

MESOTRIONE (277)

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EXPLANATION

Mesotrione belongs to the benzoylcyclohexanedione group of herbicides. It is a systemic pre-emergence and post-emergence herbicide for selective contact and residual control of broadleaf weeds. It is rapidly absorbed by green plant tissue or taken up via the soil, and is distributed within plants by both acropetal and basipetal movement. Mesotrione acts as an inhibitor of the enzyme 4-hydroxyphenylpyruvate dioxygenase (HPPD), thereby disrupting carotenoid biosynthesis and maintenance of chlorophyll in sensitive plants resulting in a bleaching effect.

Mesotrione was first evaluated by the JMPR in 2014, when an ADI of 0–0.5 mg/kg bw was established (an ARfD was unnecessary) and maximum residue levels were recommended for a number of commodities.

The residue definition established by the 2014 JMPR for plant and animal commodities, for both compliance with MRLs and dietary risk assessment, is: mesotrione. The residue is not fat soluble.

At the Fiftieth Session of the CCPR (2018), mesotrione was scheduled for evaluation of additional uses by the 2019 Extra JMPR. The current Meeting received GAP information, residue data and processing studies for citrus fruit, pome fruit, stone fruit and tree nuts.

RESIDUE ANALYSIS

Analytical methods

Analytical methods were evaluated by the 2014 JMPR. Method RAM 366/01 was among those considered fit for purpose to determine mesotrione alone or in combination with MNBA in plant and animal commodities at a LOQ of 0.01 mg/kg. A modified version of RAM 366/01 was used for all of the new residues studies submitted, and the Meeting received new validation data and procedural recovery data for mesotrione using this method.

Method RAM 366/01-Rev

In this method, residues of mesotrione and MNBA were extracted from crop samples with acetonitrile/water containing 10 g/L sodium chloride (50:50), centrifuged and diluted with methanol/water (10:90) before reverse phase HPLC-MS/MS analysis (m/z 338→291 for quantitation, no confirmation ion transition used). The main modification to the earlier reference method (evaluated by JMPR, 2014) was the exclusion of the additional SPE clean up and methylene chloride partitioning steps.

The validation data (Table 1) for the newly considered commodities for the modified method involved determination of three recoveries at each fortification level. Mean recovery rates ranged from 73–114% and RSDs were 0.7–13.7%. The LOQ was 0.01 mg/kg in all the crop matrices investigated. The method was also validated for the metabolite MNBA with an LOQ of 0.01 mg/kg.

Table 1 Recovery data for mesotrione by LC-MS/MS (negative ion mode; m/z 338→291) for the modified method of RAM 366/01

Matrix	Fortification Level (mg/kg)	Range (%)	Mean (%)	n	RSD (%)	Report Reference
Orange (Fruit)	0.01	76, 92, 98	89	3	12.6	TK0003124
	1.0	98, 99, 101	99	3	1.2	
Orange (Dried pulp)	0.01	85, 106, 112	101	3	13.7	
	1.0	98, 100, 100	99	3	1.0	
Orange (Juice)	0.01	83, 90, 100	91	3	9.6	
	1.0	101, 102, 104	102	3	1.8	

Matrix	Fortification Level (mg/kg)	Range (%)	Mean (%)	n	RSD (%)	Report Reference
Orange (Citrus oil)	0.01	90, 98, 104	97	3	7.0	TK0003122
	1.0	96, 100, 102	99	3	3.1	
Apple (Fruit)	0.01	71, 73, 74	73	3	1.8	
	1.0	83, 102, 104	97	3	12.3	
Apple (Wet pomace)	0.01	88, 89, 100	92	3	7.5	
	1.0	95, 96, 97	96	3	0.7	
Apple (Juice)	0.01	93, 103, 104	100	3	6.0	
	1.0	111, 115, 115	114	3	2.1	
Dried prune	0.01	83, 88, 95	88	3	6.8	TK0003121
	1.0	96, 97, 102	98	3	3.2	
Plum (Fruit)	0.01	83, 87, 89	86	3	3.5	
	1.0	94, 96, 99	96	3	2.4	
Almond (Nutmeat)	0.01	85, 87, 93	89	3	5.0	TK0003120
	1.0	94, 96, 98	96	3	2.2	
Almond (Hull)	0.01	84, 93, 97	91	3	7.8	
	1.0	95, 96, 99	97	3	1.7	

Results of the concurrent recoveries in the field trials are summarized below in the evaluation of the residues trials.

Stability of pesticide residues in stored analytical samples

The freezer storage stability of residues of mesotrione has been assessed previously by the JMPR in 2014. JMPR concluded that in analytical samples stored under frozen conditions, residues of mesotrione were stable for at least 32 months in maize commodities, radish root and soya bean seed and stable for at least 13 months in blueberry, asparagus, sugar cane and okra.

The 2019 Extra JMPR evaluated storage stability data for mesotrione in lettuce leaf, orange (fruit and juice) and almond nutmeat, in samples stored over a period of 24 months. Homogenised samples were fortified with mesotrione (and MNBA as a mixed fortification solution) at 0.1 mg/kg (Report 2K13-901-TK0061099-001). Duplicate samples were prepared and stored under frozen conditions (-20 °C) and analysed at intervals up to 24 months. Mesotrione residues were quantified using the method RAM 366/01-Rev with a LOQ of 0.01 mg/kg.

Table 2 Storage of mesotrione residues in frozen plant matrices, fortified at 0.1 mg/kg mesotrione

Matrix	Sample storage interval (months)	Fortification level (mg/kg)	Residues remaining (% , uncorrected for procedural recoveries)	Procedural recoveries (%)
Leaf lettuce	0	0.1	86, 83 (85)	76, 78
	3		99, 102 (101)	92, 102
	6		94, 95 (95)	112, 107
	12		100, 101 (101)	106, 105
	18		96, 96 (96)	105, 106
	24		111, 110 (111)	105, 114
Orange Fruit	0	0.1	83, 82 (83)	88, 75
	3		82, 96 (89)	89, 88
	6		99, 89 (94)	111, 107
	12		101, 103 (102)	107, 104
	18		104, 104 (104)	105, 105
	24		109, 106 (108)	105, 117
Orange juice	0	0.1	80, 81 (81)	80, 80
	3		86, 95 (91)	106, 93
	6		96, 99 (98)	118, 120
	12		100, 103 (102)	108, 107
	18		97, 95 (96)	108, 107
	24		105, 106 (106)	115, 108

Matrix	Sample storage interval (months)	Fortification level (mg/kg)	Residues remaining (% , uncorrected for procedural recoveries)	Procedural recoveries (%)
Almond nutmeat	0	0.1	79, 79 (79)	77, 74
	3		90, 93 (92)	93, 87
	6		86, 87 (87)	100, 96
	12		102, 101 (102)	103, 101
	18		105, 112 (109)	115, 112
	24		111, 108 (110)	111, 110

Values in parentheses = mean recovery of stored samples

USE PATTERN

Mesotrione is a systemic herbicide used pre-emergence and post-emergence for selective control of annual broad-leaved weeds. Mesotrione is registered for use in a wide range of crops in many countries. Table 3 represents a summary of the additional GAP information provided to the Meeting.

Table 3 List of additional uses of mesotrione (479 g ai/L SC formulation)

Crop	Country	Method of application	No	RTI (weeks)	Timing of 1 st application	Rate (g ai/ha)	Water (L/ha)	Rate – max. per season (g ai/ha)	PHI (days)
Citrus fruit ^b	USA	Post-emergence ^a	2	20	Late fall/early winter or spring	210	93.5-374	421	1
Pome fruit ^c	USA	Post-emergence ^a	2	20	Late fall/early winter or spring	210	93.5-374	421	30
Stone fruit ^d	USA	Post-emergence ^a	2	20	Late fall/early winter or spring	210	93.5-374	421	30
Tree nuts ^e	USA	Post-emergence ^a	2	20	Late fall/early winter or spring	210	93.5-374	421	30

^a Directed or shielded spray to orchard floor, avoiding contact with trunks, fruit or crop foliage

^b Citrus fruit = Australian desert lime, Australian finger lime, Australian round lime, Brown River finger lime, calamondin, citron, citrus hybrids, grapefruit, Japanese summer grapefruit, kumquat, lemon, lime, Mediterranean mandarin, sour orange, sweet orange, pummelo, Russell River lime, Satsuma mandarin, sweet lime, Tachibana orange, Tahiti lime, tangelo, tangerine (Mandarin), tangor, trifoliate orange, unique fruit, cultivars, varieties and/or hybrids of these

^c Pome fruit = apple, azarole, crab apple, loquat, mayhaw, medlar, pear, Asian pear, quince, Chinese quince, Japanese quince, tejocote, cultivars, varieties and/or hybrids of these

^d Stone fruit = apricot, Japanese apricot, capulin, black cherry, Nanking cherry, sweet cherry, tart cherry, Chinese jujube, nectarine, peach, plum, American plum, beach plum, Canada plum, cherry plum, Chickasaw plum, Damson plum, Japanese plum, Klamath plum, prune plum, plumcot, sloe, cultivars, varieties and/or hybrids of these

^e Tree nuts = African nut-tree, almond, beech nut, Brazil nut, Brazilian pine, bunya, bur oak, butternut, Cajou nut, candlenut, cashew, chestnut, chinquapin, coconut, Coquito nut, Dika nut, ginkgo, Guiana chestnut, hazelnut (filbert), heartnut, hickory nut, Japanese horse-chestnut, macadamia nut, Mongongo nut, monkey-pot, monkey puzzle nut, Okari nut, Pachira nut, peach palm nut, pecan, pequi, pili nut, pine nut, pistachio, Sapucaia nut, tropical almond, black walnut, English walnut, yellowhorn, cultivars, varieties and/or hybrids of these

RESULTS OF SUPERVISED RESIDUE TRIALS ON CROPS

The Meeting reviewed the supervised field trial information for the following crops.

Crop Group	Commodity	Region	Table No.
Citrus	Orange	North America	4
	Grapefruit	North America	5
	Lemon	North America	6
Pome fruit	Apples	North America	7
	Pears	North America	8

Crop Group	Commodity	Region	Table No.
Stone fruit	Cherries	North America	9
	Peaches	North America	10
	Plums	North America	11
Tree nuts	Almonds	North America	12
	Pecans	North America	13
	Almond hulls (animal feed)	North America	14

The supervised trials were well documented with laboratory and field reports. In addition to the description and details of the field trials and analytical methods, reports included method validation including procedural recoveries with spiking at residue levels similar to those occurring in samples from the supervised trials. Dates of analyses or duration of residue sample storage were also provided. Although trials included control plots, no control data are recorded in the tables as all residues in controls were < the LOQ.

Intervals of freezer storage between sampling and analysis were recorded for all trials and were covered by the conditions of the freezer storage stability studies.

Results from replicated field plots are presented as individual values and have not been corrected for concurrent method recoveries. When residues were not detected they are shown as ND and when detected but below the LOQ they are reported as <0.01 mg/kg. Residues have been rounded to two significant digits. Average values have been calculated from the residue results prior to rounding and the results from trials conducted according to the maximum GAP and used for the estimation of maximum residue levels have been (underlined). Where the results of duplicate analyses are available, the highest individual value has been selected as the HR for dietary exposure estimation. Residues of MNBA were sought but not found (above the LOQ of 0.01 mg/kg) in all the residues trials and are not reported in the tables.

Citrus fruits

Twenty three residue trials were conducted in citrus fruits; twelve in orange, six in grapefruit, and five in lemon the USA in 2011.

Two broadcast applications to the orchard floor were made using an SC formulation at a nominal rate of 211 g ai/ha with an application interval of around 31 days. An adjuvant and a spray additive, the latter which was included in most trials not all, were applied in each tank mix.

Fruit samples were collected at normal commercial harvest at 1 day after last application. Additionally one trial for orange and one trial for grapefruit were conducted as decline trials where samples over time (ranging from a PHI of 0 to 10 days) were taken.

Samples were immediately frozen and maintained in frozen storage for periods of up to 277 days prior to extraction and analysis.

Residues of mesotrione (and MNBA) in oranges, grapefruits and lemons were determined simultaneously using Method RAM 366/01-Rev. Procedural recoveries were conducted at fortification levels of 0.01 mg/kg and 0.1 mg/kg with recoveries in the range of 79–114%.

Table 4 Residues in oranges from supervised trials in the USA involving two broadcast applications (applied to the orchard floor) of mesotrione (SC formulation)

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
GAP USA	2	210	20 weeks	late fall/early winter or spring	1			
Oak Hill, Florida, USA 2011 Orange / Hamlin	2	208 208	29	BBCH 79 BBCH 83	0 1 3 7 10	Fruit	ND, <0.01 (<0.01) ND, ND (ND) <0.01, <0.01 (<0.01) ND, <0.01 (<0.01) <0.01, ND (<0.01)	TK0003124-01 Applied Oct-Nov
Clermont, Florida, USA 2011 Orange / Mid sweet	2	202 201	29	BBCH 81 BBCH 83	1	Fruit	ND, <0.01 (<0.01)	TK0003124-02 Applied Oct-Nov
Clermont, Florida, USA 2011 Orange / Hamlin	2	206 206	29	BBCH 81 BBCH 83	1	Fruit	ND, ND (ND)	TK0003124-03 Applied Oct-Nov Only above trial underlined, as this trial is the same apart from variety only
Oviedo, Florida, USA 2011 Orange / Navel	2	211 212	29	BBCH 81 BBCH 83	1	Fruit	ND, ND (ND)	TK0003124-04 Applied Oct-Nov
Chuluota, Florida, USA 2011 Orange / Hamlin	2	205 207	29	BBCH 81 BBCH 83	1	Fruit	ND, ND (ND)	TK0003124-05 Applied Oct-Nov
Bithlo, Florida, USA 2011 Orange / Valencia	2	213 211	30	BBCH 85 BBCH 89	1	Fruit	<0.01, ND (<0.01)	TK0003124-06 Applied Apr-May
Clermont, Florida, USA 2011 Orange / Valencia	2	210 213	30	BBCH 85 BBCH 89	1	Fruit	<0.01, <0.01 (<0.01)	TK0003124-07 Applied Apr-May

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
Oviedo, Florida, USA 2011 Orange / Valencia	2	211 211	30	BBCH 85 BBCH 89	1	Fruit	ND, ND (<u>ND</u>)	TK0003124-08 Applied Apr- May
Raymondville, Texas, USA 2011 Orange / N33- Navel	2	228 216	28	BBCH 83 BBCH 85	1	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003124-09 Applied Nov- Dec
Porterville, California, USA 2011 Orange / Valencia	2	212 214	31	BBCH 85 BBCH 89	1	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003124-10 Applied Jun-Jul
Porterville, California, USA 2011 Orange / Washington	2	213 211	30	BBCH 81 BBCH 85	1	Fruit	ND, ND (<u>ND</u>)	TK0003124-11 Applied Nov- Dec
Richgrove, California, 2011 Orange / Atwoods	2	210 210	29	BBCH 81 BBCH 85	1	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003124-12 Applied Nov- Dec

Values in parentheses = mean of two independent representative treated samples taken at the trial site

Table 5 Residues in grapefruits from supervised trials in USA involving two broadcast applications (applied to the orchard floor) of mesotrione (SC formulation)

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
GAP USA	2	210	20 weeks	late fall/early winter or spring	1			
Oak Hill, Florida, USA 2011 Grapefruit / Rio Red	2	206 211	29	BBCH 79 BBCH 83	0 1 3 7 10	Fruit	ND, ND (ND) ND, ND (ND) ND, ND (ND) <0.01, <0.01 (<u><0.01</u>) ND, ND (ND)	TK0003124-13 Applied Oct- Nov
Clermont, Florida, USA 2011 Grapefruit / Ray	2	207 205	29	BBCH 79 BBCH 83	1	Fruit	ND, ND (<u>ND</u>)	TK0003124-14 Applied Oct- Nov

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
Mims, Florida, USA 2011 Grapefruit / Marsh White	2	211 211	29	BBCH 81 BBCH 83	1	Fruit	<0.01, ND (<u><0.01</u>)	TK0003124-15 Applied Nov- Dec
Raymondville, Texas, USA 2011 Grapefruit / Rio Red	2	225 217	28	BBCH 83 BBCH 85	1	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003124-16 Applied Nov- Dec
Porterville, California, USA 2011 Grapefruit / Mellogold	2	211 210	30	BBCH 75 BBCH 89	1	Fruit	ND, <0.01 (<u><0.01</u>)	TK0003124-17 Applied Oct- Nov
Lindsay, California, USA 2011 Grapefruit / Mellogold	2	212 212	29	BBCH 79 BBCH 85	1	Fruit	ND, <0.01 (<u><0.01</u>)	TK0003124-18 Applied Nov- Dec

Values in parentheses = mean of two independent representative treated samples taken at the trial site

Table 6 Residues in lemons from supervised trials in USA involving two broadcast applications (applied to the orchard floor) of mesotrione (SC formulation)

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
GAP USA	2	210	20 weeks	late fall/early winter or spring	1			
Clermont, Florida, USA 2011 Lemon / Bearss	2	212 211	30	BBCH 76 BBCH 79	1	Fruit	ND, ND (<u>ND</u>)	TK0003124-19 Applied Jul- Aug
Porterville, California, USA 2011 Lemon / Pryor	2	203 211	30	BBCH 75 BBCH 78	1	Fruit	ND, ND (<u>ND</u>)	TK0003124-20 Applied Oct- Nov
Filmore, California, USA 2011 Lemon / Allen/Mac	2	211 213	30	BBCH 87 BBCH 89	1	Fruit	ND, ND (<u>ND</u>)	TK0003124-21 Applied Nov- Dec

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
Somis, California, USA 2011 Lemon / Eureka	2	211 208	29	BBCH 74 BBCH 89	1	Fruit	ND, <0.01 (<0.01)	TK0003124-22 Applied Sep- Oct
Lindsay, California, USA 2011 Lemon / Lisbon	2	210 211	30	BBCH 85 BBCH 89	1	Fruit	ND, ND (ND)	TK0003124-23 Applied Nov- Dec

Values in parentheses = mean of two independent representative treated samples taken at the trial site

Pome fruits

Eighteen residue trials were conducted in pome fruits; twelve in apples and six in pears, in the USA in 2011.

Two broadcast applications to the orchard floor were made using an SC formulation at a nominal rate of 211 g ai/ha with an application interval of around 30 days. An adjuvant and a spray additive, the latter which was included in most trials not all, were applied in each tank mix.

Fruit samples were collected at normal commercial harvest (close to anticipated PHI of 30 days). Additionally one trial for apple and one trial for pear were conducted as decline trials where samples over time (ranging from a PHI of 27 to 39 days) were taken.

Samples were immediately frozen and maintained in frozen storage for periods of up to 152 days prior to extraction and analysis.

Residues of mesotrione (and MNBA) in apples and pears were determined simultaneously using the modification to the analytical method RAM 366/01-Rev. Procedural recoveries were conducted at fortification levels of 0.01 mg/kg and 0.1 mg/kg with recoveries in the range of 89–119%.

Table 7 Residues in apples from supervised trials in the USA involving two broadcast applications (applied to the orchard floor) of mesotrione (SC formulation)

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
GAP USA	2	210	20 weeks	late fall/early winter or spring	30			
Alton, New York, USA 2011 Apple / Granny Smith	2	212 212	30	BBCH 76 BBCH 77	30	Fruit	<0.01, <0.01 (<0.01)	TK0003122-01 Applied Aug- Sep
North Rose, New York, USA 2011 Apple / Empire	2	211 208	30	BBCH 77 BBCH 81	30	Fruit	<0.01, <0.01 (<0.01)	TK0003122-02 Applied Aug- Sep

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
Hereford, Pennsylvania, USA 2011 Apple / Starkrimson Red Delicious	2	214 211	29	BBCH 75 BBCH 79	31	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003122-03 Applied Jul-Aug
Cana, Virginia, USA 2011 Apple / Rome	2	211 208	30	BBCH 76 BBCH 81	31	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003122-04 Applied Jul-Aug
Conklin, Michigan, USA 2011 Apple / Red Delicious	2	210 211	30	BBCH 75 BBCH 81	30	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003122-05 Applied Jul-Aug
Marengo, Illinois, USA 2011 Apple / Red Chief	2	211 212	30	BBCH 74 BBCH 80	29	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003122-06 Applied Jul-Aug
Perry, Utah, USA 2011 Apple / Gala	2	214 212	32	BBCH 74 BBCH 78	31	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003122-07 Applied Jul-Aug
Porterville, California, USA 2011 Apple / Granny Smith	2	213 214	30	BBCH 75 BBCH 78	31	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003122-08 Applied Jul-Aug
Ephrata, Washington, USA 2011 Apple / Red Delicious	2	211 208	29	BBCH 75 BBCH 84	31	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003122-09 Applied Aug- Sep
Ephrata, Washington, USA 2011 Apple / Gala	2	214 211	30	BBCH 72 BBCH 77	30	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003122-10 Applied Jul-Aug

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
Weiser, Idaho, USA 2011 Apple / Law Rome	2	208 211	30	BBCH 76 BBCH 79	27 30 33 36 38	Fruit	<0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01)	TK0003122-11 Applied Aug- Sep
Caldwell, Idaho, USA 2011 Apple / Jonathan	2	217 219	31	BBCH 75 BBCH 78	29	Fruit	<0.01, <0.01 (<0.01)	TK0003122-12 Applied Jul-Aug

Table 8 Residues in pears from supervised trials in USA involving two broadcast applications (applied to the orchard floor) of mesotrione (SC formulation)

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
GAP USA	2	210	20 weeks	late fall/early winter or spring	30			
Alton, New York, USA 2011 Pear / Bartlett	2	212 212	30	BBCH 73 BBCH 75	30	Fruit	<0.01, <0.01 (<0.01)	TK0003122-13 Applied Jun-Jul
Lindsay, California, USA 2011 Pear / Olympic	2	212 212	30	BBCH 75 BBCH 77	27 30 33 36 39	Fruit	<0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01)	TK0003122-14 Applied Jul-Aug
Porterville, California, USA 2011 Pear / Olympic	2	211 212	30	BBCH 75 BBCH 79	30	Fruit	<0.01, <0.01 (<0.01)	TK0003122-15 Applied Jul-Aug
Ephrata, Washington, USA 2011 Pear / Bartlett	2	214 208	30	BBCH 72 BBCH 78	30	Fruit	<0.01, <0.01 (<0.01)	TK0003122-16 Applied Jul-Aug

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
Ephrata, Washington, USA 2011 Pear / Concorde	2	211 211	30	BBCH 76 BBCH 85	30	Fruit	<0.01, <0.01 (<0.01)	TK0003122-17 Applied Jul-Aug
Payette, Idaho, USA 2011 Pear / Bartlett	2	208 206	30	BBCH 75 BBCH 77	30	Fruit	<0.01, 0.01 ^a (<0.01)	TK0003122-18 Applied Jul-Aug

Values in parentheses = mean of two independent representative treated samples taken at the trial site

^a Rounded from 0.0100 mg/kg, An estimated 0.0057 mg/kg was found in the control sample. Taking account of the other trials results that are all <0.01 mg/kg, the average result for this trial is concluded as <0.01 mg/kg.

Stone fruits

Twenty one residue trials were conducted in stone fruits; six in cherries, nine in peaches, and six in plum in the USA in 2011.

Two broadcast applications to the orchard floor were made using an SC formulation at a nominal rate of 211 g ai/ha with an application interval of around 30 days. An adjuvant and a spray additive, the latter which was included in most trials not all, were applied in each tank mix.

Fruit samples were collected at normal commercial harvest (close to anticipated PHI of 30 days). Additionally one trial for cherry and one trial for peach were conducted as decline trials where samples over time (ranging from a PHI of 27 to 39 days) were taken.

Samples were immediately frozen and maintained in frozen storage for periods of up to 256 days prior to extraction and analysis.

Residues of mesotrione (and MNBA) in cherries, peaches and plums were determined simultaneously using the modification to the analytical method RAM 366/01-Rev. Procedural recoveries were conducted at fortification levels of 0.01 mg/kg and 1.0 mg/kg with recoveries in the range of 92–117%.

Table 9 Residues in cherries from supervised trials in the USA involving two broadcast applications (applied to the orchard floor) of mesotrione (SC formulation)

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
GAP USA	2	210	20 weeks	late fall/early winter or spring	30			
Alton, New York, USA 2011 Sour Cherries / Montmorency	2	213 213	30	BBCH 65 BBCH 75	27 30 33 37 39	Fruit	<0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01)	TK0003121-01 Applied May-Jun

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
GAP USA	2	210	20 weeks	late fall/early winter or spring	30			
Conklin, Michigan, USA 2011 Sour Cherries / Montmorency	2	211 210	30	BBCH 66 BBCH 78	30	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003121- 02 Applied May- Jun
Merengo, Illinois, USA 2011 Sour Cherries / North Star	2	208 215	30	BBCH 65 BBCH 73	30	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003121- 03 Applied May- Jun
Plainview, California, USA 2011 Sweet cherries / Tulare	2	212 212	30	BBCH 61 BBCH 71	30	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003121- 04 Applied Mar- Apr
Ephrata, Washington, USA 2011 Sweet cherries / Bing	2	213 214	30	BBCH 69 BBCH 75	30	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003121- 05 Applied May- Jun
Weiser, Idaho, USA 2011 Sweet cherries / Benton	2	208 216	30	BBCH 65 BBCH 73	30	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003121- 06 Applied May- Jun

Table 10 Residues in peaches from supervised trials in the USA involving two broadcast applications (applied to the orchard floor) of mesotrione (SC formulation)

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
GAP USA	2	210	20 weeks	late fall/early winter or spring	30			
Alton, New York, USA 2011 Peach / Red Haven	2	224 211	30	BBCH 73 BBCH 75	31	Fruit	<0.01, <0.01 (<u><0.01</u>)	TK0003121-07 Applied Jun-Jul

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
GAP USA	2	210	20 weeks	late fall/early winter or spring	30			
Monetta, South Carolina, USA 2011 Peach / Big Red	2	212 210	30	BBCH 75 BBCH 77	29	Fruit	<0.01, <0.01 (<0.01)	TK0003121-08 Applied Jun-Jul
Chula, Georgia, USA 2011 Peach / Hawthorne	2	205 219	30	30% fruit formation BBCH 75	30	Fruit	<0.01, <0.01 (<0.01)	TK0003121-09 Applied Apr- May
Morven, Georgia, 2011 Peach / Gala	2	216 211	30	30% fruit formation BBCH 75	30	Fruit	<0.01, <0.01 (<0.01)	TK0003121-10 Applied Apr- May
Conklin, Michigan, USA 2011 Peach / Red Haven	2	208 211	29	BBCH 73 BBCH 75	30	Fruit	<0.01, <0.01 (<0.01)	TK0003121-11 Applied Jun-Jul
D'Hanis, Texas, USA 2011 Peach / La Feliciana	2	212 205	30	BBCH 73 BBCH 79	30	Fruit	<0.01, <0.01 (<0.01)	TK0003121-12 Applied Apr- May
Kingsburg, California, USA 2011 Peach / Cling	2	215 214	30	BBCH 75 BBCH 78	27 30 33 36 39	Fruit	<0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01)	TK0003121-13 Applied May- Jun
Porterville, California, USA 2011 Peach / Fay Alberta	2	208 211	30	BBCH 75 BBCH 78	30	Fruit	<0.01, <0.01 (<0.01)	TK0003121-14 Applied Jun-Jul
Dinuba, California, USA 2011 Peach / Princess Tyme	2	214 215	30	BBCH 74 BBCH 75	30	Fruit	<0.01, <0.01 (<0.01)	TK0003121-15 Applied Apr- May

Table 11 Residues in plums from supervised trials in the USA involving two broadcast applications (applied to the orchard floor) of mesotrione (SC formulation)

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
GAP USA	2	210	20 weeks	late fall/early winter or spring	30			
Conklin, Michigan, USA 2011 Plum / Stanley	2	211 211	30	BBCH 75 BBCH 78-81	30	Fruit	<0.01, <0.01 (<u>≤0.01</u>)	TK0003121-16 Applied Jun-Jul
Poplar, California, USA 2011 Plum / French Prunes	2	210 211	30	BBCH 71 BBCH 81	30	Fruit	<0.01, <0.01 (<u>≤0.01</u>)	TK0003121-17 Applied Jun-Jul
Woodville, California, USA 2011 Plum / French Prunes	2	210 211	30	BBCH 77 BBCH 81	30	Fruit	<0.01, <0.01 (<u>≤0.01</u>)	TK0003121-18 Applied Jun-Jul
Dinuba, California, USA 2011 Plum / Friar	2	210 212	30	BBCH 75 BBCH 76	30	Fruit	<0.01, <0.01 (<u>≤0.01</u>)	TK0003121-19 Applied May-Jun
Lindsay, California, USA 2011 Plum / Angelina's	2	206 210	30	BBCH 79 BBCH 81	30	Fruit	<0.01, <0.01 (<u>≤0.01</u>)	TK0003121-20 Applied Jun-Jul
Newberg, Oregon, USA 2011 Plum / Italian	2	210 211	30	BBCH 74 BBCH 78	31	Fruit	<0.01, <0.01 (<u>≤0.01</u>)	TK0003121-21 Applied Jul-Aug

Values in parentheses = mean of two independent representative treated samples taken at the trial site

Tree nuts

Ten residue trials were conducted in tree nuts; five in almonds and five in pecans, in the USA in 2011.

Two broadcast applications to the orchard floor were made using an SC formulation at a nominal rate of 211 g ai/ha with an application interval of around 30 days. An adjuvant and a spray additive, the latter which was included in most trials not all, were applied in each tank mix.

Samples of nutmeat (almond and pecan) and hulls (almonds only) were collected at normal commercial harvest (close to anticipated PHI of 30 days). Additionally one trial for pecan and one trial

for almonds was conducted as a decline trial where samples over time (ranging from PHI of 27 to 39 days) were taken.

Samples were immediately frozen and maintained in frozen storage for periods of up to 174 days prior to extraction and analysis.

Residues of mesotrione (and MNBA) in almonds and pecans were determined simultaneously using the modification to the analytical method RAM 366/01-Rev. Procedural recoveries were conducted at fortification levels of 0.01 mg/kg and 0.1 mg/kg with recoveries in the range of 89–115%.

Table 12 Residues in almonds from supervised trials in the USA involving two broadcast applications (applied to the orchard floor) of mesotrione (SC formulation). Please refer to Table 14 for data on almonds hulls.

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
GAP USA	2	210	20 weeks	late fall/early winter or spring	30			
Terra Bella, California, USA 2011 Almond / Carmel	2	210 212	32	BBCH 79 BBCH 87	28	Nutmeat	<0.01, <0.01 (<0.01)	TK0003120- 01 Applied Jun- Jul
Wasco, California, USA 2011 Almond / Price	2	208 211	32	BBCH 79 BBCH 87	28	Nutmeat	<0.01, <0.01 (<0.01)	TK0003120- 02 Applied Jun- Jul
Buttonwillow, California, USA 2011 Almond / Monterey	2	212 211	31	BBCH 79 BBCH 87	29	Nutmeat	<0.01, <0.01 (<0.01)	TK0003120- 03 Applied Jul- Aug
Dinuba, California, USA 2011 Almond / Carmel	2	208 213	26	BBCH 79 BBCH 86	30	Nutmeat	<0.01, ND (<0.01)	TK0003120- 04 Applied Jun- Jul
Strathmore, California, USA 2011 Almond / Nonpareil	2	213 213	30	BBCH 79 BBCH 81	27 30 32 35 39	Nutmeat	<0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01)	TK0003120- 05 Applied Jun- Jul

Table 13 Residues in pecans from supervised trials in the USA involving two broadcast applications (applied to the orchard floor) of mesotrione (SC formulation)

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
GAP USA	2	210	20 weeks	late fall/early winter or spring	30			
Girard, Georgia, USA 2011 Pecan / Desirables	2	213 211	30	BBCH 76 BBCH 80	29	Nutmeat	<0.01, <0.01 (<u><0.01</u>)	TK0003120-06 Applied Sep-Oct
Mystic, Georgia, USA 2011 Pecan / Sumner	2	211 206	29	BBCH 73 BBCH 79	31	Nutmeat	<0.01, <0.01 (<u><0.01</u>)	TK0003120-07 Applied Sep-Oct
Alexandria, Louisiana, USA 2011 Pecan/ Creek	2	216 203	29	Early dough Beginning shuck split	31	Nutmeat	<0.01, <0.01 (<u><0.01</u>)	TK0003120-08 Applied Sep-Oct
Pearsall, Texas, USA 2011 Pecan/ Cheyenne	2	210 207	30	BBCH 79 BBCH 87	27 29 33 36 39	Nutmeat	<0.01, <0.01 (<0.01) <0.01, <0.01 (<u><0.01</u>) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01)	TK0003120-09 Applied Aug-Sep
Anton, Texas, USA 2011 Pecan / Western Schley	2	211 204	30	Green shuck Green shuck	30	Nutmeat	<0.01, <0.01 (<u><0.01</u>)	TK0003120-10 Applied Oct-Nov

Values in parentheses = mean of two independent representative treated samples taken at the trial site

Animal Feed- Almond hulls

Five residue trials, as reported in the evaluation above for tree nuts, were conducted in almonds in the USA in 2011 providing data on almond hulls.

Table 14 Residues in almonds from supervised trials in the USA involving two broadcast applications (applied to the orchard floor) of mesotrione (SC formulation)

Location, Country Year, Crop/Variety	No	Rate (g ai/ha)	Interval (days)	Growth stage at application	PHI (days)	Crop part	Mesotrione (mg/kg)	Reference & Comments
GAP USA	2	210	20 weeks	late fall/early winter or spring	30			
Terra Bella, California, USA 2011 Almond / Carmel	2	210 212	32	BBCH 79 BBCH 87	28	Hull	<0.01, <0.01 (<u><0.01</u>)	TK0003120-01 Applied Jun-Jul
Wasco, California, USA 2011 Almond / Price	2	208 211	32	BBCH 79 BBCH 87	28	Hull	<0.01, <0.01 (<u><0.01</u>)	TK0003120-02 Applied Jun-Jul
Buttonwillow, California, USA 2011 Almond / Monterey	2	212 211	31	BBCH 79 BBCH 87	29	Hull	<0.01, <0.01 (<u><0.01</u>)	TK0003120-03 Applied Jul-Aug
Dinuba, California, USA 2011 Almond / Carmel	2	208 213	26	BBCH 79 BBCH 86	30	Hull	<0.01, <0.01 (<u><0.01</u>)	TK0003120-04 Applied Jun-Jul
Strathmore, California, USA 2011 Almond / Nonpareil	2	213 213	30	BBCH 79 BBCH 81	27 30 32 35 39	Hull	0.051, 0.058 (0.055) 0.014, <0.01 (0.012) 0.024, 0.025 (<u>0.025</u>) 0.025, 0.013 (0.019) 0.012, 0.034 (0.023)	TK0003120-05 Applied Jun-Jul

FATE OF RESIDUES DURING PROCESSING

In processing-effect on the residue level

For the current meeting new data was received on the fate of mesotrione residues on the processing of citrus (orange), pome fruits (apple), and stone fruit (plums).

The validated analytical method (RAM 366/01-Rev) was used to measure residues of mesotrione with concurrent recoveries for the processed fractions of 87–116% (at fortification levels at the LOQ of 0.01 mg/kg and at 0.1 mg/kg). Residues of MNBA were sought but not found (above the LOQ of 0.01 mg/kg) in all the processing trials and are not reported below.

Citrus (orange)

In two of the supervised field trials on oranges, an additional plot was treated with an exaggerated rate (3×) of 632 g ai/ha as a directed orchard floor spray. The application interval was 30–31 days. Whole orange fruit samples were harvested 1 day after the last application.

Fruit samples were processed via representative processes to dried pulp, orange oil and juice. The processes used were to simulate commercial operations. The effect of peeling was not investigated as part of this study.

The residues in the raw agricultural commodity (RAC) and the processed fractions are presented in Table 14.

Pome fruit (apple)

In two of the supervised field trials on apples, an additional plot was treated with an exaggerated rate (3×) of 632 g or 645 g ai/ha as a directed orchard-floor spray. The application interval was 29–30 days. Whole apple fruit samples were harvested 30 or 31 days after the last application.

Fruit samples were processed via representative processes to wet pomace and apple juice. The processes used were to simulate commercial operations.

The residues in the raw agricultural commodity (RAC) and the processed fractions are presented in Table 14.

Stone fruit (plum)

In two of the supervised field trials on plums, an additional plot was treated with an exaggerated rate (3×) of 632 g as a directed orchard-floor spray. The application interval was 30 days. Whole plum fruit samples were harvested 30 days after the last application.

Fruit samples were processed via representative processes to dried prunes. The processes used were to simulate commercial operations.

The residues in the raw agricultural commodity (RAC) and the processed fractions are presented in Table 15.

Table 15 Residues of mesotrione in processed fractions of oranges, apples and plums

Crop	Trial Details	Commodity	Residue of mesotrione (mg/kg)	Processing Factor (PF) ^a
Oranges	Oveido, FL (variety Valencia) 2 × 632-637 g ai/ha 187 L water/ha 30-day RTI 1-day PHI TK0003124-08	Orange whole fruit (RAC)	<0.01, <0.01 (<0.01)	—
		Juice	<0.01, <0.01 (<0.01)	n.d.
		Orange oil	<0.01, <0.01 (<0.01)	n.d.
		Dried pulp	<0.01, <0.01 (<0.01)	n.d.
	Porterville, CA (variety Valencia) 2 × 631-634 g ai/ha 262 L water/ha 31-day RTI 1-day PHI TK0003124-10	Orange whole fruit (RAC)	<0.01, <0.01 (<0.01)	—
		Juice	<0.01, 0.01 ^b (<0.01)	n.d.
		Orange oil	<0.01, <0.01 (<0.01)	n.d.
		Dried pulp	<0.01, <0.01 (<0.01)	n.d.
Apples	Alton, NY (variety Granny Smith) 2 × 630-633 g ai/ha 374 L water/ha 30-day RTI 30-day PHI TK0003122-01	Apple whole fruit (RAC)	<0.01, <0.01 (<0.01)	—
		Juice	<0.01, <0.01 (<0.01)	n.d.
		Wet pomace	<0.01, <0.01 (<0.01)	n.d.
	Ephrata, WA (variety Red Delicious)	Apple whole fruit (RAC)	<0.01, <0.01 (<0.01)	—
		Juice	ND, ND ND)	n.d.

Crop	Trial Details	Commodity	Residue of mesotrione (mg/kg)	Processing Factor (PF) ^a
	2 × 649-642 g ai/ha 281 L water/ha 29-day RTI 31-day PHI TK0003122-09	Wet pomace	<0.01, <0.01 (<0.01)	n.d.
Plums	Poplar, CA (variety French prunes) 2 × 631-632 g ai/ha 262 L water/ha 30-day RTI 30-day PHI TK0003121-17	Plum whole fruit (RAC)	<0.01, <0.01 (<0.01)	—
		Dried prunes	<0.01, <0.01 (<0.01)	n.d.
	Woodville, CA (variety French Prunes) 2 × 631-633 g ai/ha 262 L water/ha 30-day RTI 30-day PHI TK0003121-18	Plum whole fruit (RAC)	<0.01, <0.01 (<0.01)	—
		Dried prunes	<0.01, <0.01 (<0.01)	n.d.

Values in parentheses = mean of two independent representative treated samples taken at the trial site

RAC = raw agricultural commodity

^a Processing factor = residue in processed commodity (mg/kg) / residue in RAC (mg/kg). Since average residues for each trial were <LOQ (<0.01 mg/kg), it is not possible to give a numeric estimation of a processing factor. It is not possible to conclude whether residues decline or concentrate over processing.

^b Rounded from 0.0105 mg/kg. An estimated 0.0042 mg/kg was found in the control juice sample. The average result for this trial is concluded as <0.01 mg/kg.

Due to residues being concluded as <LOQ in all the processed and unprocessed (RAC) fractions, it is not possible to conclude on whether there is any concentration or reduction in residues over processing, and processing factors could not be derived.

APPRAISAL

Mesotrione, a herbicide, was firstly evaluated by the JMPR in 2014, when an ADI of 0–0.5 mg/kg bw was established, and an ARfD was unnecessary. The residue definition for plant and animal commodities, for both compliance with MRLs and dietary risk assessment is: *mesotrione*. The residue is not fat soluble.

At the Fiftieth Session of the CCPR (2018), mesotrione was scheduled for evaluation of additional uses by the 2019 Extra JMPR. The current Meeting received GAP information, residue data and processing studies for citrus fruit, pome fruit, stone fruit and tree nuts.

Methods of analysis

Residues were determined in the crops with a method involving extraction with acetonitrile/water containing sodium chloride, with a final determination, following dilution with methanol/water, using HPLC-MS/MS. The Meeting concluded that suitable methods are available for the determination of residues of mesotrione with a LOQ of 0.01 mg/kg in the commodities under consideration.

Stability of residues in stored analytical samples

The stability of residues has been assessed previously by the JMPR for a range of crop matrices. In this meeting stability data were provided for lettuce leaf, orange (fruit and juice) and almond nutmeat indicating that residues of mesotrione were stable in these commodities for at least 24 months of frozen storage. The maximum length of storage of commodities considered by the current meeting was up to 277 days. All trial samples and processed commodities were analysed within acceptable storage intervals.

Results of supervised residue trials on crops

Citrus fruits

The critical GAP in the USA for citrus is two applications at 210 g ai/ha with a PHI of 1 day. Eleven residue trials in orange, six in grapefruit, and five in lemon, approximating the GAP but with a shorter application interval were received.

Residues in citrus fruits (oranges, grapefruits and lemons) were all ≤ 0.01 mg/kg (n=22).

Whilst trial data are not available for the subgroup mandarins, the other various citrus crop data that are available show that residues would not be expected in mandarins following the GAP for citrus fruits. The Meeting agreed to include mandarins in the recommendation.

Six trials across various fruit tree crops including citrus fruits conducted at an exaggerated rate (3×) for the purpose of studying processing showed residues < 0.01 mg/kg. Furthermore, mesotrione is applied to the ground at the base of the trees and not directed to the crop.

The Meeting estimated a maximum residue level of 0.01(*) mg/kg and a STMR of 0 mg/kg for the citrus fruits group.

Pome fruits

The critical GAP in the USA for pome fruit is two applications at 210 g ai/ha with a PHI of 30 days. Twelve residue trials in apples and six in pears, approximating the GAP but with a shorter application interval were received.

Residues in pome fruits (apples and pears) were all ≤ 0.01 mg/kg (n=18).

Six trials across various fruit tree crops including pome fruits conducted at an exaggerated rate (3×) for the purpose of studying processing showed residues < 0.01 mg/kg. Furthermore, mesotrione is applied to the ground at the base of the trees and not directed to the crop.

The Meeting estimated a maximum residue level of 0.01(*) mg/kg and a STMR of 0 mg/kg for the pome fruits group.

Stone fruits

The critical GAP in the USA for stone fruits is two applications at 210 g ai/ha with a PHI of 30 days. Six residue trials in cherries, nine in peaches and six in plums, approximating the GAP but with a shorter application interval, were received.

Residues in stone fruits (cherries, peaches and plums) were all ≤ 0.01 mg/kg (n=21).

Six trials across various fruit tree crops including stone fruits conducted at an exaggerated rate (3×) for the purpose of studying processing showed residues < 0.01 mg/kg. Furthermore, mesotrione is applied to the ground at the base of the trees and not directed to the crop.

The Meeting estimated a maximum residue level of 0.01(*) mg/kg and a STMR of 0 mg/kg for stone fruits group.

Tree nuts

The critical GAP in the USA for tree nuts is two applications at 210 g ai/ha with a PHI of 30 days. Five residue trials in almonds and five in pecans, approximating the GAP but with a shorter application interval were received.

Residues in tree nuts (almonds and pecans) were all ≤ 0.01 mg/kg (n=10).

The Meeting estimated a maximum residue level of 0.01(*) mg/kg and a STMR of 0.01 mg/kg for tree nuts group.

*Animal feed commodities**Almond hulls*

The critical GAP is for the USA which is two applications at 210 g ai/ha with a PHI of 30 days. Five residue trials in almonds, approximating the GAP but with a shorter application interval were available.

Residues in almond hulls were: ≤ 0.01 (4) and 0.025 mg/kg.

The Meeting estimated a maximum residue level of 0.04 mg/kg (dry weight basis) and a median of 0.01 mg/kg for almond hulls.

Residues in processed commodities

The current meeting received residue data on the magnitude of residues over processing for mesotrione on citrus fruits (orange), pome fruits (apple), and stone fruits (plums). Two trials for each commodity were conducted at an exaggerated rate (3×); residues were below the LOQ (< 0.01 mg/kg) in both raw and processed fractions and it was not possible to derive processing factors.

Residues in animal commodities

Dietary burden calculations, incorporating almond hulls and the other feed items considered by the JMPR in 2014, have been undertaken. Estimation by the present meeting does not impact on the previous (2014) level of the dietary burden. The Meeting confirmed the previous recommendations for mesotrione for animal commodities.

RECOMMENDATIONS

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

Definition of the residue for compliance with the MRL and dietary risk assessment for plant commodities: mesotrione.

Definition of the residue for compliance with the MRL and dietary risk assessment for animal commodities: mesotrione.

The residue is not fat-soluble.

CCN	Commodity	Recommended Maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
		New	Previous		
FC 0001	Citrus fruits	0.01*	-	0	
FP 0009	Pome fruits	0.01*	-	0	
FS 0012	Stone fruits	0.01*	-	0	
TN 0085	Tree nuts	0.01*	-	0.01	

CCN	Commodity	Recommended Maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
		New	Previous		
AM 0660	Almond hulls	0.04 (dw)	-	Median: 0.01 (as)	

(as) – as received; (dw) – dry weight

DIETARY RISK ASSESSMENT

Long-term dietary exposure

The ADI for mesotrione is 0–0.5 mg/kg bw. The International Estimated Daily Intakes (IEDIs) for mesotrione were estimated for the 17 GEMS/Food Consumption Cluster Diets using the STMR or STMR-P values estimated by the JMPR. The results are shown in Annex 3 of the 2019 Extra JMPR Report.

The IEDIs were 0% of the maximum ADI. The Meeting concluded that long-term dietary exposure to residues of mesotrione from uses considered by the JMPR is unlikely to present a public health concern.

Acute dietary exposure

The 2014 JMPR decided that an ARfD for mesotrione was unnecessary. The Meeting therefore concluded that the acute dietary exposure to residues of mesotrione from the uses considered is unlikely to present a public health concern.

REFERENCES

Author	Report No./Trial ID	Year	Title, Institute
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Wyatt, D.R.	TK0003122	2012	Mesotrione: Mesotrione SC (A12738A) – Magnitude of the Residues in or on Apple and Pear as Representative Crops of Pome Fruits, Group 11 – USA, 2011. Report No. TK0003122. Syngenta File No. A12738A_50050
Wyatt, D.R.	TK0003121	2012	Mesotrione: Mesotrione SC (A12738A) – Magnitude of the Residues in or on Cherry, Peach, and Plum as Representative Crops of Stone Fruits, Group 12 – USA, 2011. Report No. TK0003121. Syngenta File No. A12738A_50046
Wyatt, D.R.	TK0003120	2012	Mesotrione: Mesotrione SC (A12738A) - Magnitude of the Residues in or on Almond and Pecan as Representative Crops of Tree Nuts, Group 14 - USA, 2011. Report No. TK0003120. Syngenta File No. A12738A_50043
Perez, R, Patel, D, Perez, S	2K13-901-TK0061099-001	2013	Stability of Mesotrione and MNBA Residues in Diverse Crop Commodities Stored Under Freezer Conditions. Report No. 2K13-901-TK0061099-001. Syngenta File No. ZA1296_50735