



Fertigation in mandarins with Ultrasol® Special Formulae increased yield and income with 10%

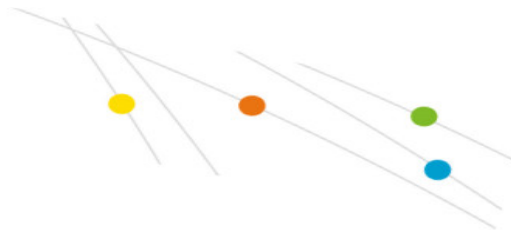
Together with asparagus, mandarin has been one of the leading crops in the Peruvian agro-export business. Actually, the professional citrus growing area is about 10.000 ha, of which 60% is concentrated in the Lima area. A further increase in the planted area is foreseen for the coming years. Increased yields of quality fruit will become a decisive factor for the profitability of this business.

SQM VITAS is already contributing to the search for increased income for the grower. Recently, a fertigation trial, conducted in cooperation with a leading mandarin grower, was completed in the area of Huaral (90 km north-west of Lima). In comparison to the actual fertilizer programme, SQM VITAS proposed a fertigation programme that focused on:

- A well-balanced N to K ratio for the three consecutive growth stages.
- Increased nitrate-nitrogen contribution.
- Acidic product characteristics to counteract alkaline growing conditions.
- Selection of nutrient sources with minimum impact on soil salinity build-up.

The purpose of the SQM VITAS fertigation programme was to increase fruit quality (greater degrees Brix), while maintaining an acceptable yield level without exceeding the financial budget.

Based on the analysis of soil, water and fertigation management, three different tailor-



made formulae were developed (Table 1).

Table 1. Overview of Ultrasol® Special formulations and moments of application.

Product name	Description	Period of application
Ultrasol® Especial 1 (UE 1)	NPK + Others	January - April
Ultrasol® Especial 2 (UE 2)	NPK + Others	May - July
Ultrasol® Especial 3 (UE 3)	NPK + Others	August - October

The trial plot consisted of 5 hectares of a 25 years old mandarin crop (

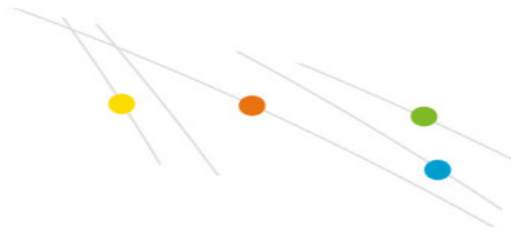
Citrus reticulata var *Malvasio*

), grown on a sandy soil with a plant density of 625 trees per ha. The irrigation water had a pH 8,5 and an EC of 0,3 dS/m, and contained appreciable quantities of calcium, magnesium and sulphates. The trial plot was divided into two halves, of which one half received the traditional programme and the other half the SQM VITAS programme (Table 2).}

Table 2. Comparison of the traditional and SQM VITAS fertigation programs.

Treatment	Nutrients applied (kg/ha)	Used products	Total products (kg/ha)
Control	268 N - 54 P ₂ O ₅ 370 K ₂ O 3 CaO - 69 MgO	Ammonium nitrate, Phosphoric A., Potassium sulphate, Potassium nitrate, Magnesium nitrate and Calcium salt	1.906
SQM VITAS program	214 N - 75 P ₂ O ₅ 267 K ₂ O 22 CaO - 16 MgO	UE1, UE2, UE3 and Ultrasol® Cal- cium	1.255

The SQM VITAS team constantly monitored nutrients, pH, EC in the irrigation water, nutrient solution and soil solution extract at 30 cm and at 60 cm depth through the



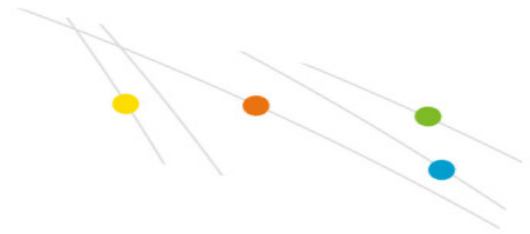
use of various analytical tools like pH and EC meter, RQ Flex and Cardy Meter. Furthermore, leaf analysis was conducted during fruit growth and before harvest. No significant differences were observed between both fertigation treatments at both moments of sampling.



Figure 1. Analytical tools used.

It was concluded that the SQM VITAS fertigation programme with three Ultrasol® Special formulations outperformed the traditional programme in terms of fruit quality (greater °Brix and % juice). Yield was increased with 8 MT/ha or 10%, which was explained by picking more fruits per tree with increased individual fruit weight.

Table 3. Comparison of both treatments with respect to yield and quality parameters.



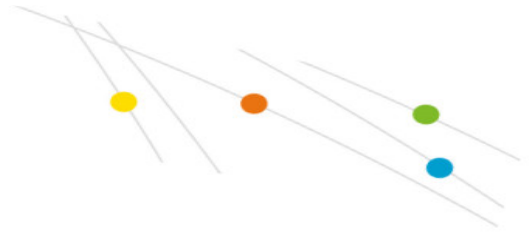
Parameter		Treatment	
		Control	SQM VITAS
Yield	MT/ha	78,8	86,6
Quality	°Brix	9,40	10,00
	Acidity %	0,50	0,48
	Maturity index %	18,80	20,83
	Juice in fruit %	32,34	34,29

The SQM VITAS treatment resulted in less fertilizer input in terms of weight (Table 2), which made its application even the cheaper option per hectare. This, in combination with the yield increase, resulted in 10% increase in net income for the grower (Table 4).

Table 4. Economical analysis comparison between control and SQM VITAS program.

Treatment	Yield	Increase %	Fruit price (US\$/kg)	Gross income (US\$/kg)	Fertilizer cost (US\$/kg)	Net income (US\$/kg)
	MT/ha					
Control	78,8	-	0,60	47,356	1,611	45,745
SQM VITAS	86,8	10	0,60	52,156	Co	Co

In this trial it has been demonstrated that it is possible to fertigate with less product and less input of nutrients, at a lower cost per hectare without any negative impact on relevant fruit yield and quality parameters. SQM VITAS will continue conducting this type of business development activities, through the recommendation of well-balanced plant nutrition programmes, according to the needs of the crop in every



growth stage, supported by soil-water-plant monitoring services, in order to increase grower's net income.