



Particle Film Technology

Reducing heat damage to wine
grapes

Background

- Heatwaves have long been a problem in the Riverland region
- In the past, many growers relied on full-cover irrigation to lower canopy temperatures and maintain soil profiles to reduce crop loss.
- More recent widespread adoption of drip irrigation means few growers still have this ability.
- Sunscreens (PFT sprays) have added another tool to help combat heat effects resulting in yield and quality loss.
- Recent work by AWRI showing no ill effects of the kaolin – based products has given many wine companies confidence in allowing their use.

Heat damage

- Heat damage can cost in terms of both yield and quality
- Some varieties more susceptible than others
- Concern about depletion of acid levels in fruit, depletion of colour and off flavours as well as yield loss.
- In many cases simply adding water is not enough to prevent damage.

Past Experience

- Previously used PFT products during my previous work at Jubilee Park Vineyards with some success.
- Noticeable reduction in leaf scorch and berry burn, and off flavours (“burnt jam”) in particular in Merlot.
- On North / South rows, with varieties susceptible to heat damage, there appeared to be an affect fro musing the product.



Application

- Currently there are some difficulties with application of the PFT to the berry surface – especially Gordo berries.
- Initial application is supposed to allow subsequent applications to adhere better.
- Some more work may be needed with adjuvant types and rates
- Suspension of the kaolin product rapidly settles out if agitation is inadequate.



Effectiveness of PFT



- Surface temperature measurements were taken using an infra red thermometer during a heat wave.
- One trial site in a Gordo patch suffered severe sulphur burn which rendered the trial useless.
- Point source assessment of burn damage showed no significant difference in incidence of damage due to PFT spray.
- Temperature measurements showed uniform but statistically insignificant differences in temperature.

Surface temperature measurements

Temperatures recorded with a hand – held infra-red thermometer during daytime heat and ambient temperature of 46.1°C

<i>Trial</i>	Gordo				Shiraz			
	SunScreen		Control		SunScreen		Control	
	Leaf	Berry	Leaf	Berry	Leaf	Berry	Leaf	Berry
Mean Temperature	45.6	48.8	47.9	50.1	42.3	45.1	45.0	46.8
Difference due to sunscreen	-2.33	-1.32			-2.74	-1.6		
	-5.1%	-2.7%			-6.5%	-3.6%		

Yield Effect

	GORDO			SHIRAZ					
Treatment	Area	T	T/ha	Treatment	Area	T	Be	T/ha	Colour
Surround	0.91	31.57	34.69	Surround	0.9	22.08	13.9	24.53	1.37
Control	0.83	26.5	31.93	Control	1.04	20.04	14.4	19.27	1.42
Absolute Difference			2.76	Absolute Difference			-0.5	5.26	-0.05
			8.66%				-3.47%	27.32%	-3.52%
Gordo Price per T	\$385			Shiraz Price per T	\$390				
Difference in Gross Return	\$ 1064.37 per ha.			Difference in Gross Return	\$ 2051.40 per ha				

Cost : Benefit

Application Costs	Gordo		Shiraz	
	Total	Per ha	Total	Per ha
Cost of Product	\$450.00	\$258.62	\$280.00	\$144.33
Machine & Labour	\$467.00	\$268.39	\$233.00	\$120.10
Total Per ha cost		\$527.01		\$264.43
Increased Income / ha due to PFT use		\$1,064.37		\$2,051.40
Net Benefit		\$537.36		\$1,786.97
(Cost of Surround at \$4.00 per kg plus GST)				
(Cost of spraying at \$100/hour plant and labour)				

Conclusions



- There is considerable cost in applying the PFT products, and great effort should be made in making sure that coverage and adherence problems are addressed.
- Application BEFORE heat is essential!
- Should not be treated as an **alternative to** supplying adequate water – rather used **in conjunction with** irrigation to ameliorate heat effects.

Conclusions



- Small differences in canopy temperature from PFT use may account for significant changes to quality & yield outcomes. Perhaps it changes the tipping point where the vine drought response and shut down occurs.
- Similar response seen in application of PFT to young citrus.
- PFT show promise as PART of a number of measures that can have some effect against extreme heat.