FRAC CODE LIST FOR FUNGICIDES IP CODED FOR USE ON WINE GRAPES
(FRAC = Fungicides Resistance Action Committee)

How to use this list for Resistance Management

Alternate fungicides with different FRAC codes in your spray programme to reduce the likelihood of fungi developing resistance to the fungicides. Using fungicides with the same FRAC code one after the other in a spray programme will encourage the development of resistance. For example: azoxystrobin (Quadris) cannot be alternated with kresoxim-methyl (Stroby) in a spray programme, as they both have a FRAC code of 11.

Some fungicides with a risk for resistance are pre-mixed with a contact fungicide like mancozeb, specifically for resistance management purposes.

Please consult your consultant/advisor or the fungicide distributor for help with resistance management when drawing up your spray programme.

FRAC CODE	CHEMICAL GROUP	ACTIVE INGREDIENT	COMMENTS
1	Benzimidazoles	benomyl	High risk for resistance – positive cross resistance between group members.
		cardendazim	
2	Dicarboximides	iprodione	Medium to high risk – cross resistance common between group members. Resistance common in Botrytis.
		procymidone	
		vinclozolin	
3	Pyridines	pyrifenox	Medium risk – generally wise to accept cross resistance between fungicides active against the same fungus.
	Pyrimidines	fenarimol	
	Triazoles	flusilazole	
		hexaconazole	
		myclobutanil	
		penconazole	

		tebuconazole	
		tetraconazole	
		triadimenol	
4	Acylalanines	benalaxyl	High risk. Resistance and cross resistance well known in various Oomycetes.
		metalaxyl	
		metalaxyl-M	
5	Spiroketalamines	spiroxamine	Low to medium risk.
7	Pyridine carboxamides	boscalid	Medium risk.
9	Anilino-pyrimidines	cyprodinil	Medium risk – resistance known in Botrytis.
		pyrimethanil	
11	Quinone outside Inhibitors (QoI- fungicides)	azoxystrobin	High risk – cross resistance shown between all members of the QoI group.
		pyraclostrobin	
		Kresoxim-methyl trifloxystrobin	
		famoxadone	
		fenamidone	
12	Phenylpyrroles	fludioxonil	Low to medium risk – resistance management required.
13	Quinolines	quinoxyfen	Medium risk – resistance management required.
17	Hydroxyanilides	fenhexamid	Low to medium risk – resistance management required.

22	**Toluamides**	**zoxamide**	**Low to medium risk – resistance management required.**
27	**Cyanoacetamide-oximes**	**cymoxanil**	**Low to medium risk – resistance management required.**
29	**Dinitrophenyl crotonates**	**dinocap**	**Resistance not known.**
33	**Phosphonates**	**fosetyl-Al**	**Low risk.**
		phosphorous acid & salts	
40	**Carboxylic Acid Amides (CAA-fungicides)**	**dimetomorph**	**Low to medium risk. Resistance known in *Plasmopara viticola.* Cross resistance between all CAA group members.**
		Iprovalicarb	
M Multi-site contact activity	**M1 inorganic**	**copper**	**Generally considered low risk group – no signs of resistance developing, no cross resistance between group members M1 to M3.**
	M2 inorganic	**sulphur**	
	M3 dithiocarbamates	**mancozeb**	
		maneb	
		metiram	
		propineb	
		thiram	
	M4 phthalimides	**folpet**	