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ADHOC LIST OF AGROCHEMICALS WITH EU MRL AND PHI FOR POMEGRANATE PRODUCTION

ICAR-National Research Centre on Pomegranate, Solapur

ICAR-Indian Institute of Horticultural Research, Bengaluru

Updated: 26th March, 2021

S. No.	Agrochemicals recommended for major diseases and insect pests	Nature of Pesticide	Dose on formulation basis	EU MRL (mg/kg)	PHI (Days)
	DISEASES				
A. Bacterial Blight *(Xanthomonas axonopodis* pv. *punicae)*					
1a	Copper compounds	NS		20	60
	(i) Copper hydroxide 53.8% WP		1.5-2 g/l		
	(ii) Copper oxychloride 50% WP		2.5-3.0 g/l		
	(iii) Bordeaux Mixture (freshly prepared)		0.5-1 %		
2	2-Bromo-2-nitropropane-1,3-diol (a.i. 95%)	S	0.5 g/l	0.01	60
3	Streptomycin sulphate 90% + Tetracycline hydrochloride 10%	S	0.5 g/l	0.01+0.01	60
B. Wilt (Fungi: *Ceratocystis fimbriata; Macrophomina sp.; Rhizoctonia; Fusarium oxysporum)*					
4a	**Carbendazim 50% WP** $ # @	S	2.0 g/l	0.1	@
5a	Fosetyl-Al 80% WP @ @	S	0.6 g/l	2.00	@
6a	Propiconazole 25% EC @	S	2.0 ml/l	0.01	@
7a	Tebuconazole 25.9% w/w EC@	S	0.3 ml/l	0.02	@
@ Note: Recommended for soil application/drenching only during rest period soon after harvest					

S. No.	Agrochemicals recommended for major diseases and insect pests	Nature of Pesticide	Dose on formulation basis	EU MRL (mg/kg)	PHI (Days)
C. Fungal Leaf/Fruit Spots and Rots *(Alternaria alternate; Cercospora punicae; Colletotrichum sp.; Coniella sp.; Drechslera sp.; Sphaceloma sp. etc.)*					
8a	Azoxystrobin 23% SC	S	0.5-1.0 ml/l	0.01	25
9	Azoxystrobin 20% SC + Difenoconazole 12.5 % SC	S+ S	1 ml/l	0.01+ 0.1	60
4b	**Carbendazim 50% WP** $^{\$\#}$	S	1.0 g/l	0.1	100
10	Chlorothalonil 75% WP $^{\#}$	NS	2.0 g/l	0.01	90
11	Chlorothalonil 50% WP + Metalaxyl-M 3.75%	NS+ S	2.0-2.5 g/l	0.01+ 0.01	90
1b	Copper compounds	NS		20	60
	(i) Copper hydroxide 53.8% WP		1.5-2 g/l		
	(ii) Copper oxychloride 50% WP		2.5-3.0 g/l		
	(iii) Bordeaux Mixture (freshly prepared)		0.5-1 %		
12	Copper oxychloride 45% WP + Kasugamycin 5%	S+NS	2-2.5 g/l	20.0 + NF	60
13	Difenoconazole 25% EC	S	0.5-1 .0 ml/l	0.1	60
14	Hexaconazole 5%EC	S	1.0 ml/l	0.01	70
15a	**Mancozeb 75% WP** $^{\#}$	NS	2.0 g/l	0.05	100
7	Mandipropamid 23.4% SC	NS	0.8 – 1 ml/l	0.01	100
16a	Metalaxyl 8% + $^{\#}$ **Mancozeb 64% WP**	S+NS	2.5 g/l	0.01+ 0.05	90
17	Myclobutanil 10WP	S	0.4 g/l	0.02	90
6b	Propiconazole 25% EC	S	0.5-1 ml/l	0.01	60
18	Propineb 70% WP $^{\#}$	NS	3.0 g/l	0.05	100
19a	Pyraclostrobin 20% WG	S	1.0 g/l	0.02	60
20	Pyraclostrobin 5% + Metiram 55% WG $^{\#}$	S+NS	1.5-1.75 g/l	0.02+0.05	120
6	Sulphur 80% WP	NS	2.5 g/l	50	15
7b	Tebuconazole 25.9 EC	S	0.625 ml/l	0.02	60
21	Tebuconazole 50% + Trifloxystrobin 25% WG	S+S	0.175-0.2 g/l	0.02+0.01	60
22	**Thiophanate Methyl 70% WP** $^{\$}$	S	1.0 g/l	0.1	60
23	**Thiram 75%WP** $^{\$\#}$	NS	2.0g/l	0.1	100
24	Tricyclazole 18%+**Mancozeb 62% WP**$^{\$}$	S+NS	2.5-3g/l	0.01+ 0.05	90
25	**Ziram** 27%SC $^{\$\#}$	NS	2.5ml/l	0.1	100
D. Fungal Blight *(Phytophthora* sp.*)*					
8b	Azoxystrobin 23% SC	S	0.5-1.0 ml/l	0.01	60
26	Boscalid 25.2% + Pyraclostrobin 12.8% w/w WG	S+S	0.5-0.6 g/l	0.01	60
1c	Copper compounds	NS		20	60
	(i) Copper hydroxide 53.8% WP		1.5-2 g/l		
	(ii) Copper oxychloride 50% WP		2.5-3.0 g/l		
	(iii) Bordeaux Mixture (freshly prepared)		0.5-1 %		

S. No.	Agrochemicals recommended for major diseases and insect pests	Nature of Pesticide	Dose on formulation basis	EU MRL (mg/kg)	PHI (Days)
27	Cymoxanil 8%+**Mancozeb** 64% WP	S+NS	2.0 g/l	0.01+0.05	90
28	Dimethomorph 50% WP	S	1.0 g/l	0.01	90
5b	Fosetyl- Al 80%WP	S	2.0 g/l	2.0	52
15b	**Mancozeb 75% WP** $\$\#$	NS	2.0g/l	0.05	90
16b	Metalaxyl 8% + $\#$**Mancozeb** 64% $\$$ WP	S	2.5 g/l	0.01+ 0.05	90
19b	Pyraclostrobin 20% WG	S	1.0 g/l	0.02	60
INSECT AND NON INSECT PESTS					
E. Fruit Borer (*Deudorix isocrates*)					
29a	Azadirachtin 1% (10000 ppm)	NS	3.0 ml/l	0.01	3
30a	Chlorantraniliprole (18.5% EC)	NS	0.75 ml/l	0.4	60
31a	Chlorantraniliprole 9.3% w/w + Lambda Cyhalothrin 4.6% w/w ZC	NS	0.25 ml/l	0.4+0.01	55
32a	Cyantraniliprole 10.26% OD	S	0.7-0.9 ml/l	0.01	40
33a	Cypermethrin 25% EC	NS	1.0 ml/l	0.05	70
34a	Flubendiamide 19.92**%** w/w + Thiacloprid 19.92**%** w/w	NS+S	0.5 ml/l	0.01+ 0.01	90
35a	Indoxacarb 14.5% SC	NS	0.75 ml/l	0.02	30
36a	Spinetoram 12**%** SC	NS	0.75 ml/l	0.05	30
37a	Spinosad 45% SC	NS	0.5 ml/l	0.02	40
38a	Tolfenpyrad 15 % EC	NS	0.75-1.0 ml/l	NF	30
F. Stem Borer (*Celosterna spinator*), **Shot hole borer** (*Xyleborus fernicatus*), **Termites** (*Odontotermes obesus*, *Microtermis obesi*)					
29b	Azadirachtin 1% (10000 ppm)	NS	3.0 ml/l	0.01	3
31b	Chlorantraniliprole 9.3% w/w + Lambda Cyhalothrin 4.6% w/w ZC	NS	0.25 ml/l	0.4+0.01	55
39	**Chlorpyrifos 20% EC** $\$\#@$	NS	2.0 ml/l	0.01	40
40a	Imidacloprid 17.8% SL $\#$ *	S	0.5 ml/l	1.0	60
41a	Lambda-Cyhalothrin 5% EC *	NS	2.0 ml/l	0.01	80
42a	Thiamethoxam 25%WG $\#$*	S	0.5 g/l	0.01	60
@ **Note**: **Recommended for soil application/drenching/ stem pasting/spray**					
G. Mealybugs (*Ferrisia virgata; Nipaecoccus virdis; Pseudococcus jackbeardsleyi* etc.***) Scale Insects (***Ceroplastes* spp.**)**					
29c	Azadirachtin 1% (10000 ppm)	NS	3.0 ml/l	0.01	3
43	Buprofezin 25% SC	NS	1-1.5 ml/l	0.01	38
32b	Cyantraniliprole 10.26% OD	S	0.7-0.9 ml/l	0.01	40
44	Emamectin benzoate 3%+ Thiamethoxam 12% WG	NS+S	0.75-1.0 g/l	0.01+ 0.01	60
40b	Imidacloprid 17.8% SL $\#$ *	S	0.5 ml/l	1.0	60
36b	Spinetoram 12% SC	NS	0.75-1.0 ml/l	0.05	30
45	Thiamethoxam 12.6 + Lambda cyhalothrin 9.5 % ZC	S+NS	0.75-1.0 ml/l	0.01+ 0.01	80
42b	Thiamethoxam 25%WG $\#$ *	S	0.5 g/l	0.01	60

S. No.	Agrochemicals recommended for major diseases and insect pests	Nature of Pesticide	Dose on formulation basis	EU MRL (mg/kg)	PHI (Days)
H. Thrips (*Scirtothrips dorsalis***), Aphids** *(Aphis punicae*), **Whitefly** *(Siphoninus phillyreae*), **Sucking bugs** (*Nezara viridula)* leaf footed bug *etc.*					
46	Acetamiprid 20 SP # *	S	0.3 ml/l	0.01	90
29d	Azadirachtin 1% (10000 ppm)	NS	3.0 ml/l	0.01	3
30b	Chlorantraniliprole (18.5% SC)	NS	0.75 ml/l	0.4	60
47	Chlorantraniliprole 8.80 %+ Thiamethoxam 17.5%	NS+S	0.75 ml/l	0.4+ 0.01	60
31c	Chlorantraniliprole 9.3% w/w + Lambda Cyhalothrin 4.6% w/w ZC	NS	0.25 ml/l	0.4+0.01	55
48	**Chlorpyrifos 50%** $ + Alphacypermethrin 5% EC	NS+NS	0.75 ml/l	0.01+ 0.05	70
32c	Cyantraniliprole 10.26% OD	S	0.7-0.9 ml/l	0.01	40
49	Fipronil 80WG # *	NS	0.25 g/l	0.005	90
50	Flonicamid 50% WG	NS	0.75-1.0 g/l	0.03	30
51	Flubendiamide 19.92% w/w+ Thiacloprid 19.92% w/w SC	NS+S	0.5 ml/l	0.01+0.01	90
40c	Imidacloprid 17.8% SL *	S	0.5 ml/l	1.0	60
51	Pongamia oil	NS	3.0 ml/l	NF	3
41b	Lambda-Cyhalothrin 5% EC # *	NS	0.5 ml/l	0.01	80
36c	Spinetoram 12% SC	NS	0.75 ml/l	0.05	30
37b	Spinosad 45% SC	NS	0.5 ml/l	0.02	40
52	Thiacloprid 21.7%SC #	S	0.3-0.75 ml/l	0.01	90
42c	Thiamethoxam 25%WG #*	S	0.5 g/l	0.01	60
38b	Tolfenpyrad 15 % EC	NS	0.75-1.0 ml/l	NF	30
I. Mites (*Tenupalpus punicae***)**					
29e	Azadirachtin 1%	NS	2.0 ml/l	0.01	3
53	Fenazaquin 10%EC	NS	1.5 ml/l	0.01	30
54	Fenpyroximate 5% EC	NS	0.4-0.5 ml/l	0.01	40
55	Phosalone 35% EC	NS	2.0 ml/l	0.01	40
56	Propargite 57% EC #	NS	1.0 ml/l	0.01	15
57	Spiromesifen 240 SC	NS	0.4-0.5 ml/l	0.02	30
J. Leaf eating caterpillars (*Spodoptera litura, Trabala vishnou and Ophiusa tirhaca***)**					
30c	Chlorantraniliprole (18.5% EC)	NS	0.75 ml/l	0.4	60
31d	Chlorantraniliprole 9.3% w/w + Lambda Cyhalothrin 4.6% w/w ZC	NS	0.25 ml/l	0.4+0.01	55
32d	Cyantraniliprole 10.26% OD	S	0.7-0.9 ml/l	0.01	40
33b	Cypermethrin 25% EC	NS	1.0 ml/l	0.05	70
58	**Deltamethrin 2.8 EC** # $	NS	1.5 ml/l	0.01	40
35b	Indoxacarb 14.5% SC	NS	0.75 ml/l	0.02	30
36d	Spinetoram 12% SC	NS	0.75 ml/l	0.05	30
37c	Spinosad 45% SC	NS	0.5 ml/l	0.02	40

S. No.	Agrochemicals recommended for major diseases and insect pests	Nature of Pesticide	Dose on formulation basis	EU MRL (mg/kg)	PHI (Days)
K. Nematodes (*Meloidogyne incognita*)					
29f	Azadirachtin 1% (10000 ppm)[€]	NS	2.0 ml/l	0.01	3
59	Fluensulfone 2**%** GR [®]	NS	10 g/dripper	NF	30
60	Fluopyram 34.48% SC[!]	S	2 ml/plant	0.01	135
Note: [€]Needs to be applied through drip irrigation. [®] The dose needs to be distributed according to the no**.** of dippers per plants; quantity of chemical should be 10 gram per dripper and maximum dose should not exceed 40 gram per plant with 4 drippers. [!]Plants should be watered sufficiently before drenching. Drenching should be done @ 2ml/plant in 1 liter of water.					
PLANT GROWTH REGULATORS **(For defoliation, flowering and checking flower/fruit drop)**					
61	6-Benzylaminopurine (6BA) Technical grade	S	0.01 to 0.02 g/l	NA	NA
62	**2,4-Dichloro phenoxy acetic acid Technical grade**[$]	S	0.01 to 0.02 g/l	0.1 (NF)	60
63	Ethephon 39% SL	S	1.0- 2.5 ml/l	0.05	135
64	Gibberellic Acid (GA) Technical grade	S	0.02 to 0.05 g/l	NA	NA
65	1-Naphthyl acetic acid 4.5% SL	S	0.23 ml/l	0.06 (NF)	60
WEEDICIDE					
66	Indaziflam 500 SC	S	0.125 ml/l	NF	55

EU-MRL: European Union–Maximum Residue Level **PHI**: Pre Harvest Interval;
NA: Not Available **NS**: Non-systemic; **S**: Systemic **NF**= Not Found **NA**: Not Applicable

Note:

[*] Pesticides highly toxic to honey bees**:** Avoid sprays in the flowering period

[#] Not banned but in EU Pesticides Watch list; Use with caution

[®] Not enlisted in EU pesticide list but it was evaluated for toxicology jointly by FAO/WHO meeting on pesticide residues (JMPR) in 2013.

[$] The names of the chemicals mentioned in the bold font and marked with [$] are mentioned in the gazette of India. Draft order: Banning of Insecticides Order, Department of Agriculture Cooperation and Farmer's Welfare, GOI, May 18: 2020 (Complete list given at the end.)

NOTE:

- *Recommended agrochemicals for the management of various insect pests and diseases along with their dose, PHI and MRL values are recommendations by Universities and Institutes & available research literature, hence are of advisory nature for the Good Pomegranate Production Practices and therefore, not covered under any legal scrutiny.*
- *As the data based on scientific field trials on PHI for pomegranate are not available for all chemicals hence, are based on available residue analysis reports of limited pomegranate samples of harvested produce during previous years or PHI for other fruit crops grown in similar climatic conditions and hence, may change at later stage on*

availability of scientific data. Therefore PHI given here are only indicative and ad-hoc in nature and are of advisory nature, therefore, not covered under any legal scrutiny.

- *All the doses mentioned above are for high volume sprayers, where normal spray volume is 1000 l/ha. Spray volume can however, be changed as per the efficiency of sprayers used. However, the amount of each pesticide (active ingredient) recommended for 1 ha on the basis of 1000 l spray solution should be strictly maintained to minimize pesticide residues.*
- *The responsibility of safe usage of chemicals for the management of any of the above pests and diseases will rest with the growers or exporters in compliance with the requirements of the Exporters/EU. ICAR-National Research Centre on Pomegranate and ICAR-Indian Institute of Horticultural Research, Bengaluru shall not be covered under any legal scrutiny.*

CIB REGISTERED LIST OF PESTICIDES FOR POMEGRANATE

[Reference: MAJOR USES OF PESTICIDES, (Registered under the Insecticides Act, 1968), (UPTO - 30/11/2020); http://ppqs.gov.in/divisions/cib-rc/major-uses-of-pesticides]

Fungicides: (1) Azoxystrobin 23% SC, **(2)** Difenoconozole 25 % EC, **(3)** Kitazin 48% SC , **(4)** Propineb 70% WP and **(5)** Metiram 55% + Pyraclostrobin 5% WG

Insecticides: (1) Cyantraniliprole 10.26% OD, **(2)** Lambda-cyhalothrin 04.90% CS and **(3)** Quinalphos 25% EC

Growth Hormones: (1) Ethephon 39% SL

LIST OF PESTICIDES WHICH MAY BE BANNED IN INDIA

Reference: Draft order: Banning of Insecticides Order, Department of Agriculture Cooperation and Farmer's Welfare, GOI, May 18: 2020 http://agricoop.nic.in/sites/default/files/Notification.pdf

Note: the order will come into force on the date of its final publication in the Official Gazette.

1. Acephate	8. Chlorpyriphos	15. Malathion	22. Sulfosulfuron
2. Atrazine	9. 2,4-D	16. Mancozeb	23. Thiodicarb
3. Benfuracarb	10. Deltamethrin	17. Methomyl	24. Thiophanat methyl
4. Butachlor	11. Dicofol	18. Monocrotophos	25. Thiram
5. Captan	12. Dimethoate	19. Oxyfluorfen	26. Zineb
6. Carbendazim	13. Dinocap	20. Pendimethalin	27. Ziram
7. Carbofuran	14. Diuron	21. Quinalphos	

S. No. &, 13 and 18 banned in EU also
S. No.6 and 16 in EU Watchlist

Disclaimer: The document has been compiled on the basis of available information for guidance and not for legal purposes.

CONTRIBUTORS

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