinese cabbage, etc.	0.3	0.46	0.32

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Flusulfamide GR	Fungicide	Chinese cabbage	0.2	0.294	0.211
Flusulfamide SC	Fungicide	Chinese cabbage	12.5	0.36	0.23
Flusulfamide·Flutolanil DP	Fungicide	Chinese cabbage	1.3	1.434	0.664
Flusulfamide·Fluxapyroxad FG	Fungicide	Chinese cabbage	0.42	0.29	0.21
Fluthiacet-methyl·Glufosinate- ammonium ME	Herbicide	Potato, etc.	12.2	>9.814	>9.814
Flutianil EC	Fungicide	Red pepper, etc.	5	0.669	0.577
Flutianil SC	Fungicide	Cucumber	2	>4.272	>4.165
Flutolanil GR	Fungicide	Rice, etc.	7	9.706	8.221
Flutolanil WG	Fungicide	Lawn	60	51.52	11.83
Flutolanil·Hymexazol WP	Fungicide	Rice	40	>9.933	>9.933
Flutolanil·Isoprothiolane EC	Fungicide	Garlic, Lawn	32	5.47	5.47
Flutolanil·Isoprothiolane WP	Fungicide	Garlic, Lawn	45	5.36	4.91
Flutolanil·Metalaxyl-M GR	Fungicide	Red pepper	3.5	6.83	4.71
Flutolanil·Propamocarb hydrochloride SC	Fungicide	Red pepper, Lawn	40	>10	>10
Fluxapyroxad GR	Fungicide	Onion, Garlic	0.4	0.295	0.191
Fluxapyroxad SC	Fungicide	Pear, etc.	15.3	0.37	0.28
Fluxapyroxad·Kresoxim-methyl SC	Fungicide	Apple, etc.	24	1.029	0.967
Fluxapyroxad·Metrafenone SC	Fungicide	Melone, etc.	17.1	0.43	0.41
Fluxapyroxad·Pyraclostrobin SC	Fungicide	Persimmon, etc.	12.9	0.029	0.024
Folpet WP	Fungicide	Apple, etc.	50	2.926	2.926
Foramsulfuron OD	Herbicide	Lawn	2.3	0.24	0.18
Fosetyl-AI WG	Fungicide	Lawn	79.7	>10	>10
Fosetyl-AI WP	Fungicide	Cucumber, etc.	80	>10	>10
Fosthiazate GR	Insecticide	Tomato, etc.	5	>9.675	>9.675
Fosthiazate SL	Insecticide	Melon, etc.	30	11.7	11.1
Gamma-cyhalothrin CS	Insecticide	Persimmon, etc.	1.4	0.0036	0.0027
Gamma-cyhalothrin·Imidacloprid ZC	Insecticide	Red pepper, etc.	9.35	0.0251	0.0077
Gibberellic acid SP	Plant growth regulator	Grape, etc.	3.1	>10	>10
Gibberellic acid·Gibberellin A4+7 PA	Plant growth regulator	Pear	2.7	>10	>10
Gibberellic acid·Gibberellin A4+7 SP	Plant growth regulator	Pear, Apple	4	>10	>10
Gibberellic acid·Gibberellin A4+7·6-Benzyl aminopurine SL	Plant growth regulator	Apple	3.6	5.9	5.9
Gibberellic acid·Prohydrojasmon SL	Plant growth regulator	Pear	2	2.22	2.15
Glufosinate ammonium SL	Herbicide	Apple, etc.	18	>10	>10
Glufosinate ammonium·Glyphosate- isopropylamine SL	Herbicide	Apple, etc.	44	4.311	3.983
Glufosinate ammonium·MCPA SL	Herbicide	Apple, etc.	21	>10	>10
Glufosinate ammonium·MCPA SL	Herbicide	Orange, etc.	22	>10	>10
Glufosinate-P SL	Herbicide	Orange, etc.	9.8	9.313	9.313
Glyphosate ammonium SG	Herbicide	Apple	74	5.605	4.875
Glyphosate ammonium SL	Herbicide	Apple, etc.	41	>10	>10
Glyphosate ammonium SL	Herbicide	Apple, etc.	16.2	>10	>10

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Glyphosate-isopropylamine SL	Herbicide	Apple, etc.	41	>10	>10
Glyphosate-isopropylamine SL	Herbicide	Apple, etc.	13.5	7.85	7.18
Glyphosate-isopropylamine·MCPA SL	Herbicide	Apple, etc.	39	>10	>10
Glyphosate-isopropylamine·MCPA SL	Herbicide	Orange, etc.	37	>10	>10
Glyphosate-isopropylamine·Mecoprop P SL	Herbicide	Noncropland, etc.	27.6	3.5	3.5
Glyphosate-isopropylamine·Mecoprop SL	Herbicide	Noncropland	31	2.566	2.566
Glyphosate-isopropylamine·Oxyfluorfen ME	Herbicide	Orange	21	4.9	3.3
Glyphosate-isopropylamine·Oxyfluorfen SC	Herbicide	Apple, etc.	43	>10	>10
Glyphosate ammonium·Oxyfluorfen WG	Herbicide	Apple	38	9.426	9.206
Glyphosate-isopropylamine·Pyraflufen-ethyl SC	Herbicide	Apple, etc.	30.15	>10	>10
Glyphosate potassium SL	Herbicide	Orange	44.75	>10	>10
Halosulfuron-methyl GR	Herbicide	Rice	0.2	>10	>10
Halosulfuron-methyl·MCPA·Pyriminobac-methyl GR	Herbicide	Rice	0.78	>10	>10
Halosulfuron-methyl·Mefenacet GG	Herbicide	Rice	22.1	14.987	12.727
Halosulfuron-methyl·Mefenacet GG	Herbicide	Rice	11.04	>10	>10
Halosulfuron-methyl·Mefenacet GR	Herbicide	Rice	3.7	>10	>10
Halosulfuron-methyl·Mefenacet SC	Herbicide	Rice	21.08	65.36	40.01
Halosulfuron-methyl·Mefenacet·Pyriminobac-methyl GR	Herbicide	Rice	27.36	>10	>10
Halosulfuron-methyl·Mefenacet·Thiobencarb GR	Herbicide	Rice	6.68	3.02	2.9
Halosulfuron-methyl·Mesotrione·Penoxsulam GR	Herbicide	Rice	0.56	>10	>10
Halosulfuron-methyl·Oxaziclomefone GR	Herbicide	Rice	0.38	>10	>10
Halosulfuron-methyl·Pretilachlor·Pyriminobac-methyl GR	Herbicide	Rice	1.28	5.044	4.129
Halosulfuron-methyl·Pyriminobac-methyl DT	Herbicide	Rice	2.22	>10	>10
Halosulfuron-methyl·Pyriminobac-methyl GG	Herbicide	Rice	3.36	>10	>10
Halosulfuron-methyl·Pyriminobac-methyl GG	Herbicide	Rice	0.28	>10	>10
Hexaconazole EC	Fungicide	Rice, Lawn, etc.	10	2.61	2.31
Hexaconazole GR	Fungicide	Rice, Red pepper, etc.	1	3.48	3.08
Hexaconazole SC	Fungicide	Pear, etc.	2	2.4097	2.4097
Hexaconazole SC	Fungicide	Persimmon, etc.	5	0.638	0.638
Hexaconazole WG	Fungicide	Barley, etc.	2	6.403	5.867
Hexaconazole WP	Fungicide	Apple, etc.	5	2.16	1.56
Hexaconazole·Iprobenfos GR	Fungicide	Rice	14.3	>10	>10
Hexaconazole·Isoprothiolane GR	Fungicide	Garlic, Onion	14	6.62	5.52
Hexaconazole·Metalaxyl GR	Fungicide	Garlic, etc.	2.5	8.973	8.387
Hexaconazole·Metalaxyl WP	Fungicide	Lawn	18	2.21	1.9
Hexaconazole·Pencycuron SC	Fungicide	Rice, Lawn	17	5.88	4.32
Hexaconazole·Prochloraz EC	Fungicide	Rice, Red pepper	26	1.41	1.36
Hexaconazole·Tebuconazole EC	Fungicide	Lawn	10	0.477	0.477
Hexaconazole·Tebuconazoel EC	Fungicide	Apple	26.5	3.373	3.373
Hexaconazole·Tebuconazole SC	Fungicide	Apple, Lawn	21	4.51	4.4
Hexaconazole·Tefluthrin GR	Insecti-Fungicide	Red pepper, etc.	2	0.0012	0.0012
Hexaconazole·Thifluzamide GR	Fungicide	Rice, Onion, etc.	3	19.439	14.815

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Hexaconazole·Thiifluzamide SC	Fungicide	Rice, Garlic, etc.	7	3.41	3.29
Hexaconazole·Tiadinil SC	Fungicide	Rice	25	7.4	7.4
Hexaconazole·Tricyconazol SC	Fungicide	Rice	27	18.36	18.36
Hexaconazole·Validamycin-A ME	Fungicide	Lawn	10	4.583	4.2
Hexythiazox WP	Insecticide	Orange, etc.	10	>10	>10
Hymexazol DP	Fungicide	Rice	4	>10	>10
Hymexazol GR	Fungicide	Rice	4	>10	>10
Hymexazol SG	Fungicide	Rice	30	>10	>10
Hymexazol SL	Fungicide	Rice, Lawn, etc.	30	>10	>10
Hymexazol·Metalaxyl DP	Fungicide	Rice	4.5	>2	>2
Hymexazol·Metalaxyl-M DP	Fungicide	Rice	4.25	>10	>10
Hymexazol·Metalaxyl-M SL	Fungicide	Rice, Lawn	32	6.68	6.68
Imazaquin GR	Herbicide	Lawn	3	>10	>10
Imazaquin SL	Herbicide	Lawn	20	>10	>10
Imazaquin·Pendimethalin GR	Herbicide	Lawn	3.5	23	16
Imazaquin·Pendimethalin SE	Herbicide	Lawn	22	2.946	2.578
Imazosulfuron·Indanofan SC	Herbicide	Rice	3.9	3.587	3.335
Imazosulfuron·Mefenacet SC	Herbicide	Rice	21.5	>10	>10
Imazosulfuron·Mefenacet·Metamifop SC	Herbicide	Rice	18.3	3.76	3.76
Imazosulfuron·Mefenacet·Tefuryltrion SC	Herbicide	Rice	26.5	>8.706	>8.706
Imazosulfuron·Mefenacet·Thiobencarb GR	Herbicide	Rice	6.75	3.21	3.06
Imazosulfuron·Methamifop GR	Herbicide	Rice	0.55	5.739	4.97
Imazosulfuron·Oxaziclomefone GR	Herbicide	Rice	0.45	>10	>10
Imazosulfuron·Penoxsulam SC	Herbicide	Rice	1.98	>10	>10
Imazosulfuron·Pentoxazone GR	Herbicide	Rice	1.05	>10	>10
Imazosulfuron·Pyrazolate·Simetryn GR	Herbicide	Rice	3.88	>10	>10
Imazosulfuron·Pyriminobac-methyl GG	Herbicide	Rice	4.2	>10	>10
Imazosulfuron·Pyriminobac-methyl GR	Herbicide	Rice	0.35	>10	>10
Imazosulfuron·Pyriminobac-methyl SC	Herbicide	Rice	2.1	>10	>10
Imibenconazole EC	Insecticide	Chrysanthemum	5	0.600	0.600
Imibenconazole WP	Fungicide	Apple, etc.	15	4.51	2.87
Imicyafos GR	Insecticide	Melon, etc.	5	>9.7	>9.7
Imicyafos SL	Insecticide	Chrysanthemum, etc.	30	>9.813	>9.813
Imidacloprid AL	Insecticide	Chrysanthemum	0.005	2.04	1.79
Imidacloprid DC	Insecticide	Pine, etc.	20	>10	>10
Imidacloprid FG	Insecticide	Red pepper, etc.	1	>10	>10
Imidacloprid GR	Insecticide	Rice, Red pepper, etc	2	>10	>10
Imdacloprid ME	Insecticide	Red pepper, etc.	20	>10	>10
Imidacloprid SC	Insecticide	Rice, Apple, etc.	8	>10	>10
Imidacloprid SG	Insecticide	Rice, Apple, etc.	25	>10	>10
Imidacloprid SL	Insecticide	Rice, Apple	4	>10	>10
Imidacloprid WG	Insecticide	Pear, etc.	68	>10	>10
Imidacloprid WP	Insecticide	Apple, etc.	10	>10	>10
Imidacloprid·Lambda-cyhalothrin WP	Insecticide	Red pepper, etc.	11	0.013	0.013

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Imidacloprid·Methiocarb WP	Insecticide	Orange, etc.	23	>10	>10
Imidacloprid·Methoxyfenozide WP	Insecticide	Rice, Chinese cabbage, etc.	12	8.79	6.64
Imidacloprid·Spinetoram SC	Insecticide	Red pepper, etc.	12	>10	>10
Imidacloprid·Spinosad SC	Insecticide	Orange, etc.	15	>10	>10
Imidacloprid·Spirotetramat SC	Insecticide	Red pepper, etc.	22	6.365	6.217
Imidacloprid·Tebufenzide WP	Insecticide	Rice, Orange	8.6	>10	>10
Imidacloprid·Thiocyclam hydrogen oxalate WP	Insecticide	Pear	23	1.54	1.21
Imidacloprid·Novaluron SC	Insecticide	Orange, Apple	11.5	>10	>10
Iminoctadine triacetate SL	Fungicide	Apple, etc.	25	12.6	7.2
Iminoctadine triacetate·Penthiopyrad SC	Fungicide	Red pepper, etc.	20.5	3.517	2.924
Iminoctadine triacetate·Thiophanate-methyl PA	Fungicide	Apple	4	5.47	2.81
Iminoctadine tris(albesilate) EW	Fungicide	Persimmon, etc.	30	8.866	6.394
Iminoctadine tris(albesilate) SC	Fungicide	Cucumber, etc.	30	>10	>10
Iminoctadine tris(albesilate) WP	Fungicide	Green tea, etc.	40	>10	>10
Iminoctadine tris(albesilate)·Polyoxin-B WP	Fungicide	Ginseng, etc.	30	5.94	5.7
Iminoctadine tris(algesilate)·Pyribencarb WP	Fungicide	Cucumber, etc.	25	2.014	1.839
Iminoctadine tris(albesilate)·Thiophanate-methyl WP	Fungicide	Orange, etc.	60	12.37	11.81
Indaziflam SC	Herbicide	Apple, etc.	19.05	0.6	0.6
Indoxacarb EC	Insecticide	Red pepper, etc.	4	0.29	0.2
Indoxacarb SC	Insecticide	Rice, Chinese cabbage, etc.	5	0.62	0.53
Indoxacarb WG	Insecticide	Chinese cabbage, etc	30	1.604	1.604
Indoxacarb WP	Insecticide	Chinese cabbage, etc	10	1.623	1.511
Indoxacarb·Spinosad WG	Insecticide	Orange, etc.	14	2.91	1.86
Indoxacarb·Teflubenzuron WP	Insecticide	Apple, etc.	3	3.8	3.8
Indoxacarb·Novaluron SC	Insecticide	Persimmon, etc.	9.75	3.06	1.37
Iodosulfuron-methyl sodium WG	Herbicide	Lawn	10	>10	>10
Ipconazole FS	Fungicide	Rice	8	1.6	1.6
Ipfencarbazone·Pyrazosulfuron-ethyl·Tefuryltrione GR	Herbicide	Rice	1.6	>8.985	>8.985
Ipfencarbazone·Tefuryltrione SC	Herbicide	Rice	11	3.715	3.639
Iprobenfos EC	Fungicide	Rice	48	>10	>10
Iprobenfos GR	Fungicide	Rice	17	14.583	12.844
Iprobenfos·Metconazole GR	Plant growth regulator	Rice	13.7	>10	>10
Iprodione SC	Fungicide	Apple, etc.	43	4.26	4.26
Iprodione·Thiophanate-methyl WP	Fungicide	Apple, etc.	70	>2	>2
Iprodione·Trifloxystrobin SC	Fungicide	Lawn	24.4	1.526	1.437
Iprodione·Trifloxystrobin WG	Fungicide	Red pepper, etc.	38	0.3	0.27
Iprovalicarb·Propineb WP	Fungicide	Grape, etc.	66	>10	>10
Iprovalicarb·Zoxamide WP	Fungicide	Cucumber, etc.	22	>10	>10
Isofetamide SC	Fungicide	Orange, etc.	36	39	35
Isoprothiolane EC	Fungicide	Rice	40	2.570	2.379

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Isoprothiolane GR	Fungicide	Rice, Apple, etc.	12	13.0	8.7
Isopyrazam EC	Fungicide	Cucumber, etc.	12.57	0.022	0.0155
Isotianil SC	Fungicide	Rice	18	>10	>10
Isotianil·Chlorantraniliprole·Clothianidin GR	Insecti-Fungicide	Rice	1.9	>5.39	>5.39
Isotianil·Chlorantraniliprole·Imidaclopride GR	Insecti-Fungicide	Rice	2.9	>5.31	>5.31
Isotianil·Clothianidin GR	Insecti-Fungicide	Rice	1.5	>10	>10
Isotianil·Fipronil GR	Insecti-Fungicide	Rice	1.6	1.683	1.482
Isotianil·Penflufen·Fipronil GR	Insecti-Fungicide	Rice	3.1	0.508	0.46
Isotianil·Prochloraz-manganese·Fipronil FS	Insecti-Fungicide	Rice	15.75	1.21	1.21
Isotianil·Thiacloprid GR	Insecti-Fungicide	Rice	2	10.661	4.65
Isotianil·Thifluzamide·Clothianidin GR	Insecti-Fungicide	Rice	4.5	>10	>10
Isoxaben SC	Herbicide	Lawn	50	>2	>2
Kasugamycin SL	Fungicide	Rice, Red pepper, etc.	2.3	>2	>2
Kasugamycin WG	Fungicide	Red pepper, etc.	10	>10	>10
Kasugamycin WG	Insecti-Fungicide	Apple, etc.	36	>10	>10
Kasugamycin·Oryastrobin SC	Fungicide	Rice	7	1.08	1.021
Kasugamycin·Polyoxin D WG	Fungicide	Rice, Red pepper, etc.	13	>10	>10
Kasugamycin·Thiophanate-methyl SC	Fungicide	Rice, Red pepper etc.	39.35	>10	>10
Kasugamycin·Tricyclazole SC	Fungicide	Rice	22	12	11.45
Kasugamycin·Tricyclazole WP	Fungicide	Rice	22	11.597	11.231
Kasugamycin·Validamycin A·Clothianidin SL	Insecti-Fungicide	Rice	8.5	5.92	5.754
Kresoxim-methyl SC	Fungicide	Apple, etc.	44.2	0.36	0.34
Kresoxim-methyl WG	Fungicide	Apple, etc.	47	0.583	0.538
Kresoxim-methyl·Metconazole WG	Fungicide	Persimmon, etc.	30	0.368	0.339
Kresoxim-methyl·Triflumizole SC	Fungicide	Orange, etc.	35	0.769	0.64
Lambda-cyhalothrin DP	Insecticide	Chinese cabbage	0.2	0.511	0.511
Lambda-cyhalothrin EC	Insecticide	Apple, etc.	1	0.00067	0.00066
Lambda-cyhalothrin EW	Insecticide	Apple, etc.	3	0.00035	0.00035
Lambda-cyhalothrin ME	Insecticide	Persimmon, etc.	3	0.00074	0.00074
Lambda-cyhalothrin WP	Insecticide	Apple, etc.	1	0.076	0.076
Lambda-cyhalothrin·Imidacloprid WP	Insecticide	Red pepper, etc.	11	0.013	0.013
Lambda-cyhalothrin·Lufenuron EC	Insecticide	Persimmon, etc.	5	0.004	0.003
Lambda-cyhalothrin·Sulfoxaflor SL	Insecticide	Red pepper, etc.	8.2	0.003994	0.003675
Lambda-cyhalothrin·Thiamethoxam SG	Insecticide	Orange, etc.	8.1	0.008881	0.008591
Lepimectin EC	Insecticide	Red pepper, etc.	2	0.015	0.015
Lime sulfur GR	Fungicide	Chinese cabbage, Orange	40	3.97	2.36
Linuron WP	Herbicide	Onion, etc.	50	7.7	7.11
Linuron·Pendimethalin GR	Herbicide	Potato, etc.	3.7	4.81	4.33
Linuron·Thiobencarb EC	Herbicide	Potato, etc.	70	2.91	2.46
Lufenuron EC	Insecticide	Chinese cabbage, etc.	5	0.46	0.46
Lufenuron EW	Insecticide	Red pepper, Chinese cabbage	5	3.3	2.63
Mancozeb WP	Fungicide	Apple, etc.	75	1.04	1.04
Mancozeb·Metalaxyl WP	Fungicide	Sesame, etc.	63.5	>10	>10

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Mancozeb·Myclobutanil WP	Fungicide	Apple, etc.	67	>2	>2
Mancozeb·Oxadixyl WP	Fungicide	Potato, etc.	64	5.4	4.61
Mandestrobin SC	Fungicide	Persimmon, etc.	40	1.589	1.52
Mandipropamid SC	Fungicide	Red pepper, etc.	22.59	>10	>10
MCPA SL	Herbicide	Rice, Lawn	50	>10	>10
MCPA·Metazosulfuron GR	Herbicide	Rice	1.33	>10	>10
Mefenacet·Metazosulfuron GR	Herbicide	Rice	3.83	>10	>10
Mefenacet·Penoxsulam SC	Herbicide	Rice	21.5	6.7	6.32
Mefenacet·Pyrazosulfuron-ethyl GR	Herbicide	Rice	3.57	>10	>10
Mefenacet·Pyrazosulfuron-ethyl SC	Herbicide	Rice	21.42	32.32	22.8
Mefenacet·Pyrimisulfan GR	Herbicide	Rice	3.72	>10.2	>10.2
Mefenacet·pyrimisulfan SC	Herbicide	Rice	16	10.163	5.261
Mefenacet·Pyrimisulfan UG	Herbicide	Rice	32	>91.7	>91.7
Mefenacet·Tefuryltrione SC	Herbicide	Rice	24.2	7.176	6.843
Mepanipyrim SC	Fungicide	Grape, etc.	40	>10	2.91
Mepanipyrim WP	Fungicide	Strawberry, etc.	50	>10	>10
Mepanipyrim·Myclobutanil SC	Fungicide	Strawberry, etc.	11.5	1.94	1.77
Mepiquat chloride SL	Plant growth regulator	Grape	44	>10	>10
Meptyldinocap EW	Fungicide	Cucumbr, etc.	24	0.15	0.083
Mesotrione·Metazosulfuron GR	Herbicide	Rice	0.63	>17.333	>17.333
Mesotrione·Penoxsulam SC	Herbicide	Rice	2.28	>10	>10
Mesotrione·Penoxsulam·Pretilachlor GR	Herbicide	Rice	1.38	5.741	3.911
Mesotrione·Pretilachlor GR	Herbicide	Rice	4.6	2.017	1.614
Metaflumizone EC	Insecticide	Rice, Persimmon etc.	20	1.617	1.205
Metaflumizone SC	Insecticide	Rice, Chinese cabbage, etc.	20	7.057	5.627
Metalaxyl GR	Fungicide	Rice, Tobacco, etc.	1	>10	>10
Metalaxyl GR	Fungicide	Rice, Sesame, etc.	2	20.47	15.7
Metalaxyl WP	Fungicide	Rice, Chinese cabbage, etc.	25	>10	>10
Metalaxyl·Imidacloprid GR	Insecti-Fungicide	Red pepper, Sesame.	4.7	>10.626	>10.645
Metalaxyl·Tebuconazole GR	Fungicide	Red pepper, Garlic.	3	>10	>10
Metalaxyl-M EC	Fungicide	Tobacco, etc.	48	10.1	10.1
Metalaxyl-M SL	Fungicide	Rice, Tobacco, etc.	45.28	9.563	9.341
Metalaxyl-M WP	Fungicide	Rice, Tobacco, etc.	12	>10	>10
Metamifop·Pyrazosulfuron-ethyl GR	Herbicide	Rice	0.37	3.207	2.819
Metam sodium SL	Insecti-Fungicide	Pine, Melon	25	0.588	0.355
Metam sodium SL	Insecti-Fungicide	Potato, etc.	42	0.41	0.35
Metazosulfuron DT	Herbicide	Rice	4	>8.01	>8.01
Metazosulfuron DT	Herbicide	Rice	2	>10	>10
Metazosulfuron GR	Herbicide	Rice	0.33	30.6	30.6
Metazosulfuron SC	Herbicide	Rice	2	>8.98	>8.98
Metazosulfuron WG	Herbicide	Rice	33.33	>10	>10
Metazosulfuron WP	Herbicide	Rice	10	>10.76	>10.76

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Metazosulfuron·Oxaziclomefone SC	Herbicide	Rice	2.8	>10	>10
Metazosulfuron·Pretilachlor GR	Herbicide	Rice	6.7	4.106	2.782
Metazosulfuron·Tefuryltrione DT	Herbicide	Rice	9.2	>10	>10
Metconazole GR	Fungicide	Garlic, etc.	0.75	4.111	2.306
Metconazole SC	Fungicide	Persimmon, etc.	20	4.67	4.65
Metconazole WG	Fungicide	Garlic, Apple	20	3.641	3.504
Metconazole·Bifenthrin EC	Insecti-Fungicide	Garlic, Onion	17	0.00566	0.005384
Metconazole·Bifenthrin GR	Insecti-Fungicide	Garlic	1.2	0.007022	0.006452
Metconazole·Pyraclostrobin SC	Fungicide	Persimmon, etc.	17	0.057	0.056
Metconazole·Thiophanate-methyl WG	Fungicide	Persimmon, etc.	56	>10	>10
Methiram WG	Fungicide	Orange, etc.	55	>10	>10
Methoxyfenozide SC	Insecticide	Rice, Chinese cabbage, etc.	21	>10	>10
Methoxyfenozide WP	Insecticide	Rice, Chinese cabbage, etc.	4	>10	>10
Metrafenone SC	Fungicide	Red pepper, etc.	25.2	>9.28	>9.28
Myclobutanil WP	Fungicide	Red pepper, etc.	6	6.41	6.41
1-naphtylacetamide DP	Plant growth regulator	Carnation	0.4	>10	>10
Napropamide GR	Herbicide	Tobacco, etc.	5	>10	>10
Napropamide EC	Herbicide	Red pepper, etc.	21.8	>10	>10
Napropamide SC	Herbicide	Red pepper, etc.	30	9.6	9.35
Napropamide WG	Herbicide	Lawn	49.5	>10	>10
Napropamide WP	Herbicide	Orange, etc.	50	>10	>10
Napropamide·Oxyfluorfen WP	Herbicide	Garlic, Lawn	42	8.09	7.89
Napropamide·Pendimethalin GR	Herbicide	Potato, Red pepper	5	>10	>10
Needs·Polyoxyethylene fatty acid ester ME	Plant growth regulator	Apple	62	6.11	5.71
Nicosulfuron SC	Herbicide	Corn	4	1.26	1.17
Nonyl phenol sulfonic acid copper WP	Fungicide	Watermelon, etc.	96.5	0.569	0.355
Novaluron SC	Insecticide	Apple, etc.	10	4.84	3.77
Ofurace·Propamocarb hydrochloride WP	Fugicide	Tomato, Grape	24	>10	>10
Orthosulfamuron·Pretilachlor GR	Herbicide	Rice	1.2	3.54	2.83
Orysastrobin SC	Fungicide	Rice	12	1.081	1.009
Orysastrobin·Benfuracarb GR	Insecti-Fungicide	Rice	7.1	0.85	0.8
Orysastrobin·Benfuracarb·Chlorantraniliprole GR	Insecti-Fungicide	Rice	6.8	0.73	0.67
Orysastrobin·Chlorantraniliprole GR	Insecti-Fungicide	Rice	3.9	3.27	2.2
Orysastrobin·Chlorantraniliprole WS	Insecti-Fungicide	Rice	40	1.272	1.272
Orysastrobin·Clothianidin GR	Insecti-Fungicide	Rice	4	3.8	3.67
Orysastrobin·Fipronil GR	Insecti-Fungicide	Rice	2.8	2.458	1.655
Orysastrobin·Probenazole·Fipronil GR	Insecti-Fungicide	Rice	8.6	1	0.79
Orysastrobin·Prochloraz-manganese·Fipronil GR	Insecti-Fungicide	Rice	3.6	0.929	0.562
Orysastrobin·Thiamethoxam GR	Insecti-Fungicide	Rice	4.5	3.726	2.433
Orysastrobin·Tricyclazole·Fipronil GR	Insecti-Fungicide	Rice	3.6	>4.264	>4.264
Orysastrobin·Triticonazole·Clothianidin WS	Insecti-Fungicide	Rice	46	1.51	1.34

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Oryzalin·Pendimethalin EC	Herbicide	Lawn	28	0.31	0.29
Oxadiazyl EC	Herbicide	Rice	1.7	0.9	0.83
Oxadiazyl SC	Herbicide	Lawn	34.5	>10	>10
Oxadiazyl·Oxadiazon EC	Herbicide	Rice	6.2	1.47	1.47
Oxadiazon EC	Herbicide	Rice	12	2.7	2.7
Oxadiazon·Pretilachlor EW	Herbicide	Rice	18	2.32	1.9
Oxathiapiprolin SC	Fungicide	Onion, etc.	4	>10.7	>10.7
Oxaziclomefene·Penoxsulam GR	Herbicide	Rice	0.28	6.97	6.97
Oxaziclomefene·PenoxsulamTefuryltrione GR	Herbicide	Rice	1	>10	>10
Oxaziclomefene·Pyrazosulfuron-ethyl WG	Herbicide	Rice	17.75	>10	>10
Oxaziclomefene·Tefuryltrione DT	Herbicide	Rice	7.6	>10	>10
Oxaziclomefene·Tefuryltrione GR	Herbicide	Rice	1.27	>9.587	>9.587
Oxaziclomefene·Tefuryltrione SC	Herbicide	Rice	7.2	>10	>10
Oxaziclomefene·Tefuryltrione SC	Herbicide	Rice	2.6	>10	>10
Oxine-copper WP	Fungicide	Apple, etc.	50	0.17	0.15
Oxolinic acid SC	Fungicide	Chinese cabbage, Peach	20	>10	>10
Oxolinic acid WG	Fungicide	Chinese cabbage, etc.	20	>10	>10
Oxolinic acid WP	Fungicide	Rice, Chinese cabbage, etc.	20	>10	>10
Oxolinic acid·Oxytetracycline WP	Fungicide	Orange, etc.	20	>10	>10
Oxolinic acid·Streptomycin WP	Fungicide	Rice, Peach, etc.	25	>10	>10
Oxolinic acid·Streptomycin WP	Fungicide	Peach, etc.	20	13.679	12.893
Oxolinic acid·Validamycin-A WP	Fungicide	Red pepper, etc.	20	>10	>10
Oxycarboxin WP	Fungicide	Chrysanthemum	75	>10	>10
Oxytetracycline WP	Fungicide	Jujube, etc.	17	>10	>10
Oxytetracycline·Streptomycin sulfate salt SG	Fungicide	Orange, etc.	20.3	>10	>10
Oxytetracycline·Streptomycin sulfate salt WP	Fungicide	Orange, etc.	20.3	>10	>10
Paclobutrazole SC	Plant growth regulator	Lettuce, etc.	0.39	14.9	14.9
Paclobutrazole SC	Plant growth regulator	Lawn	22.9	>100	>100
Paraffin wax EW	Others	Red pepper, etc.	24	>10	>10
Paraffinic oil EC	Insecticide	Orange, etc.	98	>10	>10
Pencycuron GR	Fungicide	Garlic, etc.	3	>7.561	>6.764
Pencycuron SC	Fungicide	Rice, Lawn, etc.	20	>2	>2
Pencycuron WG	Fungicide	Lawn	50	>10	>10
Pencycuron WP	Fungicide	Rice, Lawn	25	>10	>10
Pencycuron·Tebuconazole SC	Fungicide	Rice, Lawn, etc.	24	>10	>10
Pencycuron·Tebuconazole SC	Fungicide	Lawn, Garlic	25	>10	>10
Pencycuron·Thifluzamide EC	Fungicide	Rice, Lawn, etc.	7	1.25	1.22
Pendimethalin EW	Plant growth regulator	Tobacco	3	1.48	1.11
Pendimethalin GR	Herbicide	Rice, Potato, etc.	5	1.32	1.18
Pendimethalin SC	Herbicide	Lawn	45	1.82	1.62

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Pendimethalin·Pretilachlor EC	Herbicide	Rice	16	0.5	0.5
Pendimethalin·Thiobencarb GR	Herbicide	Potato, etc.	7.5	4.35	2.42
Penoxsulam GR	Herbicide	Rice	0.12	>10	>10
Penoxsulam GR	Herbicide	Rice	0.08	>10	>10
Penoxsulam SC	Herbicide	Rice	0.6	1.58	1.28
Penoxsulam SC	Herbicide	Rice, Lawn	3	>10	>10
Penoxsulam·Pyrazosulfuron-ethyl GR	Herbicide	Rice, Lawn	0.13	10.24	8.81
Penoxsulam·Pyrazosulfuron-ethyl WG	Herbicide	Rice, Lawn	11	>10	>10
Penoxsulam·Tefuryltrione DT	Herbicide	Rice	9.4	>10	>10
Penoxsulam·Thiobencarb GR	Herbicide	Rice	7.08	3.428	3.313
Penthiopyrad EC	Fungicide	Strawberry, etc.	20	0.361	0.288
Penthiopyrad SC	Insecticide	Pear, etc.	15	0.428	0.384
Penthiopyrad WG	Fungicide	Lawn	50	0.511	0.431
Penthiopyrad·Picoxystrobin SC	Fungicide	Cucumber, etc.	26	0.098	0.094
Penthiopyrad·Tebuconazole SC	Fungicide	Persimmon, etc.	11.5	0.888	0.836
Pentoxazone EC	Herbicide	Rice	6	0.68	0.45
Pentoxazone GR	Herbicide	Rice	0.8	5.74	5.74
Pentoxazone SC	Herbicide	Rice	5	9.2	9.2
Pentoxazone·Pretilachlor SE	Herbicide	Rice	17	1.27	1.03
Phenthoate EC	Insecticide	Rice, Apple, etc.	47.5	3.02	2.64
Phorate·Terbufos GR	Insecticide	Garlic, Potato	4.5	0.25	0.25
Phoxim GR	Insecticide	Red pepper	2	>2	>2
Phthalide·Tricyclazole WP	Fungicide	Rice	33	>10	>10
Phthalide·Validamycin-A SC	Fungicide	Rice	25	>2	>2
Picarbutrazox SC	Fungicide	Onion	10	>9.707	>9.707
Picoxystrobin SC	Fungicide	Red pepper, etc.	25	0.028	0.028
Picoxystrobin WG	Fungicide	Cucumber, etc.	25	0.042	0.036
Polyether modified polysiloxane SL	Others	Red pepper, etc.	99	3.77	3.57
Polyoxin D zinc salt WP	Fungicide	Rice, Melon, etc.	2.25	>2	>2
Polyoxin B SP	Fungicide	Cucumber, etc.	50	>10	>10
Polyoxin D zinc salt AE	Fungicide	Apple	0.55	7.04	5
Polyoxin D zinc salt WG	Fungicide	Watermelon, etc.	5	3.122	2.977
Polyoxin D zinc salt·Pyriofenone WP	Fungicide	Strawberry, etc.	6.5	>10	>10
Potassium salt of maleic hydrazide SL	Plant growth regulator	Tobacco	21.7	>10	>10
Pretilachlor EW	Herbicide	Rice	37	5.7	5.5
Pretilachlor GR	Herbicide	Rice	2	3.054	1.639
Pretilachlor·Pyraclozil SE	Herbicide	Rice	15.8	1.369	1.241
Pretilachlor·Pyrazolate GR	Herbicide	Rice	7.5	>10	>10
Pretilachlor·Pyrazosulfuron-ethyl·Pyriminobac-methyl GR	Herbicide	Rice	1.17	3.391	2.789
Pretilachlor·Pyrazosulfuron-ethyl·Simetryn GR	Herbicide	Rice	1.37	3.24	2.57
Probenazole·Benfuracarb GR	Insecti-Fungicide	Rice	13.6	1.189	0.942
Probenazole·Carbosulfan GR	Insecti-Fungicide	Rice	7.1	2.61	1.26
Probenazole·Clothianidin GR	Insecti-Fungicide	Rice	4.1	4.07	4.07

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
ProbenazoleClothianidin GR	Insecti-Fungicide	Rice	10.5	3.11	2.9
Probenazole·Fipronil FG	Insecti-Fungicide	Rice	12.6	3.651	3.651
Probenazole·Fipronil GR	Insecti-Fungicide	Rice	4.2	2.64	2.56
Probenazole·Imidacloprid GR	Insecti-Fungicide	Rice	15	2.45	1.79
Probenazole·Thifluzamide·Carbosulfan GR	Insecti-Fungicide	Rice	10.1	1.78	0.94
Probenazole·Tricyclazole GR	Fungicide	Rice	5	>10	>10
Prochloraz EC	Fungicide	Rice	25	1.588	1.522
Prochloraz EW	Fungicide	Rice	25	1.827	1.538
Prochloraz ME	Fungicide	Rice, Orchid	2	0.97	0.92
Prochloraz copper chloride complex FS	Fungicide	Rice	20	1.23	1.15
Prochloraz copper chloride complex·Tebuconazole FS	Fungicide	Rice	25	1.38	1.38
Prochloraz copper chloride complex·Tebuconazole SC	Fungicide	Rice, Red pepper, etc.	25	1.38	1.38
Prochloraz-manganese complex WG	Fungicide	Red pepper, Apple	50	2.42	2.42
Prochloraz-manganese complex WP	Fungicide	Mushroom, etc.	50	>2	>2
Prochloraz-manganese·Tebuconazole WP	Fungicide	Apple, etc.	40	3.03	2.72
Prochloraz·Triflumizole EC	Fungicide	Rice	27.5	1.45	1.18
Procymidone FW	Fungicide	Strawberry, etc.	30	>2	>2
Procymidone GP	Fungicide	Strawberry, etc.	25	>2	>2
Procymidone WP	Fungicide	Strawberry, etc.	50	7.24	7.24
Procymidone·Diethofencarb FW	Fungicide	Strawberry	30	>10	>10
Procymidone·Diethofencarb WP	Fungicide	Strawberry, Lawn	50	>10	>10
Procymidone·Mancozeb WP	Fungicide	Grape, Lawn	65	1.53	1.53
Prodiamine SC	Herbicide	Lawn	40.7	>10	>10
Prodiamine WG	Herbicide	Lawn	63	>10	>10
Prohexadione-calcium SC	Plant growth regulator	Lawn, etc.	20	>10	>10
Prohexadione-calcium WP	Plant growth regulator	Rice	1	0.53	0.53
Propamocarb hydrochloride SL	Fungicide	Tabacco, etc.	66.5	>10	>10
Propargite EC	Insecticide	Orange, Apple	57	0.27	0.26
Propiconazole EC	Fungicide	Rose, Lawn	25	1.795	1.154
Propiconazole GR	Fungicide	Rice, Garlic, etc.	1	4.66	4.21
Propiconazole·Tebuconazole SC	Fungicide	Lawn	45	6.05	5.82
Propiconazole·Tebuconazole SE	Fungicide	Red pepper, etc.	22	3.962	3.767
Propiconazole·Thiophanate-methyl SE	Fungicide	Rice, Persimmon, etc.	21	7.275	7.275
Propineb WP	Fungicide	Apple, etc.	70	2.19	2.16
Pymetrozine WG	Insecticide	Rice, Red pepper, etc.	49	>10	>10
Pymetrozine WP	Insecticide	Red pepper, etc.	25	>10	>10
Pyraclonil·Tefuryltrione DT	Herbicide	Rice	15.2	10.247	10.247
Pyraclostrobin EC	Fungicide	Orange, etc.	22.9	0.013	0.008
Pyraclostrobin SC	Fungicide	Persimmon, etc.	11	0.027	0.027
Pyraclostrobin WG	Fungicide	Pear, etc.	20	0.017	0.017

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Pyraclostrobin·Tebuconazole SC	Fungicide	Red pepper, etc.	18	0.028	0.028
Pyrazolate SC	Herbicide	Rice	36	4.52	1.55
Pyrazolate·Pyrazosulfuron-ethyl·Simetryn GR	Herbicide	Rice	3.75	11.552	9.867
Pyrazolate·Thiobencarb GR	Herbicide	Rice	13	2.04	1.44
Pyrazosulfuron-ethyl WG	Herbicide	Lawn	5	>10	>10
Pyrazosulfuron-ethyl·Pyrifthalide GR	Herbicide	Rice	0.67	>10	>10
Pyrazosulfuron-ethyl·Pyriminobac-methyl GG	Herbicide	Rice	2.04	>10	>10
Pyrazosulfuron-ethyl·Pyriminobac-methyl GR	Herbicide	Rice	0.17	>10	8.95
Pyrazosulfuron-ethyl·Pyriminobac-methyl WG	Herbicide	Rice	17	>10	>10
Pyrazosulfuron-ethyl·Thiobencarb GR	Herbicide	Rice	7.07	>10	>10
Pyribencarb FS	Fungicide	Rice	20	0.967	0.967
Pyribencarb SC	Fungicide	Pear, etc.	20	1.22	1.14
Pyribencarb WG	Fungicide	Persimmon, etc.	40	1.51	1.188
Pyribencarb·Thiophanate-methyl SC	Fungicide	Orange	25	6.447	6.325
Pyridaben EC	Insecticide	Cucumber, etc.	20	0.012	0.011
Pyridaben EW	Insecticide	Orange, etc.	10	0.014	0.014
Pyridaben SC	Insecticide	Cucumber, etc.	20	0.026	0.02
Pyridaben WP	Insecticide	Orange, etc.	20	>2	>2
Pyridalyl EW	Insecticide	Red pepper, etc.	10	5.478	2.867
Pyridalyl·Spinetoram EW	Insecticide	Cucumber, etc.	19.5	>10	>10
Pyridalyl·Tebufenozide SE	Insecticide	Chinese cabbage, etc.	30	>11.326	>11.326
Pyrifluquinazon SC	Insecticide	Orange, etc.	6.5	2.935	2.275
Pyrifluquinazon WG	Insecticide	Pear, etc.	10	2.942	2.942
Pyrimethanil SC	Fungicide	Strawberry, etc.	37	>10	>10
Pyrimethanil WP	Fungicide	Apple, etc.	30	>10	>10
Pyriproxyfen EC	Insecticide	Tomato, etc.	10	1.27	1.17
Pyriproxyfen SC	Insecticide	Cucumber	10	>10	>10
Pyriproxyfen SF	Insecticide	Red pepper, Tomato	2.45	>10	>10
Quinoclamine GR	Herbicide	Rice	9	0.51	0.41
Quinoclamine WG	Herbicide	Lawn	50	0.53	0.37
Rimsulfuron WP	Herbicide	Lawn	6	7.03	7.03
Sethoxydim EC	Herbicide	Bean, etc.	20	4.1	4.1
Silafluofen WP	Insecticide	Persimmon	10	>10	>10
Simazine WP	Herbicide	Apple, etc.	50	>10	>10
Simeconazole WG	Fungicide	Lawn, Garlic.	50	>10	>10
Simeconazole WP	Fungicide	Cucumber, etc.	20	>10	>10
Simeconazole GR	Fungicide	Rice, Garlic	1.5	>10	>10
S-Metolachlor EC	Herbicide	Bean, etc.	25	2.63	2.48
S-Metolachlor GR	Herbicide	Bean, etc.	2.5	17.9	15.1
S-Metolachlor·Thiobencarb EC	Herbicide	Garlic, etc.	42	3.2	1.56
S-Metolachlor·Thiobencarb GR	Herbicide	Garlic, etc.	7	2.07	1.41
Sodium 5-nitroguaiacolate SL	Plant growth regulator	Tobacco	0.3	7.29	5.83
Spinetoram SC	Insecticide	Chinese cabbage, etc.	5	7.94	5.19

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Spinetoram·Thiacloprid SC	Insecticide	Red pepper, etc.	15	>10	>10
Spinosad SC	Insecticide	Chinese cabbage, etc.	10	9.365	8.401
Spinosad WG	Insecticide	Cucumber, etc.	10	2.51	2.4
Spinosad WP	Insecticide	Strawberry, etc.	79.5	>10	>10
Spirodiclofen SC	Insecticide	Apple, etc.	22	5.7	5.7
Spiromesifen SC	Insecticide	Strawberry, etc.	20	0.64	0.47
Spiromesifen WP	Insecticide	Apple	20	0.75	0.55
Spirotetramat SC	Insecticide	Red pepper, etc.	22	3.41	1.95
Spirotetramat·Thiacloprid SC	Insecticide	Red pepper, etc.	22	4.14	3.29
Spreader-sticker DC	Others	Red pepper, Apple	77	>10	>10
Streptomycin WP	Fungicide	Orange, etc.	20	>10	>10
Streptomycin·Validamycin-A WP	Fungicide	Potato, etc.	20	>10	>10
Sulfoxaflor GR	Insecticide	Red pepper, Cucumber	2	>10.00	>10.00
Sulfoxaflor SC	Insecticide	Rice, Red pepper, etc.	7	>93.8	>93.8
Sulfoxaflor WG	Insecticide	Rice, Red pepper, etc.	7	>0.858	>0.640
Sulfur SC	Fungicide	Strawberry, etc.	52	>10	>10
Sulfur WG	Fungicide	Orange, etc.	80	>10	>10
Sulfur·Buprofezin SC	Insecti-Fungicide	Peach, etc.	39.5	>10	>10
Tebuconazole DC	Fungicide	Persimmon, etc.	12	1.1	0.99
Tebuconazole EC	Fungicide	Peanut, etc.	25	4.64	4.64
Tebuconazole GR	Fungicide	Red pepper, etc.	2	10.44	8.13
Tebuconazole ME	Fungicide	Red pepper, etc.	25	2.808	2.338
Tebuconazole PA	Fungicide	Apple	2	8.09	6.18
Tebuconazole WP	Fungicide	Apple, etc.	25	>2	>2
Tebuconazole·Bifenthrin GR	Insecti-Fungicide	Red pepper, etc.	2.3	0.082631	0.054069
Tebuconazole·Buprofezin WP	Insecti-Fungicide	Red pepper	27.5	8.745	7.162
Tebuconazole·Chlorpyrifos GR	Insecti-Fungicide	Garlic, Leek	4	0.745	0.539
Tebuconazole·Dimethoate GR	Insecti-Fungicide	Garlic	7	>10	>10
Tebuconazole·Lambda-cyhalothrin GR	Insecti-Fungicide	Garlic, Onion	1.8	0.0151	0.0102
Tebuconazole·Thifluzamide SC	Fungicide	Lawn	24	7.995	7.995
Tebuconazole·Thiophanate-methyl SC	Fungicide	Red pepper, etc.	27	>10	>10
Tebuconazole·Thiophanate-methyl WP	Fungicide	Red pepper	27	>12.12	>12.12
Tebufenozide EC	Insecticide	Persimmon, etc.	8	1.44	1.44
Tebufenozide SC	Insecticide	Rice, Apple, etc.	20	>10	>10
Tebufenozide WP	Insecticide	Rice, Apple, etc.	8	>10	>10
Tecloftalam WP	Fungicide	Rice	10	13	13
Tecloftalam·Validamycin-A SC	Fungicide	Rice	15	>10	>10
Teflubenzuron SC	Insecticide	Persimmon, etc.	5	>2	>2
Tefluthrin GR	Insecticide	Peanut, etc.	0.5	0.0006	0.0006
Tefluthrin·Thiamethoxam GR	Insecticide	Red pepper, etc.	1	0.043	0.024
Tefuryltrione·Triafamone GR	Herbicide	Rice	0.84	>10	>10

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Tefuryltrione·Triafamone SC	Herbicide	Rice	4.9	>10	>10
Tetraconazole EC	Fungicide	Persimmon, etc.	12	1.22	1.22
Tetraconazole EW	Fungicide	Pear, etc.	12.5	4.46	4.46
Tetraconazole·Thiifluzamide EC	Fungicide	Lawn	9	0.568	0.551
Tetradifon EC	Insecticide	Orange, etc.	8	3	2.33
Thiabendazole SC	Insecticide	Orange, Apple	42	>10	>10
Thiacloprid GR	Insecticide	Rice	1	>10	>10
Thiacloprid SC	Insecticide	Apple, etc.	10	>9.007	>9.007
Thiamethoxam DC	Insecticide	Pine	15	2.2	2.05
Thiamethoxam FG	Insecticide	Potato, etc.	1.5	>6.592	>6.592
Thiamethoxam GR	Insecticide	Rice	1	>100	>100
Thiamethoxam GR	Insecticide	Red pepper, etc.	1.5	>6.592	>6.592
Thiamethoxam SL	Insecticide	Pine	12.5	7.31	6.77
Thiamethoxam WG	Insecticide	Rose, etc.	24.49	>10	>10
Thiamethoxam WG	Insecticide	Rice, Apple, etc.	10	>10	>10
Thidiazuron WP	Plant growth regulator	Grape, Cymbidium	1	0.75	0.68
Thifensulfuron-methyl WG	Herbicide	Barley	75	>10	>10
Thiifluzamide GR	Fungicide	Rice, Lawn, etc.	3	5.86	4.04
Thiifluzamide SC	Fungicide	Rice, Strawberry, etc.	7	>10	>10
Thiifluzamide SC	Fungicide	Rice, Lawn	21	6.727	4.97
Thiifluzamide·Thiadinil SC	Fungicide	Rice	18.5	>10	>10
Thiifluzamide·Thiadinil·Clothianidin GR	Insecti-Fungicide	Rice	9.5	>10	>10
Thiifluzamide·Thiadinil·Dinotefuran GR	Insecti-Fungicide	Rice	9	>10	>10
Thiifluzamide·Thiadinil·Fipronil GR	Insecti-Fungicide	Rice	9.6	3.48	2.193
Thiifluzamide·Tricyclazole·Benfuracarb GR	Insecti-Fungicide	Rice	10.6	0.769	0.769
Thiifluzamide·Tricyclazole·Thiacloprid GR	Insecti-Fungicide	Rice	8	>10	>10
Thiobencarb EC	Herbicide	Rice	50	1.74	1.52
Thiobencarb GR	Herbicide	Rice, Barley, etc.	7	2.61	2.08
Thiocyclam hydrogen oxalate WP	Insecticide	Persimmon, etc.	25	0.57	0.47
Thiodicarb WP	Insecticide	Chinese cabbage, etc.	40	3.45	3.28
Thiophanate-methyl PA	Fungicide	Apple, Orange	3	1.03	0.95
Thiophanate-methyl SC	Fungicide	Rice, Grape	40	>10	>10
Thiophanate-methyl WP	Fungicide	Apple, etc.	70	5.61	5.61
Thiophanate-methyl·Tricyclazole SC	Fungicide	Rice	30	>10	>10
Thiophanate-methyl·Triflumizole WP	Fungicide	Rice, Apple, etc.	60	>2	>2
Thiram FS	Fungicide	Bean, etc.	26.5	0.059	0.019
Thiram SC	Fungicide	Pear, Peach	40	0.018	0.018
Thiram·Methiocarb FS	Others	Corn, Bean	30	0.020927	0.0196
Tiadinil GR	Fungicide	Rice	6	>10	>10
Tiadinil SC	Fungicide	Rice	30	6.911	6.154
Tiadinil·Benfuracarb GR	Insecti-Fungicide	Rice	9.6	1.01	0.94
Tiadinil·Benfuracarb·Chlorantraniliprole GR	Insecti-Fungicide	Rice	9.9	0.987	0.77
Tiadinil·Carbosulfan GR	Insecti-Fungicide	Rice	9.5	>10	>10

Table 1. continued

Pesticide	Classification	Crop	A.I. (%)	LC ₅₀ , mg/l*	
				48 hr	96 hr
Tiadinil·Chlorantraniliprole GR	Insecti-Fungicide	Rice	6.4	>10	>10
Tiadinil·Clothianidin GR	Insecti-Fungicide	Rice	6.5	>10	>10
Tiadinil·Clothianidin SC	Insecti-Fungicide	Rice	32.5	7.448	7.386
Tiadinil·Dinotefuran GR	Insecti-Fungicide	Rice	7	9.2	6
Tiadinil·Fipronil GR	Insecti-Fungicide	Rice	6.6	2.009	1.473
Tiadinil·Flubendiamide·Thiacloprid SC	Insecti-Fungicide	Rice	19	5.293	3.268
Tiadinil·Imidacloprid GR	Insecti-Fungicide	Rice	8.5	>10	>10
Tiadinil·Imidacloprid GR	Insecti-Fungicide	Rice	9	7.338	5.269
Tiadinil·Thiametoxam GR	Insecti-Fungicide	Rice	7	5.42	4.42
Triadimefon WP	Fungicide	Pear, etc.	5	>10	>10
Tribasic copper sulfate SC	Fungicide	Orange, etc.	15(CU)	>10	>10
Tricyclazole SC	Fungicide	Rice	41.7	>2	>2
Tricyclazole·Benfuracarb GR	Insecti-Fungicide	Rice	7.6	0.623	0.501
Tricyclazole·Carbosulfan·Imidacloprid GR	Insecti-Fungicide	Rice	7.5	6.983	5.996
Tricyclazole·Clothianidin GR	Insecti-Fungicide	Rice	4.5	>10	>10
Tricyclazole·Dinotefuran GR	Insecti-Fungicide	Rice	3.5	>10	>10
Tricyclazole·Fipronil GR	Insecti-Fungicide	Rice	4.6	4.974	2.609
Tricyclazole·Thiacloprid GR	Insecti-Fungicide	Rice	5	>10	>10
Tricyclazole·Validamycin-A SC	Fungicide	Rice	25	>10	>10
Tricyclazole·Validamycin-A·Chromafenozide SC	Insecti-Fungicide	Rice	28.5	>10	>10
Tricyclazole·Validamycin-A·Ethofenprox SE	Insecti-Fungicide	Rice	17.5	4.684	1.832
Tricyclazole·Validamycin-A·Methoxyfenozide SC	Insecti-Fungicide	Rice	29	>10	>10
Trifloxystrobin SC	Fungicide	Apple, etc.	22	0.193	0.193
Trifloxystrobin WG	Fungicide	Grape, etc.	50	0.239	0.239
Trifloxysulfuron-sodium GR	Herbicide	Lawn	0.12	>10	>10
Trifloxysulfuron-sodium WG	Herbicide	Lawn	75	>10	>10
Triflumizole WG	Fungicide	Watermelon, etc.	30	1.261	1.21
Triflumizole WP	Fungicide	Apple, etc.	30	1.63	1.21
Triflumuron WP	Insecticide	Apple, etc.	25	>10	>10
Triforine DC	Fungicide	Red pepper, etc.	19	5.724	5.724
Triforine EC	Fungicide	Eggplant, etc.	17	4.79	4.79
Trinexapac-ethyl ME	Plant growth regulator	Lawn	26.6	>10	>10
Trinexapac-ethyl SL	Plant growth regulator	Lawn	11.3	>11.3	>11.3
Validamycin-A DP	Fungicide	Rice, Potato	0.3	>10	>10
Validamycin-A SL	Fungicide	Rice, Strawberry, etc.	5	>10	>10
Validamycin-A SC	Fungicide	Red pepper, etc.	20	>10	>10
Validamycin-A SP	Fungicide	Chinese cabbage, etc.	10	>10	>10
Validamycin-A WG	Fungicide	Chinese cabbage, etc.	20	>10	>10
Zeta-cypermethrin EC	Insecticide	Apple, etc.	3	0.0049	0.0044
Zeta-cypermethrin EW	Insecticide	Apple	3	0.006	0.005
Zoxamide SC	Insecticide	Potato, etc.	25	>10	>10

*NAS(National Institute of Agricultural Science) Database

목>살균제(304품목)>살충제(226품목)>살균·살충제(55품목)>생장조절제(27품목)>기타(4품목) 순이었다.

어독성을 48시간이 아니라 96시간 LC_{50} 값으로 구분하게 되면 41품목은 III급에서 II급으로, 18품목은 II급에서 I급으로 독성등급이 높아졌다. 특히, 벼 재배용 농약 중 독성 등급이 II급에서 I급으로 된 4품목은 사용량, 제제의 형태, 사용방법, 이화학적 특성 등을 고려하여 평가한 결과 안전성이 인정되지 않으면 등록이 보류될 수도 있다

노출시간 경과에 따라 급성독성 발현을 알아보기 위해 48시간 LC_{50} 값을 96시간 LC_{50} 값으로 나눈 결과, 전체 1,483품목 중 831품목(56.0%)은 독성값 차이가 없어 48시간 이내에 독성발현이 완전히 나타났음을 알 수 있었다.

그러나 612품목(41.3%)은 독성값 차이가 1.01~1.99배, 그리고 40품목은(2.7%)은 독성값 차이가 2배 이상으로 48시간 이후에도 급성발현이 지속적으로 나타남을 알 수 있었다. 이것은 노출시간이 길어짐에 따라 LC_{50} 값이 감소해 처리시간과 농도와는 서로 반비례 한다는 연구(Lee et al. 1984)와 농약의 독성발현이 빨리 나타나거나 지속시간이 짧은 것도 있지만 늦게 나타나거나 지속시간이 긴 것, 또는 장기간 축적되어 나타나는 것이 있어 48시간 노출만으로는 정확한 급성 독성값을 얻기 어렵다는 보고와 유사하였다(Shin et al. 1988).

그러므로, 실제 논이나 밭, 과수원 같은 농경지에 살포한 농약이 환경 내에서 이동하여 지속적으로 하천으로 유입되거나 저수지나 호수에 유입된 이후에 이동 없이 장기간 존재하는 것이 일반적이므로 48시간보다는 96시간 LC_{50} 값이 보다 정확하고 이 값으로 어독성을 구분하는 게 더 적합하다고 할 수 있다. 미국, 유럽 등에서 96시간 LC_{50} 값으로 어독성을 구분하고 급성 위해성 평가에 이용하는 것을 이러한 이유로 이해할 수 있다(EPA 2004).

이런 연구결과를 본다면 48시간 LC_{50} 값은 농약의 1단계 위해성 평가나 어독성 구분에 이용하기는 미흡하고, 미국이나 유럽처럼 96시간 LC_{50} 값으로 위해성평가나 어독성 구분을 하는 것이 정확도와 국제적 조화 차원에서 타당하다고 생각한다. 또한 최근 유엔(UN 2015)을 중심으로 화학물질(농약포함)의 관리면에서 분류 및 표지에 관한 세계조화 시스템(GHS)를 도입하여 국제적 조화, 상호인정범위를 넓히려는 국제적 동향을 볼 때 어독성 구분 체계를 분석하여 향후 우리나라 농약관리 제도를 발전시키는데 참고할 필요가 있겠다.

감사의 글

본 연구는 2015년부터 2017년까지 수행한 농촌진흥청의 “농약품목의 급성환경유해성 분야 물질분류 및 표시 체계 개선”(과제번호; PJ010983)의 연구비 지원에 의하여 이루어

진 것입니다.

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농약의 급성어독성과 노출시간에 따른 독성 변화

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요 약 농약 1,483품목의 잉어 급성독성 시험성적 중에서 48시간과 96시간 LC_{50} 값을 독성구분 기준에 따라 구분하여 비교하였고, 노출시간 차이에 따른 독성값 변화를 알아보기 위해 48 h- LC_{50} /96 h- LC_{50} 값을 구하였다. 우리나라 어독성 분류기준인 48시간 LC_{50} 값으로 어독성을 구분한 결과, 1,483품목 중 어독성 I급($LC_{50} < 0.5$ mg/l)은 237품목(16.0%) II급($0.5 \leq LC_{50} < 2$ mg/l)은 203품목(13.7%), 그리고 III급($LC_{50} \geq 2$ mg/l)은 1,043품목(70.3%)이었다. 적용작물별로 독성 등급을 구분하면 벼 재배용 농약 643품목 중 I급은 없고 II급은 83품목(12.9%), 그리고 III급은 560품목(87.1%)이었다. 원예용 농약 840품목 중 I급이 237품목(28.2%) II급이 116품목(13.8%), 그리고 III급이 487품목(58.0%) 이었다. 노출시간 경과에 따라 급성독성 변화를 알아보기 위해 48시간 LC_{50} 값을 96시간 LC_{50} 값으로 나눈 결과, 전체 1,483품목 중 831품목(56.0%)은 독성값 차이가 없어 48시간 이내에 독성발현이 완전히 나타나 노출시간이 증가함에도 독성차이가 없는 것으로 나타났다. 그러나 612품목(41.3%)은 독성값 차이가 1.01~1.99배, 그리고 40품목은(2.7%)은 2배 이상으로 48시간 이후에도 독성발현이 지속됨을 알 수 있었다.

색인어 농약, 급성독성, 잉어, 반수치사농도, 노출시간