

AGRICROP

AquaGro® Gold
Agricultural Soil Surfactant

Evaluation of AquaGro Gold (AquaGro) in processing tomatoes

Shepparton, Victoria, 2004/05.

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Project: AquaGro - processing tomatoes.
Trial Location: Shepparton, Victoria
Sponsor: Agricrop Pty Ltd

OBJECTIVES

To evaluate the performance of AquaGro, an agricultural soil surfactant in a replicated trial in processing tomatoes.

EXPERIMENTAL DETAILS

Site Details

Location	Goulburn Valley
Crop	Tomatoes
Plant Variety	Heinz 9614
Planting Date	4/12/2004
Plant Density	25 plants/ 10m
Fertiliser	Standard for district
Irrigation	Drip
Soil type	Goulburn Valley Clay Loam
Fate of Product	Processing

Summary of Treatment details

Application

AquaGro, soil surfactant was applied once only at the rate of **10 L/ha**. It was sprayed over the top of the plants down the bed and across the entire width of the tomato bed immediately after transplanting.

Application Equipment

Application equipment	Hand held row boom
Water volume	630 lt/ha
Tips and Filters:	110-02XR spray tips 100 mesh filters
Ground Speed	1 m/sec
Spraying pressure	300 kpa

Application details

Date Applied	4/12/2005
Time	1130
Temperature C	25
Wind Direction & Speed	W 2
Dew	Nil

Assessment Details

<i>Crop phytotoxicity</i>	Assessments for crop phytotoxicity of the foliage and fruit were undertaken at harvest. Crop phytotoxicity based on a visual assessment using a linear scale of 0 to 100, where 0 equals no crop or fruit phytotoxicity and 100 equals total crop loss.
<i>%Crop Vigour</i>	Crop colour, height and overall growth compared to adjacent untreated control
<i>Yield</i>	Yield from an appropriate area within each plot.

Statistical Analysis

Data was recorded on Pesticide Research Manager and statistically analysed using an analysis of variance with mean values summarised and separated using Least Significant Test at the 5% level of probability.

RESULTS

Crop Phytotoxicity

There was no phytotoxicity observed on either the developing or on the leaves of the tomato plants throughout the duration of the trial.

Crop Growth

Seventeen days after transplanting and after the application of the AquaGro to the soil, the tomato plants were assessed for overall plant vigour and growth. The trial was again assessed 27 DAT. The results of these assessments are presented in Table 1.

Table 1. The Effect of treatments on growth of tomatoes

Trt No.	Treatment Name	TOMAT % VIGOR 21/12/2004		TOMAT % vigor 31/12/2004	
15	Grover Std	0	b	0	b
16	AquaGro	11.67	a	6.67	a

Means followed by the same letter do not significantly differ (p=0.05, Duncan's New MRT)

The tomatoes in the AquaGro treated plots showed significantly greater crop vigour and plant growth at the two assessments undertaken 17 and 21 days after transplanting and treatment.

At both assessments the soil in the AquaGro treated plots was moist to the surface as shown in Figures 3, 4 & 5. The soil in the adjacent untreated control was dry and crusted at the soil surface.

The soil moisture in the tomato root zone appeared to be greater.



Fig 3. AquaGro treated (17 DAT)



Adjacent Untreated Control



Fig 4. AquaGro treated (17DAT)



Adjacent Untreated Control



Fig 5. AquaGro showing the soil moisture to the surface. Adjacent Untreated Control

Crop Yield

Heavy rains of over 100mm fell over a 48 hour period on the 2nd and 3rd of February. This rain caused significant damage to the entire tomato crop including the trial. The grower estimated yield losses in the order of 60%.

The trial was harvested 7 days prior to commercial harvest. The tomatoes were harvested as either processing red tomatoes or green tomatoes. The data from harvest is presented in table 2.

Table 2. Harvest data

Plot	AquaGro Treated				Untreated			
	Kgs of tomatoes / 1m x 1 bed			%w/w Greens	Kgs of tomatoes x 1m x 1 bed			%w/w Greens
	Red kgs	Green kgs	TOTAL kgs		Red kgs	Green kgs	TOTAL kgs	
1	21.3	3.5	24.8	14.11	17.1	2.6	19.7	13.20
2	15	3.7	18.7	19.79	16	1.9	17.9	10.61
3	11.6	3	14.6	20.55	9.1	1.7	10.8	15.74
Mean	16.0a	3.4b	19.4a	18.2a	14.1a	2.1b	16.2a	13.18a

Means followed by the same letter do not significantly differ (p=0.05, Duncan's New MRT)

There is no significant difference in the yield of red tomatoes between the AquaGro and the untreated control. The yield of green tomatoes is significantly higher than the untreated control. This indicates that the AquaGro plots have remained moister after the water has been turned off and if harvest had have been delayed, more of these green tomatoes would have been harvested as red tomatoes, thus increasing the red tomato yield.

The percentage of green tomatoes on a weight for weight basis of total yield shows that the AquaGro treated plots had a mean of 18.15% green tomatoes compared to the untreated control with 13.18% w/w.

See more crop yield data next page



Crop Yield (cont'd)

Yield data per harvested area from table 2 has been converted to yield per ha as shown in table 3.

Table 3. The effect of the treatments on mean tomato yield (t/ha).

	Tomatoes - Tonnes per ha.		
	Red	Green	TOTAL
Untreated	78.2a	11.5a	89.6a
AquaGro	88.7a	18.9b	107.6a

Means followed by the same letter do not significantly differ (p=0.05, Duncan's New MRT)

The yield of green tomatoes per hectare from the AquaGro was significantly higher than the untreated control. Whilst no significant differences exist between the yield of red tomatoes a yield difference of 10 t/ha did occur.

The AquaGro treatments were included within a fertiliser trial with a total of 16 treatments. Hence the trial was only replicated three times. Unfortunately the fertiliser company chose not to harvest their plots, thus only the AquaGro and the adjacent untreated control plots were harvested. With only two treatments and three replicates, differences needed to be large for there to be any statistical differences.

Whilst differences may not be statistical, there is a definite trend that the application of AquaGro has increased yield and possibly could have increased yield further if the trial was not harvested as early.

Soluble Solids

A random sample of 10 red tomatoes was taken from each of the harvested plots and bagged. The tomatoes were analysed by Liz Mann, Tomato Development Industry Officer.

Table 4. The effect of the treatments on mean % soluble solids

	AquaGro	Untreated
Soluble Solids %	4.73a	5.17a

Means followed by the same letter do not significantly differ (p=0.05, Duncan's New MRT)

There is no significant difference in the level of soluble solids between the AquaGro treated tomatoes and the untreated controls. Soluble solids are usually negatively correlated with yield. As tomato yield increases soluble solids decreases. This is the case in this trial. AquaGro has increased tomato yields and reduced the level of soluble solids.