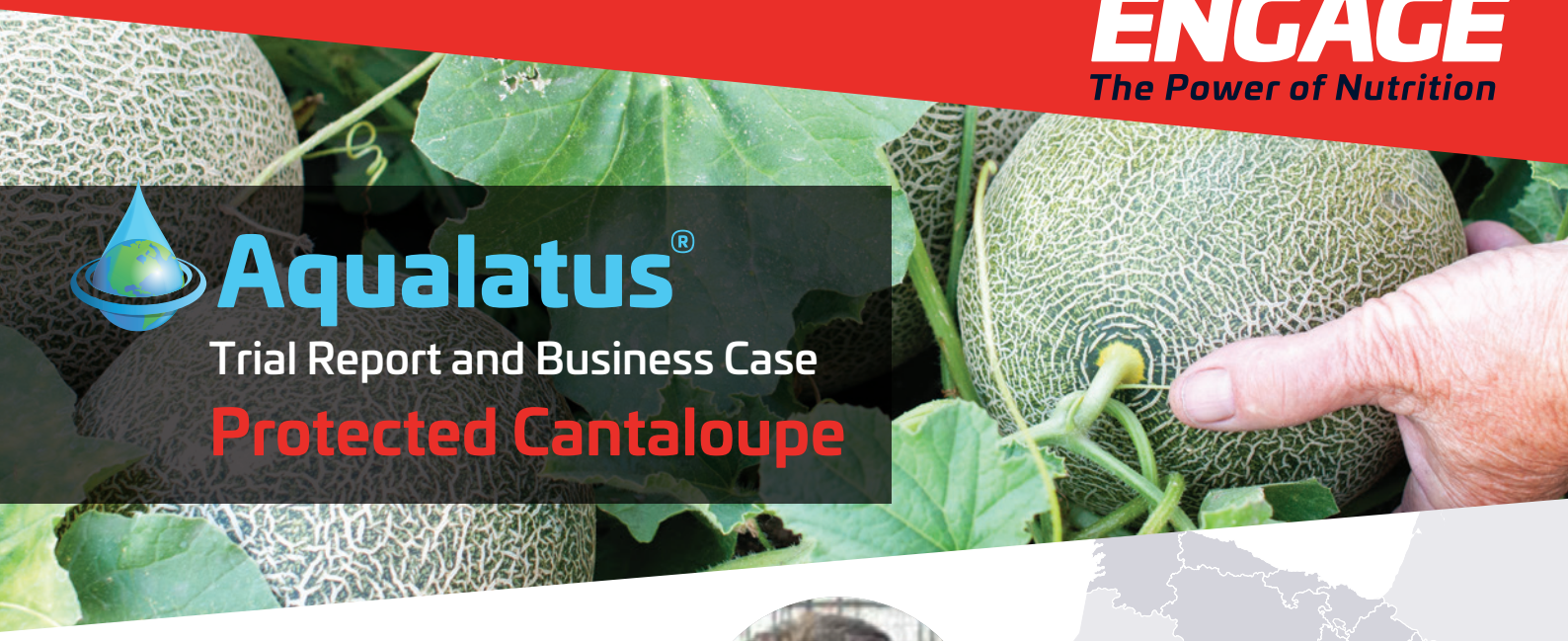
ENGAGE
The Power of Nutrition



Aqualatus®

Trial Report and Business Case

Protected Cantaloupe

Crop | **Piel de Sapo Cantaloupe**

Region of trial | **Almería, Spain**

Co-operators | **CASI - Thomas Perez Garcia**

Trial Duration | **12 weeks**

The aim of trial was to use Aqualatus technology to reduce the water required to grow a 90 day crop of Piel de Sapo Cantaloupe melon to reduce overall cost per hectare in water, fertiliser and energy.

INTRODUCTION

CASI are the largest fruit cooperative in Almería covering tomato and melon production. Established in 1944, they now have over 2100 hectares of in house production and manage over 3 million kilos of tomatoes per day from the region during the growing season.

In the 2014/15 season they produced and marketed 220 million kg of tomatoes around the world.

CASI have 1240 member growers with another 535 collaborating and third party growers.

Piel de Sapo or the 'Christmas melon' is a variety of melon of (family Cucurbitaceae, Cucumis melo, Inodorus group) originating in Spain that grows to about a foot in length and is oval in shape. It has a thick, green-striped outer rind and pale green to white inner flesh with a mild melon flavour and sweetness close to honeydew melons. It is prized in Spain due to its earliness and commands a good price if grown early in the year. With over 30,000 hectares in Spain it is now a prominent variety for production

THE ISSUE

Almeria is the most intensive protected production area in the world with now over 140,000 hectares of production in the region. The average water volume use on irrigation per hectare of protected production is up to 12 million litres (12,000m^3) depending upon the mean temperatures, which creates two issues for the region. Firstly, the cost of water in Almería, Spain to farmers and growers is €0.80 per cubic meter so the cost of water is now a major consideration. Secondly, due to the huge use of water from the surrounding mountains, a cap per hectare of water use has been imposed at 10,000m^3 per hectare. This automatically places all growers at a disadvantage as they cannot optimise production in the way they would traditionally do plus if the temperatures soar they will not be able to respond, placing their crops at risk. In the case of Piel de Sapo melon, it is grown as a cash crop for growers who grow short term autumn crops or for growers who wish to supplement their income at the end of a tomato crop. If the season has utilised their allocation of water, growers may not be able to support the crop or even take the risk of planting it, placing this sought after variety at risk. Total volume of water requirement for melons per season can vary but usage is between 4000m^3 -6000m^3.

CHOICE OF GROWER AND METHOD OF APPLICATION

CASI chose one of their leading growers to conduct the Aqualatus trial. Thomas Perez Garcia is known in the region for the quality of his production and owns 10 hectares of production just outside of Almería.. His irrigation system is automatically triggered by moisture sensors within the greenhouses so the accuracy of irrigation could be measured to give a true representation of the comparative benefit in reduction of water of adding Engage's Aqualatus technology.

Thomas also grows the melons in soil so the full benefits of the technology could be seen.

Thomas uses a three tank fertiliser system to feed his melon crop:	
A tank:	Containing Calcium, Nitrogen and Iron sources.
B tank:	Containing Potassium, Phosphate, Magnesium and trace element sources.
C tank:	For the addition of organic and specialist technologies.

It is important to note that the melons require far less fertiliser due to the fact that the previous crop of tomatoes leaves a heathy level of nutrients to start the crop off.

TRIAL METHOD

Engage's Aqualatus technology was added to the C tank at the rate of 2.0 litres into 500 litres of water for the first month and then injected at a rate of 1:100; this was then reduced for subsequent applications to 1.0 litre per month. Total application per crop was set at 4.0 litres.

Unfortunately, Thomas had used soil wetter's in previous crops and assumed that Aqualatus was a similar material so did not give great creditability to the application rate given to him in the trials protocol.

He added another 2.0 litres per ha two weeks into the trial which had unforeseen results for him which is highlighted later. This increased the overall total used to 6.0 litres.

To minimise water waste and optimise rootzone water and nutrients all irrigation rounds are controlled by tensiometers which measure the moisture content of the soil and watering is carried out via double line drip tape spaced every 1.2 metres.

It was agreed to have two large plots of 1 hectare each for ease of watering and it was decided in each of the areas to create 4 harvest plots in close proximity to soil moisture probes. Unlike tomatoes, piel de sapa melons are shallower rooted so watering is completely automated to cover the needs of the crop. Moisture minimum was set to 45% and maximum set to 70%.

Total volume of water requirement for melons per season can vary but usage is between 4000m^3 -6000m^3 at a cost of €0.50-0.80 per m^3.

Harvest plot size, was set to 5m^2 to allow for yield data to be measured.

Large plots are set as the following:	
Plot 1:	Control – no Aqualatus added
Plot 2:	Treated – Aqualatus added

All applications of fertiliser and foliar sprays remained the same at the discretion of Thomas.

RESULTS

In previous seasons watering would average at 1 hour 30mins per day, however after four weeks, watering halted in the Aqualatus plots due to moisture levels being too high.

Thomas triggered the irrigation manually as he feared the Aqualatus was creating an issue with the probes and this resulted in a marked increase in surface water being seen.

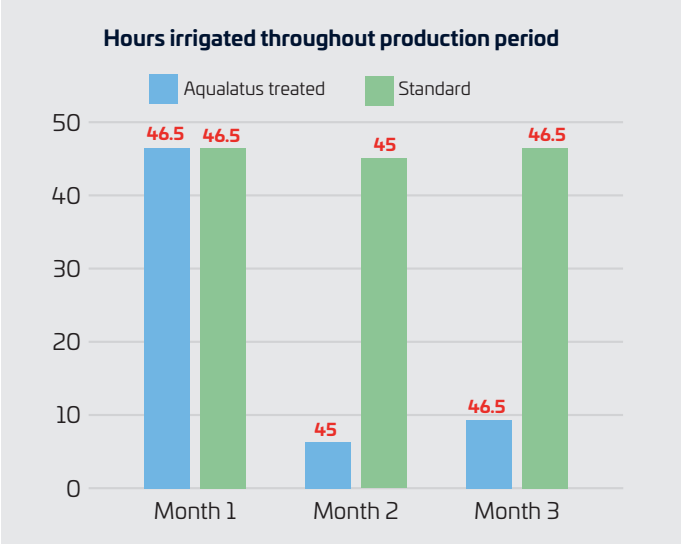
When Engage Europe agronomists visited the site and learned what had happened, they asked Thomas to trust in the technology and to allow the probes to control the watering.

Once back on automation the irrigation within the Aqualatus treated plot did not trigger again for nine days and once it began irrigating the plot again, the time was reduced from 1hr 30mins per day to just 20mins per day.

REDUCTION IN WATER AND NUTRIENTS.

The graph 1.1 below shows the levels of irrigation in hours during the trial for the two areas. Month two is especially low for Aqualatus as there were nine days whereby the soil moisture metering system did not call for water.

Graph 1.1 – Monthly total for watering plots



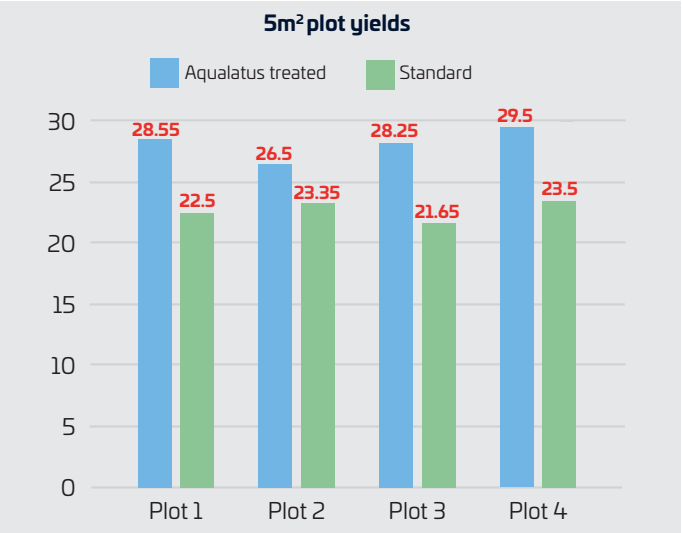
The graph above illustrates the difference Aqualatus makes in the duration of irrigation over the month. Total hours of irrigation per area were measured, with standard plot being irrigated for 138 hours over the total production period and Aqualatus plot treated being irrigated for just 62.1 hours. This equates to a reduction of 75.9 hours of irrigation or a reduction in water/nutrient requirement of 65% with no loss in crop quality or growth.

YIELD FROM HARVEST PLOTS

The four harvest plots measured a total of 20m² in each treatment plot which allowed for harvest data to be represented. The average yield for cantaloupe melons in Spain is 4.5per m².

The data below illustrates the numbers of melons harvest from 4 x 5m² plots

Graph 2.1- Number of daily watering's for control plots.



Graph 2.1 above illustrates the difference Aqualatus had on yield due to the increased level of water and nutrients available to the crop.

As the graph clearly shows both crops performed well however the increased availability of nutrients and water allowed the crop to produce and hold more melons.

The average yield per plot was:	
Control	4.55kg per m²
Aqualatus	5.64kg per m²

Therefore at the time of harvest with a price return of €0.50 per kilo the average increase in yield could net an increase of €5450.00 per ha.

TRIAL CONCLUSION

The data clearly shows that the use of Engage's Aqualatus technology in this trial reduced the overall duration of irrigation and reduced the mean length of watering from 1 hour 30 minutes to 20 minutes per day.

This represents a significant reduction in water volume and reduces cost in water, fertilisers and energy.

The data also proves that the use of Aqualatus in this trial had positive effects on yield to the value of 1.09kg per square metre.

BUSINESS CASE

The following business case is designed to illustrate the difference in cost based upon the mean saving reductions in water volume used over the melon growing period. Yield data is not included as this cannot be guaranteed from crop to crop.

Cost per m³ of €0.80 assuming water is not desalinated.

Total cost of water without energy cost inclusion €3,200.00 - €4,800.00 per ha

Cost of Aqualatus application per crop in this case was €180.00 however commercially the cost would be €120.00 per ha.

The trial has proven the reduction in water for Melons with Aqualatus in this case was 65%.

Therefore the saving in water alone is 2600 – 3900m³ which at €0.80 per m³ this equates to a

saving of €2,080.00 - €3,120.00 per ha.

Fertiliser Reduction

Melons use 500-600kgs per ha per crop at an average cost of €0.862per kilo.

Total cost per crop is €431.00 - €280.15 per ha.

Therefore the saving in fertiliser applications is between €280.15 - €336.18 per ha.

Total saving with Aqualatus usage for a melon crop is between

€2,360.12-€3,456.18.00 per ha.

For more information on Aqualatus or any other products, contact us on

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