

Annexure

Substitutes for pesticides banned by Govt of Kerala vide G.O. (MS) No. 116/2011/ Agri dated 7-5-2011

(Interim Recommendations)

Sl. No	Name of chemical banned	Present Recommendation of the Chemical for Crop / Pest as per KAU Package 2007	Substitute chemicals recommended against banned chemical	Colour code (Tox. Class) of the chemical	Dosage per hectre of formulated product of substitute chemicals
1	Endosulfan	Not recommended by KAU	1.Carbaryl 50%WP	Yellow	588 g/ha
			2.Quinalphos 25%EC	Yellow	1.5 L/ha
2	Carbofuran (Red)	1. Rice Stem Borer, Gall Midge, BPH, GLH, Hispa, Nematodes	1.Carbosulfan 6 % G	Yellow	16.7kg/ha
			2.Cartap hydrochloride 4% G	Yellow	25kg/ha
			3. Quinalphos 5% G	Yellow	5kg/ha
			4.Fipronil 0.3% G	Yellow	25kg/ha
			5.Chlorantraniliprole 0.4% G	Green	10kg/ha
			6.Thiamethoxam 25% WG	Blue	100g/ha
			7.Flubendiamide 39.35% SC	Green	50ml/ha
			8.Flubendiamide 20% WG	Green	125g/ha
			9.Imidacloprid 17.8% SL	Yellow	125 ml/ha
			10. Acephate 75 SP	Blue	1.0kg/ha
		2.Banana Aphid (Vector of virus diseases)	1.Dimethoate 30 EC	Yellow	1.98 L/ha

		Nematodes	2. Carbosulfan 6% G	Yellow	16.7kg/ha
		The following management practices should be adopted against virus diseases in banana			
		1.Field Sanitation through massive campaign			
		2.Enforcement of domestic quarantine of planting materials			
		3.Production and distribution of disease free virus indexed, tissue culture plantlets.			
		4.Paring of suckers followed by hot water treatment and application of neem cake			
		5.Crop insurance scheme to be streamlined			
		3.Brinjal (sucking pests)	1.Azadirachtin 1%EC	Green	1-1.5L/ha
			2.Azadirachtin 0.03 %EC	Green	5 L/ha
			3. Spinosad 45% SC	Blue	160ml/ha
		4.Cardamom Nematodes	1.Carbosulfan 6% G	Yellow	16.7kg/ha
3	Phorate (Red)	1. Rice Stem Borer, Gall Midge, BPH, GLH, Hispa, Nematodes	1.Carbosulfan 6% G	Yellow	16.7kg/ha
			2.Cartap hydrochloride 4% G	Yellow	25kg/ha
			3.Quinalphos 5% G	Yellow	5kg/ha
			4.Fipronil 0.3% GR	Yellow	25kg/ha
			5.Chlorantraniliprole 0.4% G	Green	10kg/ha
			6.Thiamethoxam 25% WG	Blue	100g/ha

			7.Flubendiamide 39.35% SC	Green	50 ml/ha	
			8.Flubendiamide 20% WG	Green	125g/ha	
4	Methyl Parathion (Red)	1. Rice BPH, Thrips, Hoppers, bugs, leaf folder	1.Quinalphos 5%G	Yellow	5kg/ha	
			2.Quinalphos 25 % EC	Yellow	1.5 L/ha	
			3.Carbaryl 5% DP	Yellow	25kg/ha	
			4.Carbaryl 85%WP	Yellow	588g/ha	
			5.Chlorpyrifos 20% EC	Yellow	1.87 L/ha	
			6.Fipronil 5%SC	Yellow	1.5 L/ha	
			7.Thiamethoxam 25% WG	Blue	100g/ha	
			8 Acephate 75 SP	Blue	1.0kg/ha	
				<u>For Stem borer and leaf folder</u>		
					1.Cartap hydrochloride 4% G	Yellow
			2.Cartap hydrochloride 50% SP	Yellow	1.0kg/ha	

			3.Fipronil 80% WG	Yellow	62.5g/ha
			4.Chlorantraniliprole 18.5%SC	Green	150 ml/ha
			5.Chlorantraniliprole 0.4% Gr	Green	10.0kg/ha
			6.Flubendiamide 39.35% SC	Green	50 ml/ha
			7. Flubendiamide 20% WG	Green	125g/ha
			8. Imidacloprid 17.8% SL	Yellow	125 ml/ha
			9 Acephate 75 SP	Blue	1.0kg/ha
5	Monocrotophos (Red)	1. Rice BPH, Stem borer, Leaf Folder	1.Quinalphos 5%G	Yellow	5kg/ha

			2.Quinalphos 25 % EC	Yellow	1.5 L/ha
			3.Carbaryl 5% DP	Yellow	25kg/ha
			4.Carbaryl 85%WP	Yellow	588 g/ha
			5.Chlorpyrifos 20% EC	Yellow	1.87 L/ha
			6.Fipronil 5%SC	Yellow	1.5 L/ha
			7.Thiamethoxam 25% WG	Blue	100g/ha
			8 Acephate 75 SP	Blue	1.0kg/ha
			<u>For Stem borer and leaf folder</u>		
			1.Cartap hydrochloride 4% G	Yellow	25.0kg/ha
			2.Cartap hydrochloride 50% SP	Yellow	1.0kg/ha
			3.Fipronil 80% WG	Yellow	62.5g/ha
			4.Chlorantraniliprole 18.5%SC	Green	150 ml/ha

			5.Chlorantraniliprole 0.4% Gr	Green	10kg/ha
			6.Flubendiamide 39.35% SC	Green	50g/ha
			7.Flubendiamide 20% WG	Green	125g/ha
			8.Acephate 75 SP	Blue	1.0kg/ha
		Cardamom (Thrips & pod borer)	1.Quinalphos 25% EC	Yellow	1.2 L/ha
			2.Phenthoate 50%EC	Yellow	500 ml/ha
			3.Diafenthiuron 50%WP	Blue	800g/ha
			4. Dimethoate 30% EC	Yellow	830 ml/ha
6	Methyl demeton (Red)	Sucking Pests (No specific recommendation by KAU)	Not available in Kerala and hence no substitute proposed		
7	Triazophos (Yellow)	Rice Leaf folder	1.Cartap hydrochloride 4% G	Yellow	25.0kg/ha
			2.Cartap hydrochloride 50% SP	Yellow	1.0kg/ha
			3.Fipronil 80% WG	Yellow	62.5g/ha
			4.Chlorantraniliprole 18.5%SC	Green	150 ml/ha
			5.Chlorantraniliprole 0.4% Gr	Green	10kg/ha
			6.Flubendiamide 39.35% SC	Green	50 ml/ha
			7.Flubendiamide 20% WG	Green	125g/ha
			8.Spinosad 45 SC	Blue	160ml/ha

8	Profenophos (yellow)	No specific recommendation	Widely used in Kerala without recommendation of KAU or approval by CIB-RC. Label claim available for tea only		

***Use of carbofuran is permitted for insecticide trials as check/control for research purpose in Kerala Agricultural University.** Kerala Agricultural University will be conducting detailed field trials to identify suitable chemicals/bio-pesticides for substituting the banded chemicals. For this purpose a detailed project proposal will be submitted by the Director of Extension/Director of Research, KAU, for funding from RKVY for an approximate amount of Rs.300laks

Fungicides

SI. No	Name of chemical	Present Recommendation for Crop / Pest as per KAU Package 2007	Substitute chemicals	Colour code (Tox. Class)	Dosage/ha of formulated product
<u>1</u>	Methoxy Ethyl Mercuric chloride (MEMC) (Red)	Rosewood damping off	Substitute is to be evolved through field trials. However, in case of exigency Bordeaux mixture 1% may be used.		
<u>2</u>	Ediphenphos (Yellow)	Rice blast	1. Carpropamid 27.8% SE	Green	500ml/ha
			2.Carbendazim 50%WP	Green	500g/ha
			3.Isoprothiolane 40%EC	Blue	750ml/ha
			4.Kresoxim Methyl 44.3%SC	Green	500ml/ha
			5. Tebuconazole 25.9%EC	Blue	750g/ha
		Rice sheath blight	1.Carbendazim 50%WP	Green	500g/ha

			2.Kresoxim Methyl 44.3%SC	Green	500ml/ha
			3. Tebuconazole 25.9%EC	Blue	750g/ha
			4. Pencycuron 22.9%SC	Green	750ml/ha
			5.Flusilazole 40%EC	Blue	300ml/ha
			6. Hexaconazole 5%EC	Blue	1.0L/ha
			7.Iprodione 50%WP	Blue	2.25kg/ha
		Rice Brown Leaf spot	1.Carbendazim 50%WP	Green	500g/ha
			2. Propineb70%WP	Blue	2.0kg/ha
		Rice Sheath Rot	1.Carbendazim 50%WP	Green	500g/ha
			2. Carboxin 75%WP	Blue	500g/ha
<u>3</u>	Tricyclazole (YELLOW)	Rice Blast (Seed Treatment)	1.Carbendazim 50%WP	Green	2g/kg seed
			2.Biocontrol with <i>Pseudomonas fluorescens</i>	Green	10g/kg seed
<u>4</u>	Oxythioquinox (Blue)	Tobaco and Green peas powdery mildew	Substitute to be evolved through field trials. Both the crops are seldom cultivated in Kerala. However, in case of exigency spray Carbendazim 50%WP@500g/ha		

Herbicides

SI. No	Name of chemical	Present Recommendation for Crop / Pest as per KAU Package 2007	Substitute chemicals	Colour code (Tox. Class)	Dosage/ha of formulated product
<u>1</u>	Paraquat	Non crop situation	1.Glyphosate 41%SL	Blue	0.8kg ai/ha

	(Yellow)				
2	Anilophos(Yellow)	Rice	1. Butachlor 50%EC	Blue	1.25kgai/ha
			2.Pretilachlor 50%EC	Blue	1.5kgai/ha
3	Atrazin (Blue)	Suagrcane	1.Diuron 80%WP	Blue	1.5kgai/ha
4	Thiobencarb (Blue)	Rice	1. Butachlor 50%EC	Blue	1.25kgai/ha
			2.Pretilachlor 50%EC	Blue	1.5kgai/ha

Guidelines for safe use of pesticides

WHILE HANDLING

- Keep pesticides separate during transportation.
- Bulk pesticides should be carried carefully to the site of application
- Never carry/transport pesticides along with food/fodder/other eatable articles.
- Never carry bulk pesticides on head, shoulder or on the back.

WHILE PREPARING SPRAY SOLUTION

- Always use clean water.
- Use protective clothings viz., hand gloves, face masks, cap, apron, full trouser, etc. to cover whole body.
- Always protect your nose, eyes, ears, hands, etc. from spill of spray solution.
- Read instructions on pesticide container label carefully before use.

- Prepare the solution as per requirement.
- Granular pesticides should be used as such.
- Avoid spilling of pesticides solutions while filling the spray tank.
- Always use recommended dosage of pesticide.
- Do not use muddy or stagnant water.

- Never prepare spray solution without wearing protective clothings.
- Do not allow the pesticide/its solution to fall on any body parts.
- Never use left out spray solution after 24 hours of its preparation.
- Do not mix granules with water.
- Do not smell the spray tank.
- Do not use overdose which may affect plant health and environment.
- Do not eat, drink, smoke or chew during whole operation of pesticides.

SELECTION OF SPRAY EQUIPMENTS

- Select right kind of equipments.
- Select right sized nozzles.
- Use separate sprayer for insecticides and weedicides.
- Do not use leaky or defective equipments.
- Do not blow/clean clogged nozzles with mouth. Instead use tooth brush tied with sprayer.

WHILE APPLYING SPRAY SOLUTION

- Apply only recommended dose and dilution.
- Spray operation should be conducted on calm sunny day.
- Use recommended sprayer for each spray.
- Spray operation should be conducted in the wind direction.
- After spray operation, sprayer and buckets should be washed with clean water using detergent/soap.
- Avoid the entry of animals/workers in the field immediately after spray.
- Never apply over-dose and high concentrations than recommended.
- Do not spray just before rains and immediately after the rains.
- Containers and buckets used for mixing pesticides should never be used for domestic purpose even after thorough washing.
- Never enter in the treated field immediately after spray without bearing protective clothings.

AFTER SPRAY OPERATIONS

- Left over spray solutions should be disposed off at safer place viz. barren isolated area.
 - The used/empty containers should be crushed and buried deep in soil away from water sources.
 - Wash hands and face with clean water and soap before eating/smoking.
 - On observing poisoning symptoms give the first aid and take the patient to doctor along with the empty container.
 - Left over spray solution should not be drained in or near ponds or water bodies etc.
 - Empty containers of pesticides should not be re-used for storing other articles.
 - Never eat/smoke before washing clothes and taking bath.
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