5.6 CYANTRANILIPROLE (263)

RESIDUE AND ANALYTICAL ASPECTS

Cyantraniliprole is a diamide insecticide with a mode of action (ryanodine receptor activation) similar to chlorantraniliprole and flubendiamide, with foliar and systemic activity. It is effective against the larval stages of lepidopteran insects and also on thrips, aphids and other chewing and sucking insects.

Cyantraniliprole was initially evaluated for toxicology and residues by JMPR in 2013 and a ADI of 0–0.03mg/kg bw/day was estastablished. An ARfD was deemed to be unnecessary. The residue definitions were also established:

Definition of residue for compliance with MRL for both animal and plant commodities: cyantraniliprole.

Definiton of residue for estimation of dietary intake for unprocessed plant commodities: cyantraniliprole.

Definition of residue for estimation of dietary intake for processed plant commodities: sum of cyantraniliprole and IN –J9Z38, expressed as cyantraniliprole.

Definition of residue for estimation of dietary intake for animal commodities:

sum of cyantraniliprole, *2-[3-Bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazol-5-yl]-3,4-dihydro-3,8-dimethyl-4-oxo-6-quinazolinecarbonitrile [IN-J9Z38], 2-[3-Bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazol-5-yl]-1,4-dihydro-8-methyl-4-oxo-6-quinazolinecarbonitrile [IN-MLA84], 3-Bromo-1-(3-chloro-2-pyridinyl)-N-[4-cyano-2-(hydroxymethyl)-6-[(methylamino)carbonyl]phenyl]-1H-pyrazole-5-carboxamide [IN-N7B69] and 3-Bromo-1-(3-chloro-2-pyridinyl)-N-[4-cyano-2[[(hydroxymethyl)amino]carbonyl]-6-methylphenyl]-1H-pyrazole-5-carboxamide [IN-MYX98],* expressed a cyantraniliprole.

The residue is not fat soluble.

At the Forty-sixth Session of the CCPR(2014), cyantraniliprole was scheduled for evaluation of additional use patterns by 2015 JMPR.

The Meeting received supervised residue trial data for foliar and soil applications of cyantraniliprole on a range of fruit and vegetable crops, cereals, tree nuts and tea, and information on registered uses of cyantraniliprole on corresponding crops. The processing studies on corn were also submitted to the Meeting.

Methods of analysis

The analytical methods were previously evaluated (2013 Meeting). The same methods were used in the trials submitted to the current Meeting, and are considered valid for the commodities evaluated.

Stability of residues in stored analytical samples

The stability of residues of cyantraniliprole and metabolites in stored samples was covered by the freezer stability studies evaluated by the 2013 JMPR, and is considered adequate for the trials submitted to the current Meeting.

Results of Supervised residue trials on crops

The Meeting received the residue trials for strawberry, greenhouse cucumber, bean, pea, soya bean, artichoke, maize, and tea.

Where residues have been reported as not detected (ND), i.e., <LOD, the values have been considered as <LOQ (< 0.01 mg/kg) for the purposes of MRL setting. If a higher residue level was observed at a longer PHI than the GAP, the higher value has been used in MRL setting.

The Meeting noted that GAP has been authorised for the use of cyantraniliprole and the product labels were available from Canada, Columbia, India, Japan, Vietnam and USA.

Citrus fruits

The critical GAP for cyantraniliprole on citrus fruits is in USA: 3 foliar applications of 0.15 kg ai/ha with a total of 0.45 kg ai/ha/season, applied at least 7 days intervals with a PHI of 1 day. The 2013 Meeting received the supervised residue trials for cyantaniliprole on citrus fruit (orange, lemon, grapefruit and mandarin). The current Meeting evaluated the data against the GAP for citrus fruits from the USA. Cyantraniliprole was also registered for soil application in citrus, however, the residue trials with soil application showed that the soil application did not contribute significant residues in citrus fruits.

Orange

In trials conducted in USA and Europe matching the USA GAP (with 3 applications of 0.15 kg ai/ha, PHI of 1 day), cyantraniliprole residues in whole fruit were: 0.1(2), 0.12, 0.17, 0.2, 0.21, 0.22, 0.23, 0.26, 0.28, 0.3, 0.35 and 0.39 mg/kg (n=13). The cyantraniliprole residues in pulp were: 0.01, 0.013, 0.018, 0.021, 0.036, 0.04, 0.041, 0.043, 0.046, 0.064, 0.069, and 0.086(2) mg/kg (n=13).

Lemon

In trials conducted in USA matching the USA GAP (with 3 applications of 0.15 kg ai/ha, PHI of 1 day), cyantraniliprole residues in whole fruit were: 0.16(2), 0.19, 0.21 and 0.3 mg/kg (n=5). Cyantraniliprole residues in pulp were: 0.023, 0.057, 0.063, 0.07 and 0.11 mg/kg (n=5).

Grapefruit

In trials conducted in USA matching the USA GAP (with 3 applications of 0.15 kg ai/ha, PHI of 1 day), cyantraniliprole residues in whole fruit were: 0.091, 0.12(2), 0.14, 0.16, 0.19, and 0.31mg/kg (n=7). Cyantraniliprole residues in pulp were: 0.014, 0.021, 0.026, 0.029, 0.032, 0.033 and 0.049 mg/kg (n=7).

Mandarins

In trials conducted in Europe matching the USA GAP (with 3 applications of 0.15 kg ai/ha, PHI of 1 day), cyantraniliprole residues in whole fruit were: 0.47 mg/kg (n=1). Cyantraniliprole residues in pulp were: 0.2 mg/kg (n=1).

The Meeting noted that the GAP in USA was for citrus and the medians of the data sets for oranges, lemons, grapefruits and mandarins differed by less than 5-fold, and agreed to consider a group maximum residue level. In deciding on the data set to use for estimating a group maximum residue level (the Kruskal-Wallis H-test indicated that the residue populations for oranges, lemons, grapefruits and mandarins were not different) it was agreed to combine the results to give a data set of: 0.091, 0.1(2), 0.12(3), 0.14, 0.16(3), 0.17, 0.19(2), 0.2, 0.21(2), 0.22, 0.23, 0.26, 0.28, 0.3(2), 0.31, 0.35, 0.39 and 0.47 mg/kg (n=26) to recommend a maximum residue level for the citrus fruit group. It was agreed to combine the results in pulp to give a data set of: 0.01, 0.013, 0.014, 0.018, 0.021(2), 0.023, 0.026, 0.029, 0.032, 0.033, 0.036, 0.04, 0.041, 0.043, 0.046, 0.049, 0.057, 0.063, 0.064, 0.069, 0.07, 0.086(2), 0.11 and 0.2 mg/kg (n=26).

The Meeting estimated an STMR of 0.041 mg/kg and an HR of 0.2 mg/kg based on residues in pulp, and recommended a group maximum residue level of 0.7 mg/kg for cyantraniliprole on citrus fruit. The Meeting estimated an STMR of 0.20 mg/kg in orange fruit for calculation of STMR-P.

Pomegranate

The approved GAP for cyantraniliprole on pomegranate is available from India, up to 3 foliar applications of 0.09 kg ai/ha, applied at least 7-10 day intervals with a PHI of 5 days. The assessment was undertaken using the supervised residue trials for cyantaniliprole on pomeganate received by the 2013 Meeting. The current Meeting evaluated the data against the new GAP for pomegranate from India.

In one trial conducted on pomegranate in India matching the Indian GAP cyantraniliprole residues in rind, seed and juice were < 0.01 mg/kg (n=1). In other trials conducted in four locations in India with 2, 3, 5 applications at rate of 0.075-0.18 kg ai/ha and PHI of 5 days, the cyantraniliprole residues in rind, seed and juice were all < 0.01 mg/kg (n=11).

The Meeting noted that since different times and rates of application resulted in the same residues in pomegranate, the Meeting agreed to combine the data together to estimate a maximum residue level of 0.01* mg/kg, and an STMR of 0.01 mg/kg.

Fruiting vegetables, Cucurbits

The critical GAP for cyantraniliprole on cucurbit vegetables is in Canada, up to 4 foliar applications of 0.15 kg ai/ha, applied at least 5–7 day intervals with a PHI of 1 day.

The new trials conducted on protected cucumber in North America (with 3 applications of 0.15 kg ai/ha, a PHI of 0 day) did not match the critical GAP. The meeting confirmed the previous recommendation.

Legume vegetables

The critical GAP for cyantraniliprole on legume vegetables in Canada is up to 4 foliar applications of 0.15 kg ai/ha, applied at least 5 day intervals with a PHI of 1 day for succulent seed. The 2013 Meeting received the supervised residue trials for cyantaniliprole on bean and pea from Europe. The current Meeting received new trials on bean, pea and soya bean, and evaluated all trials available to the Meeting against the new GAP for legume vegetables from Canada.

Pea with pod

In trials conducted on pea with pod (edible-podded peas) in USA matching the Canadian GAP (4 foliar applications of 0.15kg ai/ha, 1 day PHI), cyantraniliprole residues in pea with pod were: 0.29, 0.61, 0.78 and 0.79 mg/kg (n=4).

The Meeting estimated an STMR of 0.7mg/kg, and the maximum residue level of 2.0 mg/kg for cyantraniliprole in pea with pod.

Pea without pod

In trials conducted on pea without pod (succulent shelled pea) in USA matching the Canadian GAP (4 foliar applications of 0.15 kg ai/ha, 1 day PHI), cyantraniliprole residues in seed of pea without pod were: 0.019, 0.046, 0.065, 0.076, 0.082 and 0.10 mg/kg (n=6).

The Meeting estimated an STMR of 0.07 mg/kg, and maximum residue level of 0.3 mg/kg in pea without pod.

Bean with pod

In trials conducted on bean with pod (edible-podded beans) in USA matching the Canadian GAP (4 foliar applications of 0.15kg ai/ha, PHI of 1 day), cyantraniliprole residues in bean were: 0.11, 0.11, 0.23, 0.29, 0.36, 0.43, and 0.73 mg/kg (n=7).

The Meeting estimated an STMR of 0.29 mg/kg and recommended the maximum residue level of 1.5 mg/kg for cyantraniliprole in bean with pod.

Bean without pod

In trials conducted on bean without pod (succulent shelled beans) in the USA matching the Canadian GAP (4 foliar applications at 0.15kg ai/ha, PHI of 1 day), cyantraniliprole residues in seed of succulent shelled bean were: 0.01, 0.023 and 0.057 mg/kg (n=3).

Since three trials were insufficient to estimate the STMR and maximum residue level, the Meeting agreed to extrapolate the STMR and maximum residue level from pea without pods. The

Meeting estimated an STMR of 0.07 mg/kg, and a maximum residue level of 0.3 mg/kg in bean without pod.

Soya bean, immature seed

In trials conducted on soya bean in the USA matching Canadian GAP (4 applications at 0.15 kg ai/ha, PHI of 1 day). The cyantraniliprole residues in immature seed were: 0.019, 0.035, 0.036, 0.042 and 0.14 mg/kg (n=5)

The Meeting estimated an STMR of 0.036 mg/kg and recommended the maximum residue level of 0.3 mg/kg for cyantraniliprole in soya bean, immature seed.

Pulses

The critical GAP for cyantraniliprole on pulses in Canada is up to 4 foliar applications of 0.15 kg ai/ha, applied at 5 day intervals with a PHI of 7 days.

Beans (dry)

In new trials conducted on bean, dry (dry shelled beans) in USA matching the Canadian GAP (4 foliar applications of 0.15kg ai/ha, PHI of 7 day), cyantraniliprole residues in bean, dry were: < 0.01, < 0.01, < 0.01, < 0.01, < 0.01, 0.01, 0.015, 0.021, 0.048, 0.049, 0.088 and 0.22 mg/kg (n=12).

The Meeting estimated a STMR of 0.01 mg/kg and recommended the maximum residue level of 0.3 mg/kg for cyantraniliprole in bean (dry).

Peas (dry)

In new trials conducted on pea, dry (dry shelled peas) in the USA matching Canadian GAP (4 foliar applications of 0.15kg ai/ha, PHI of 7 day), cyantraniliprole residues in peas (dry) were: 0.019, 0.077, 0.086 and 0.51 mg/kg (n=4).

The Meeting agreed that four trials were insufficient for the estimation of a STMR and maximum residue level recommendation.

Soya bean (dry)

In new trials, conducted on soya bean in the USA, matching the Canadian GAP (4 applications of 0.15 kg ai/ha, PHI of 7 days), cyantraniliprole residues in soya bean (dry) were: < 0.01, 0.011, 0.012, 0.017, 0.022, 0.023, 0.027, 0.027, 0.031, 0.031, 0.033, 0.044, 0.056, 0.061, 0.083, 0.1, 0.12, 0.13, 0.15, 0.16 and 0.25 mg/kg (n=21).

The meeting estimated an STMR of 0.033 mg/kg and recommended the maximum residue level of 0.4 mg/kg for cyantraniliprole in soya bean (dry).

Artichoke

The GAP for cyantraniliprole on artichoke in Canada is up to 4 foliar applications of 0.025–0.15 kg ai/ha with a total of 0.45 kg ai/ha/season, applied at least 5–7 day intervals with a PHI of 7 days.

The new trials conducted on artichoke in Europe (2 foliar applications of 0.05kg/ha) did not match the Canadian GAP.

Maize

The GAP for cyantraniliprole on maize is available from Canada, for seed treatment at 0.012–0.024 kg ai/ha (up to 0.25 mg ai/ seed, or 100 g ai/100 kg seeds).

There were no trials matching the Canadian GAP, however, the Meeting noted that in 23 trials conducted on maize in North America, seed treatment of 0.5 mg ai/ seed, i.e., 2× GAP rate, the residues of cyantraniliprole in maize grain were all < 0.01 mg/kg. The Meeting agreed to estimate a

STMR of 0 mg/kg and recommend a maximum residue level of 0.01 mg/kg for cyantraniliprole in maize grain.

Tree nuts

The critical GAP for cyantraniliprole on tree nuts is from the USA, 3 foliar applications of 0.15 kg ai/ha, with a seasonal total of 0.45 kg ai/ha, applied at 7 day intervals with a PHI of 5 days. The Meeting received four new trials on almond and six new trials on pecan. In addition, the 2013 Meeting received supervised residue trials for cyantaniliprole on almond (6) and pecan (6). The current Meeting evaluated all available trials together against the GAP of the USA.

Almond

In trials conducted on almonds in the USA, matching US GAP (3 foliar application of 0.15 kg ai/ha, 0.45 kg ai/ha/season, PHI of 5 days), cyantraniliprole residues in nutmeat were < 0.01 (5), 0.01, 0.012, 0.014, 0.018 and 0.023 mg/kg (n=10).

Pecan

In trials conducted on pecans in the USA, matching US GAP (3 foliar application of 0.15 kg ai/ha, 0.45 kg ai/ha/season, PHI of 5 days), cyantraniliprole residues in nutmeat were all < 0.01 mg/kg (n=12).

The Meeting noted that the GAP in the USA was for tree nuts and the medians of the data sets for almond and pecan differed by less than 5-fold and agreed to consider a group maximum residue level. In deciding on the data set to use for estimating a group maximum residue level (the Kruskal-Wallis H-test indicated that the residue populations for almond and pecan were not different) it was agreed to combine the results to give a data set of: < 0.01(16), 0.01(2), 0.012, 0.014, 0.018 and 0.023 mg/kg (n=22) to recommend a maximum residue level for the tree nut group.

The Meeting estimated an STMR of 0.01 mg/kg, and recommended a group maximum residue level of 0.04 mg/kg for cyantraniliprole on tree nuts.

Oilseeds

The 2013 Meeting received supervised residue trials for cyantraniliprole on cotton, rapeseed and sunflower. The current Meeting evaluated the data against the GAP of the USA.

Cotton

The critical GAP for cyantraniliprole on cotton in the USA is for up to 3 foliar applications of 0.15 kg ai/ha with a total of 0.45 kg ai/ha/season, applied at 7 day intervals with a PHI of 7 days.

In trials conducted on cotton in the USA matching GAP, cyantraniliprole residues in cotton seed were: 0.012, 0.025, 0.035, 0.12, 0.12, 0.14, 0.16, 0.18, 0.2, 0.22, 0.26, 0.29 and 0.99 mg/kg (n=13).

The Meeting estimated an STMR of 0.16 mg/kg, and recommended the maximum residue level of 1.5 mg/kg for cyantraniliprole in cotton seed.

Rape seed (canola)

The critical GAP for cyantraniliprole on rape seed (canola) in the USA is up to 3 foliar applications of 0.15 kg ai/ha with a total of 0.45 kg ai/ha/season, applied at 7 day intervals with a PHI of 7 days.

In trials conducted on canola in the USA matching GAP, cyantraniliprole residues in rapeseed were: 0.019, 0.021, 0.022, 0.05, 0.059, 0.061, 0.07, 0.07, 0.084, 0.12, 0.17, 0.18, 0.27, 0.29, 0.32 and 0.61 mg/kg (n=16).

The Meeting estimated the maximum residue level of 0.8 mg/kg and an STMR of 0.077 mg/kg for cyantraniliprole in rapeseed.

Sunflower

The critical GAP for cyantraniliprole on sunflower in the USA is for up to 3 foliar applications of 0.15 kg ai/ha with a total of 0.45 kg ai/ha/season, applied at 7 day intervals with a PHI of 7 days.

In trials conducted on sunflower in the USA matching the USA GAP, cyantraniliprole residues in sunflower seed were: 0.028, 0.039, 0.059, 0.064, 0.067, 0.085, 0.092, 0.14 and 0.32 mg/kg (n=9).

The Meeting estimated the maximum residue level of 0.5 mg/kg and a STMR of 0.067 mg/kg for cyantraniliprole in sunflower.

Seed for beverages and sweets

Coffee

The 2013 Meeting received supervised residue trials for cyantraniliprole on coffee. The current Meeting evaluated the data against the new GAP from Columbia.

The new approved GAP for cyantraniliprole on coffee from Columbia is for up to 2 foliar application of 2.5–3.5 g ai/5 litres/100 trees, equivalent to 0.06–0.175 kg ai/ha with a total of 0.3 kg ai/ha/season, with a PHI of 7 days.

In two Brazilian trials matching the Columbian GAP, cyantraniliprole residues in green coffee beans were: < 0.01 and 0.02 mg/kg.

The Meeting noted that in a further eight trials from Brazil involved 2 foliar applications that matched the Columbian GAP but in which two soil drenches (0.01–0.06 g ai/100 mL/plant to achieve the equivalent of 0.2 kg ai/ha/treatment) were also applied 90 and 120 days before harvest, cyantraniliprole residues in green bean were: < 0.01 (3), 0.01(2), 0.02, 0.02, and 0.03 mg/kg (n=8).

The Meeting agreed that since the early season soil drench treatments did not appear to contribute to the final residue in coffee beans, the data from these two sets of results could be combined, giving a data set of: < 0.01(4), 0.01(2), 0.02(3) and 0.03 mg/kg (n=10).

The Meeting estimated a STMR of 0.01 mg/kg, and recommended a maximum residue level of 0.05 mg/kg for cyantraniliprole on coffee bean, with the withdrawal of the previous maximum residue level recommendation of 0.03 mg/kg.

Tea, green, dry

The approved GAP for cyantraniliprole on tea is from Japan, with 1 foliar application of 0.1–0.2 kg ai/ha and a PHI of 7 days.

In trials conducted in Japan matching the Japanese GAP, cyantraniliprole residues in tea, green(dry) were 4.19 and 20.6 mg/kg (n=2). The Meeting agreed that two trials were insufficient for the estimation of a STMR and a maximum residue level recommendation.

Animal feed

Bean forage and bean hay

The 2013 Meeting received supervised residue trials for cyantaniliprole on beans from Europe. The current Meeting received new trials on beans from the USA, and evaluated all available trials against the new GAP for pulses from Canada.

In new trials conducted on bean forage and hay (dry shelled beans) in the USA, matching the Canadian GAP (3 foliar applications of 0.15kg ai/ha, PHI of 7 day), cyantraniliprole residues in bean forage (dry matter) were: 6.3, 7.6, 11.6, and 16.9 mg/kg (n=4); cyantraniliprole residues in bean hay (dry matter) were: 5.2, 7.7, 9.2 and 19.1 mg/kg (n=4).

The Meeting estimated a median residue of 9.6 mg/kg and a highest residue of 16.9 mg/kg for cyantraniliprole in bean forage (dry matter) for the calculation of livestock dietary burdens.

The Meeting estimated a median residue of 8.5 mg/kg and a high residue of 19.1 mg/kg for cyantraniliprole in bean hay (dry matter), and recommended a maximum residue level of 40 mg/kg (DM).

Pea vine and pea hay

The 2013 Meeting received supervised residue trials for cyantaniliprole on peas from Europe. The current Meeting received new trials on peas from the USA, and evaluated all available trials against the new GAP for pulses from Canada.

In new trials conducted on pea vine and hay in USA matching the Canadian GAP (3 foliar applications of 0.15kg ai/ha, 7 day PHI), cyantraniliprole residues in pea vine (dry matter basis) were: 4.1, 6.6, 11.4 and 47.1 mg/kg (n=4); cyantraniliprole residues in pea hay (dry matter) were: 3.5, 6.6, 12.8 and 28.5 mg/kg (n=4).

The Meeting estimated a median residue of 9.0 mg/kg and a highest residue of 47.1 mg/kg (DM) for cyantraniliprole in pea vine (dry matter) for calculation of livestock dietary burdens.

The Meeting estimated a median residue of 9.7 mg/kg and a highest residue of 28.5 mg/kg for cyantraniliprole in pea hay, and recommended a maximum residue level of 60 mg/kg (DM) for cyantraniliprole in pea hay,

Soya bean forage and hay

The Meeting received new trials conducted on soya bean forage and hay from the USA, matching Canadian GAP (3 applications of 0.15 kg ai/ha, PHI of 7 days).

The cyantraniliprole residues in soya bean forage, on dry matter basis, were: 1.2, 2.7, 4.5, 4.9, 6.1, 12.0, 12.5 14.2, 16.9, 17.8, 21.6, 27.1, 27.2, 30.6, 39.5 and 45.3 mg/kg (n=16).

The cyantraniliprole residues in soya bean hay in dry matter were: 1.6, 2.5, 6.0, 10.0, 10.8, 10.9, 13.1, 13.2, 14.3, 22.5, 27.3, 28.4, 28.9, 32.8, 42.7 and 46.4 mg/kg (n=16)

The Meeting estimated a median residue of 15.5 mg/kg and a highest residue of 45.3 mg/kg for cyantraniliprole in soya bean forage (dry matter) for calculation of animal dietary burdens.

The Meeting estimated a median residue of 13.7 mg/kg and a highest residue of 46.4 mg/kg for cyantraniliprole in soya bean hay (dry matter), and recommended a maximum residue level of 80 mg/kg (DM) for cyantraniliprole in soya bean hay.

Almond hull

The 2013 Meeting received supervised residue trials for cyantaniliprole on almond hulls. The current Meeting evaluated the data against the new GAP from the USA.

In trials conducted on almonds hulls in the USA, matching US GAP (3 foliar application of 0.15 kg ai/ha, 0.45 kg ai/ha/season, PHI of 5 days), cyantraniliprole residues in almond hulls were: 0.72, 0.88, 0.93, 1.4, 1.9, 1.9, 2.5, 2.9, 3.6 and 4.6 mg/kg (n=10).

The Meeting estimated a mean residue of 1.9 mg/kg, a highest residue of 4.6 mg/kg on almond hulls for the purpose of estimating livestock dietary burdens.

Cotton gin trash

The 2013 Meeting received supervised residue trials for cyantraniliprole on cotton gin trash. The current Meeting evaluated the data against the GAP of the USA (3 applications of 0.15 kg ai/ha, with interval of 7 days and a PHI of 7 days).

In trials conducted on cotton in the USA, matching US GAP, residues in cotton gin trash were: 2.6, 2.7, 3.5 and 5 mg/kg (n=4)

The Meeting estimated the median residue of 3.1 mg/kg and the highest residue of 5 mg/kg in cotton gin trash for estimating livestock dietary burden.

Fate of residues during processing

The Meeting received processing studies on cyantranilipole residues in maize, cottonseed and oranges. The Meeting agreed that for commodities not being considered for maximum residue levels at this Meeting, the relevant processing studies would not be reviewed and processing factors would not be estimated. Estimated processing factors and STMR-Ps for the commodities considered at this Meeting are summarised below.

Summary of processing factors and STMR-P for cyantraniliprole+IN-J9Z38

RAC	Commodity	Cyantraniliprole+IN-J9Z38 [a]		RAC STMR (mg/kg) [b]	STMP-P (mg/kg)[d]
		Calculated processing factors	PF best estimate		
Maize	Grain			0.01	
	Asp gr fn [f]	175, 177.4	176		1.76
	Meal	0.22, 0.44	0.33		0.0033
	Flour	0.22, 0.33	0.27		0.0027
	Grits	<0.22, 0.22	0.22		0.0022
	Oil-dry	<0.22, <0.22	<0.22		<0.0022
	Oil-wet	0.44, <0.22	0.33		0.0033
	Starch	<0.22, <0.22	<0.22		<0.0022
Cottonseed [c]	RAC: seed			0.16	
	raw oil (solvent extr)		0.06		0.0096
	refined oil (solvent extr)		0.04		0.0064
	meal (solvent extr)		0.05		0.008
	hulls		0.34		0.054
	raw oil (cold press)		0.25		0.04
	refined oil (cold press)		0.04		0.0064
	meal (cold press)		0.09		0.014
Orange[(c)]	RAC: fruit			0.20	
	juice		<0.03		<0.006
	wet pulp		0.24		0.048
	dry pulp		<0.33		0.066
	meal		0.47		0.094
	molasses		0.59		0.12
	marmalade		<0.06		0.012
	oil		8.5		1.7
	canned		<0.03		<0.006
Orange	Oil	2.3, 8.2, 6.2[e]	6.2[e]		

[a] Each PF value represents a separate study where residues were above the LOQ in the RAC. The factor is the ratio of the combined cyantraniliprole plus IN-J9Z38 metabolite residues in the processed item divided by the residue of cyantraniliprole in the RAC.

[b] Residues in the RAC is cyantraniliprole.

[c] The processing factor was estimated in 2013 JMPR, the STMR-P was calculated in this Meeting.

[d] Residues in processed commodities is cyantraniliprole plus IN-J9Z38

[e] The processing factor based on residues of cyantraniliprole only for estimation of maximum residue level.

[f] Aspirated grain faction

The Meeting noted that in the studies available, cyantraniliprole residues did not concentrate in food commodities during processing except for orange oil. The Meeting estimated a maximum level of 4.5 (0.7×6.2) mg/kg for citrus oil, the processing factor was based on residues of parent only.

Residues in animal commodities

Farm animal dietary burden

The dietary burdens were estimated using the OECD diets listed in Appendix IX of the 2009 edition of FAO Manual. Potential cattle feed items include: pea, soya bean, cotton gin trash, maize and

potatoes (including by-products). Dietary burden calculations for beef cattle, dairy cattle, broilers and laying poultry are presented Annex 6 to the Report and are summarized below.

Estimated maximum and mean dietary burden of farm animal (ppm of dry matter diet)

	Animal dietary burden, cyantraniliprole							
	US-Canada		EU		Australia		Japan	
	max	mean	max	mean	max	mean	max	mean
Beef cattle	0.69	0.37	12.6	3.38	46.8 [a]	15.59 [c,]	0.14	0.009
Dairy cattle	9.86	3.42	14	3.82	35.95 [b]	12.05 [d]	0.29	0.024
Poultry-broiler	0.00	0.00	0.05	0.02	0.00	0.00	0.00	0.00
Poultry-layer	0.00	0.00	4.71 [e, g]	1.56 [f, h]	0.00	0.00	0.00	0.00

[a] Highest maximum beef or dairy cattle dietary burden suitable for MRL estimates for mammalian meat

[b] Highest maximum dairy cattle dietary burden suitable for MRL estimates for mammalian milk

[c] Highest mean beef or dairy cattle dietary burden suitable for STMR estimates for mammalian meat

[d] Highest mean dairy cattle dietary burden suitable for STMR estimates for mammalian milk

[e] Highest maximum poultry dietary burden suitable for MRL estimates for poultry tissues

[f] Highest mean poultry dietary burden suitable for STMR estimates for poultry tissues

[g] Highest maximum poultry dietary burden suitable for MRL estimates for poultry eggs

[h] Highest mean poultry dietary burden suitable for STMR estimates for poultry eggs

Animal commodity maximum residue level

For beef and dairy cattle, the calculated maximum dietary burden suitable for estimating maximum residue levels in mammalian tissues and milk are 47 ppm and 36 ppm dry weight of feed, and the calculated mean dietary burdens suitable for estimating STMRs in mammalian tissues and in milk are 16 ppm and 12 ppm dry weight of feed respectively. The residue levels of cyantraniliprole and metabolites included in the residue definition in milk and tissue were calculated by estimation based on 10ppm, 30ppm and 100ppm feeding level in the feeding studies.

Cyantraniliprole feeding study	Feed level, ppm, for		Residue [a], mg/kg				
	Tissue residue	Milk residue	Milk	Muscle	Liver	Kidney	Fat
MRL, beef or dairy cattle							
Feeding study [b]	30	30	0.445	0.11	0.936	0.427	0.27
	100	100	1.109	0.373	2.3	1.351	1.03
Dietary burden and high residue	47	36	0.50	0.17	1.26	0.65	0.45
STMR, beef or dairy cattle							
Feeding study [c]	10	10	0.11	0.026	0.246	0.128	0.065
	30	30	0.445	0.081	0.722	0.356	0.202
Dietary burden mean residue estimate	16	12	0.21	0.041	0.38	0.19	0.10

[a] Residue values used in estimating STMR are the sum of cyantraniliprole and metabolites IN-N7B69, IN-J9Z38, IN-MLA84 and IN-MYX98

[b] high residues for tissues and mean residues for milk

[c] mean residues for tissues and mean residues for milk

Residues of cyantraniliprole expected in cattle milk and tissues for use in estimating maximum residue levels are: 0.45 mg/kg (fat), 0.17 mg/kg (muscle), 1.26 mg/kg (liver) and 0.65 mg/kg (kidney) and the mean residue for milk is 0.50 mg/kg.

The Meeting estimated maximum residue levels of 0.2 mg/kg for cyantraniliprole in meat (from mammals other than marine mammals), 1.5 mg/kg for edible offal (mammalian), 0.5 mg/kg for mammalian fat and 0.6 mg/kg for milks. The Meeting estimated STMRs (parent plus metabolites) for dietary intake estimation are 0.041 mg/kg for meat, 0.38 mg/kg for edible offal, 0.1 mg/kg for fat and 0.21 mg/kg for milk. The previous recommendations should be replaced.

For poultry, noting that in some countries, laying hens may also be consumed; the calculated maximum dietary burden suitable for estimating maximum residue levels in poultry tissues and eggs is 4.7 ppm and the calculated mean dietary burden suitable for estimating STMRs in poultry tissues and in eggs is 1.6 ppm. The residue levels of cyantraniliprole and metabolites included in the residue definition in eggs and tissue were calculated by estimation based on 3.0 ppm and 10 ppm feeding level, or extrapolation below the 3.0 ppm feeding level in the feeding studies.

Residues in kidney and liver at the expected dietary burden

	Feed level, ppm, for		Residue [a], mg/kg			
	Tissues residues	Eggs residues	Eggs	Muscle	Liver	Fat
Highest residue level, hens						
Feeding study [b]	3	3	0.151	0.009	0.098	0.014
	10	10	0.32	0.028	0.225	0.084
Calculated burden	4.7	4.7	0.13	0.014	0.13	0.031
STMR, hens						
Feeding study [c]	3	3	0.082	0.0075	0.0617	0.0159
Calculated burden	1.6	1.6	0.0426	0.0039	0.0321	0.0083

[a] Residue values used in estimating STMR are the sum of cyantraniliprole and metabolites IN-N7B69, IN-J9Z38, IN-MLA84 and IN-MYX98

[b] high residues for tissues and mean residues for egg

[c] mean residues for tissues and mean residues for egg

Residues of cyantraniliprole expected in poultry egg and tissues for use in estimating maximum residue levels are: 0.031 mg/kg (fat), 0.014mg/kg (muscle), and 0.13mg/kg (liver) and the mean residue for egg is 0.13 mg/kg.

The Meeting estimated maximum residue levels of 0.02 mg/kg for cyantraniliprole in poultry meat, 0.15 mg/kg for poultry offal, 0.04 mg/kg for poultry fat and 0.15 mg/kg for eggs. The Meeting estimated STMRs (parent plus metabolites) for dietary intake estimation are 0.004 mg/kg for meat, 0.032 mg/kg for edible offal, 0.008 mg/kg for fat and 0.043 mg/kg for egg. The Meeting withdrew its previous recommendations.

RECOMMENDATIONS

On the basis of the data from supervised trials the Meeting concluded that the residue levels listed in Annex 1 are suitable for establishing maximum residue limits and for and for IEDI assessment.

DIETARY RISK ASSESSMENT

Long-term intake

The International Estimated Daily Intake (IEDI) for cyantraniliprole was calculated for the food commodities for which STMRs or HRs were estimated and for which consumption data were available. The results are shown in Annex 3 to the 2015 Report.

The International Estimated Daily Intakes of cyantraniliprole for the 17 GEMS/Food regional diets, based on estimated STMRs were 2–20% of the maximum ADI of 0.03 mg/kg bw. The Meeting concluded that the long-term intake of residues of cyantraniliprole from uses that have been considered by the JMPR is unlikely to present a public health concern.

Short-term intake

The 2013 JMPR decided that an ARfD was unnecessary and concluded that the short-term intake of cyantraniliprole residues is unlikely to present a public health concern.