# Horticulture Team Update
Richard Cameron

# SSCR 2023

23RD February 2023


DeSaltus
2.0
OMEX

# INTRODUCTION

DeSaltus 2.0

- The problem: nutrient accumulation in substrate and current treatments
- What is DeSaltus 2.0?  And previous strawberry trial summary
- Trial conducted on substrate grown long cane raspberries
- Summary & future work

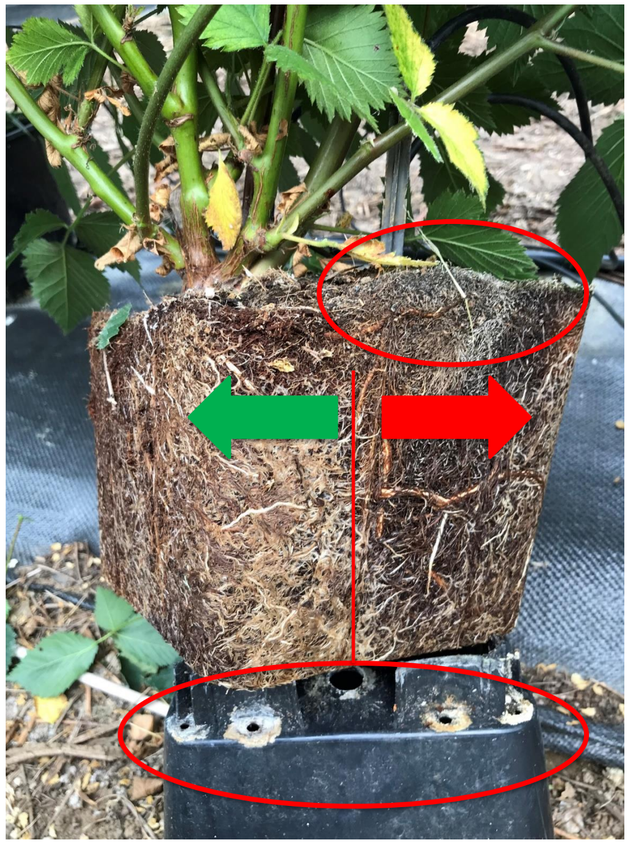
# Nutrient accumulation in coir

## Coir management

- Coir is the predominant substrate material for UK soft fruit production (80-90%)
- Unfavourable salts can accumulate in coir – Na, Cl, $SO_4$ from:

    - base water
    - evapotranspiration
    - washing of coir in sea water
    - impurities from soluble fertilisers

- New coir is usually buffered to remove these unwanted nutrients, but this costs more for the grower.
- Current flushing with either $CaNO_3$ or $KNO_3$ on it's own, but requires multiple treatments.
- Flushing removes all nutrients, good and bad, requires warm weather, applies excessive moisture, can soften fruits, can cause anaerobic conditions, can affect nutrient uptake at root hairs (Fe).



Salt has accumulated around the pot's drainage holes and surface of the coir. Imbalance in the feed distribution has caused a growth zone (green arrow) and a dead zone (red arrow) in the coir.

OMEX

# DeSaltus 2.0

Poor growing media structure

Good growing media structure

A compacted growing media (top) which has poor water movement. A good growing media structure (bottom), illustrating the open nature of the media particles allowing water and air to penetrate the root zone.

## What is DeSaltus 2.0 and how does it work?

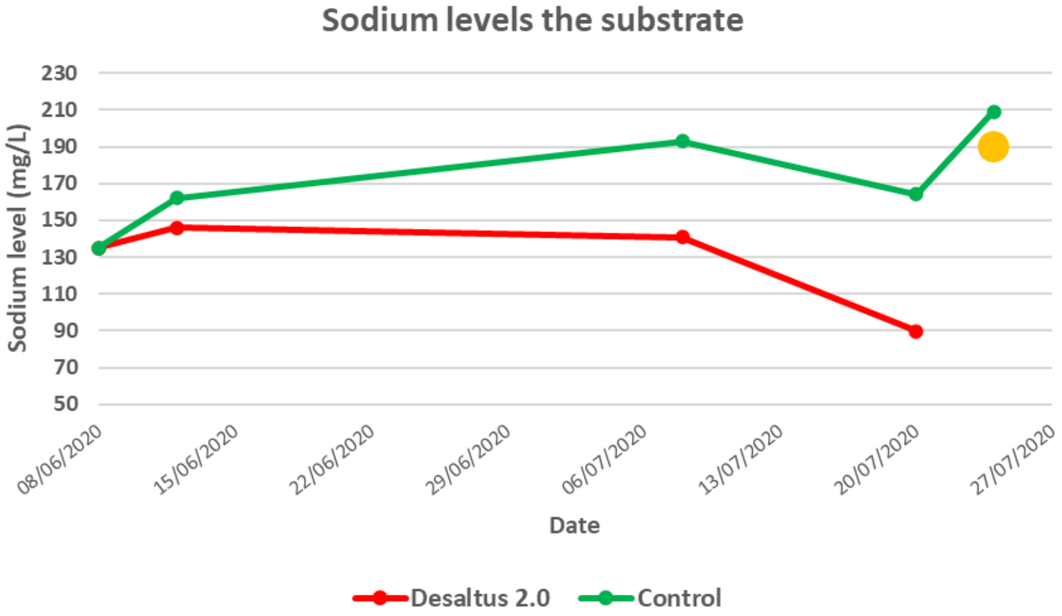
- DeSaltus 2.0 is a water conditioner which contains the active ingredient polymaleic acid.
- DeSaltus 2.0 promotes the aggregation of growing media particles, by increasing the solubility of calcium into the media.
- This increased particle size, creates pore space and improves the structure of the media.
- With greater salt and nutrient movement through the growing media, growers can improve nutrient use efficiency and overall plant productivity.

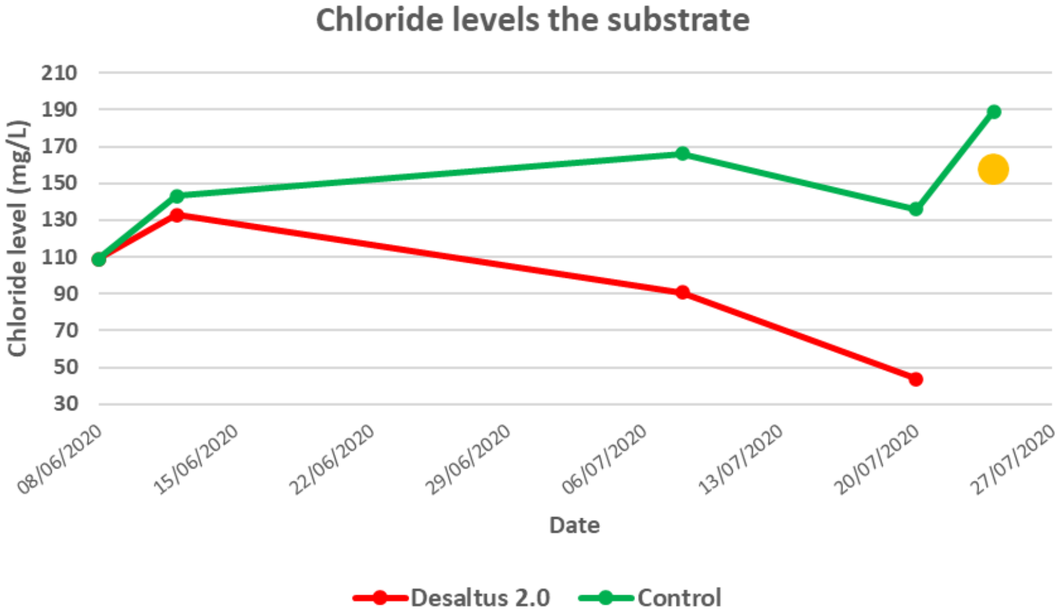
# DeSaltus 2.0

## at Kirkenel Orchard

## Strawberry trial methodology

- Trial Area = 2ha table-top ever bearer strawberries grown in new coir bags. The DeSaltus 2.0 treated plot was compared to an untreated plot.
- Starting level of Na in the (borehole) water supply = 240 mg/L which the AHDB class as excessive. The AHDB recommended maximum Na level is 72 mg/L in the water supply.
- Applications were made via the stock tank (B) at a rate of 2.5L/1000L and applied to the crop at a dilution rate of 1:100.
- DeSaltus 2.0 was applied continuously with the fertigation over summer 2020 from mid-June to end of July.
- Calcium levels in the feed recipe = 162 mg/L.
- The AHDB recommend that Na levels within the compost be <51 mg/L.
- Coir samples were taken from treated and untreated coir bags over an eight week period and sent to NRM for nutrient content analysis.
- A final sample was taken from the DeSaltus 2.0 treated plot after the application of DeSaltus 2.0 had ceased (look for the amber dot overleaf).




# DeSaltus 2.0

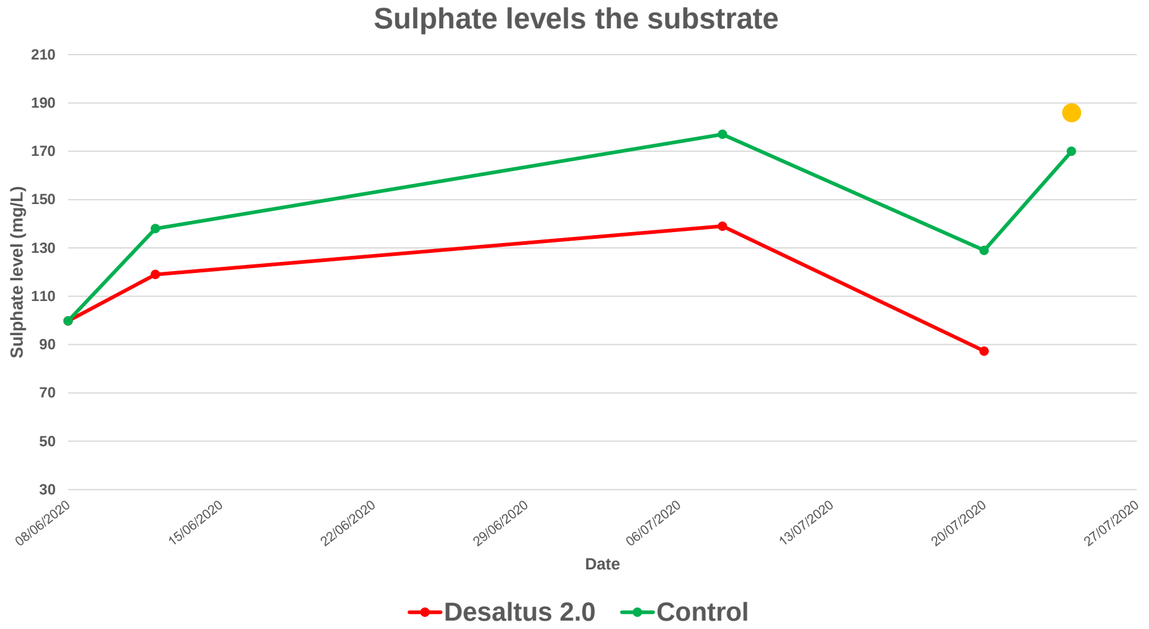
## Coir Analysis

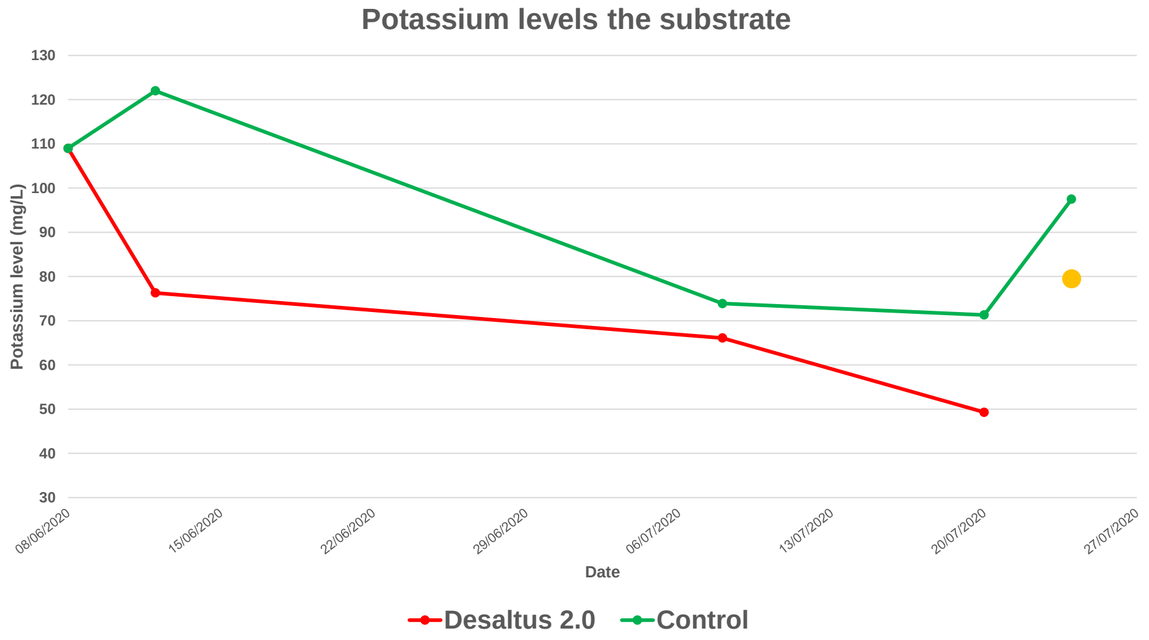
Levels of sodium and chloride within coir samples removed from the control and DeSaltus 2.0 treated plots. Note the orange dot which indicates the nutrient levels present once the DeSaltus 2.0 inputs had ceased.

# DeSaltus 2.0

## Coir Analysis

- Levels of sulphate and potassium within coir samples removed from the control and DeSaltus 2.0 treated plots. Note the orange dot which indicates the nutrient levels present once the DeSaltus 2.0 inputs had ceased.
- Potassium levels also reduced in the control treatment, suggesting some K removal with increasing crop load.



# Strawberry trial summary

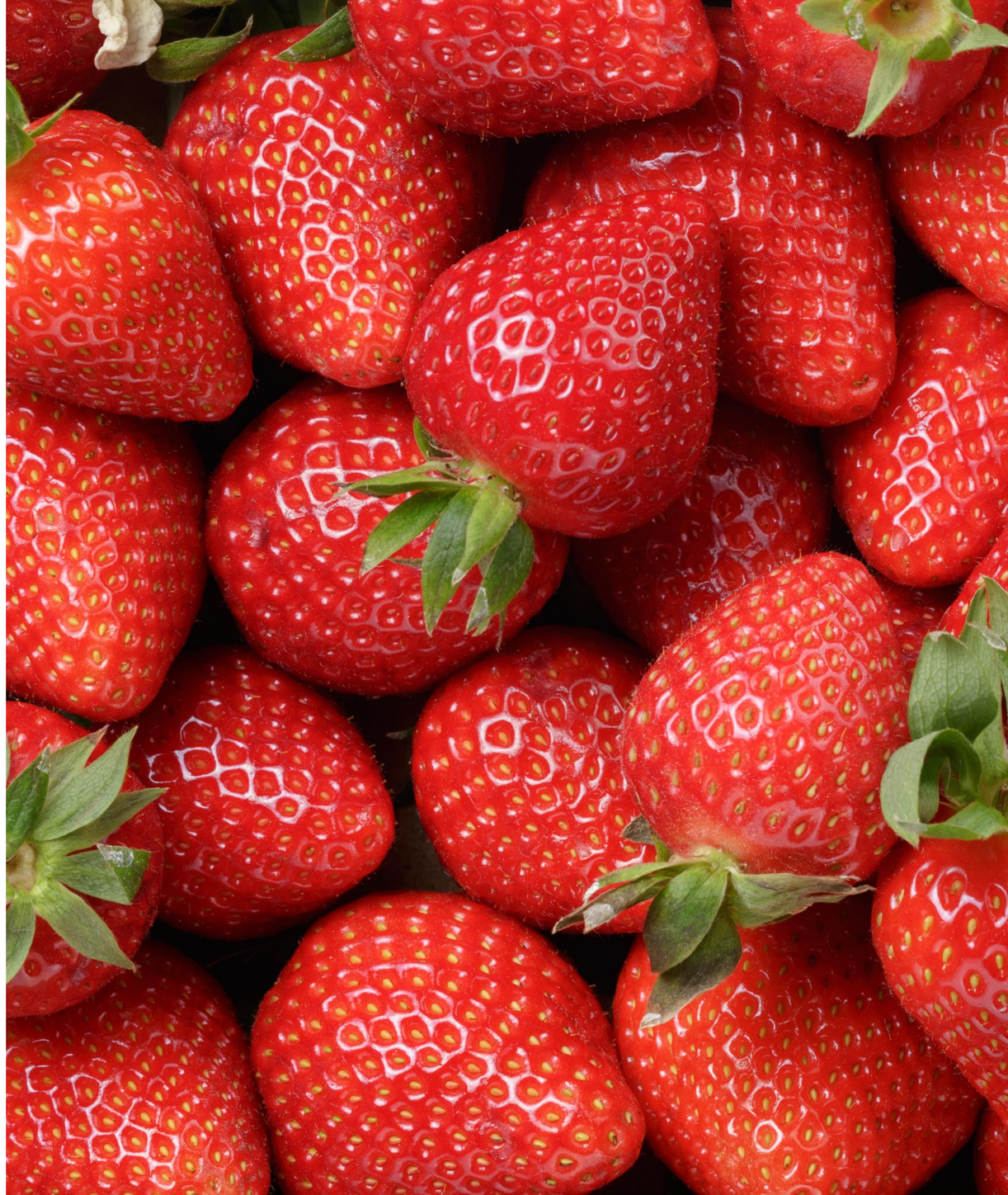
- A 33% Na, 60% Cl and 13% $SO_4$ reduction was observed in the DeSaltus 2.0 treated coir bags at the end of the trial compared to the start of the trial.

| Nutrient | Control | DeSaltus 2.0 |
|---|---|---|
| **Sodium** | +55% | -33% |
| **Chloride** | +73% | -60% |
| **Sulphate** | +70% | -13% |

Percentage change in nutrient composition for each treatment at the end of the trial period compared to the start.

- Compared to the control treatment at the end of the trial, there was a 33-68% reduction in unwanted nutrients.

| Nutrient | DeSaltus 2.0 |
|---|---|
| **Sodium** | -45% |
| **Chloride** | -68% |
| **Sulphate** | -33% |

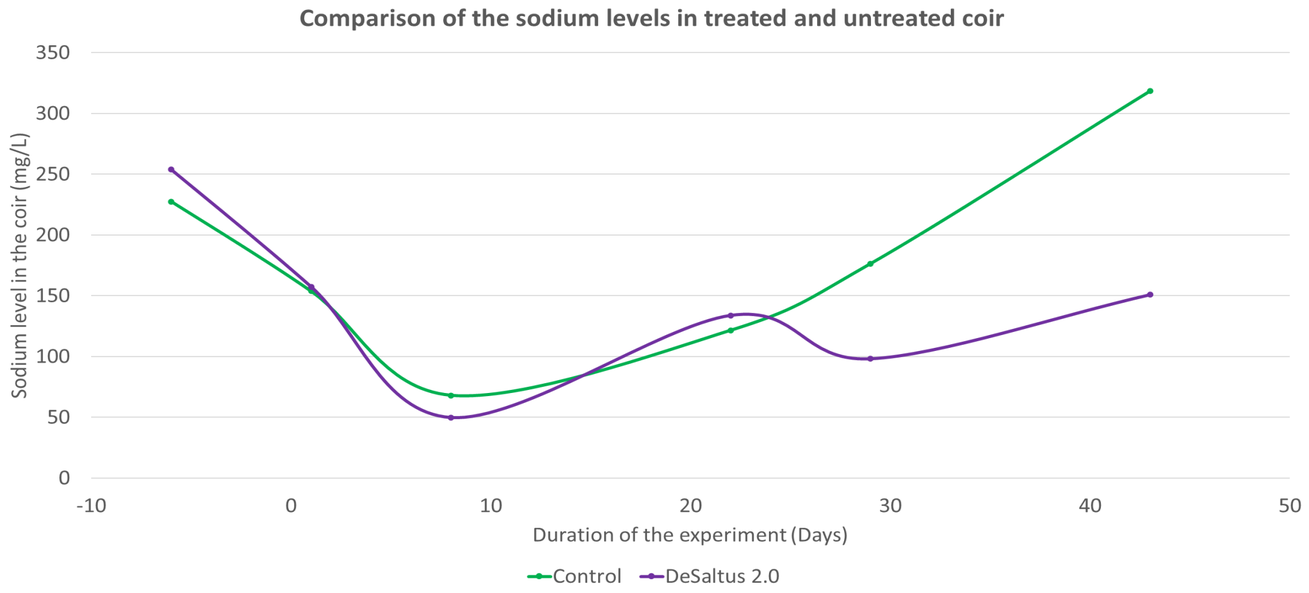


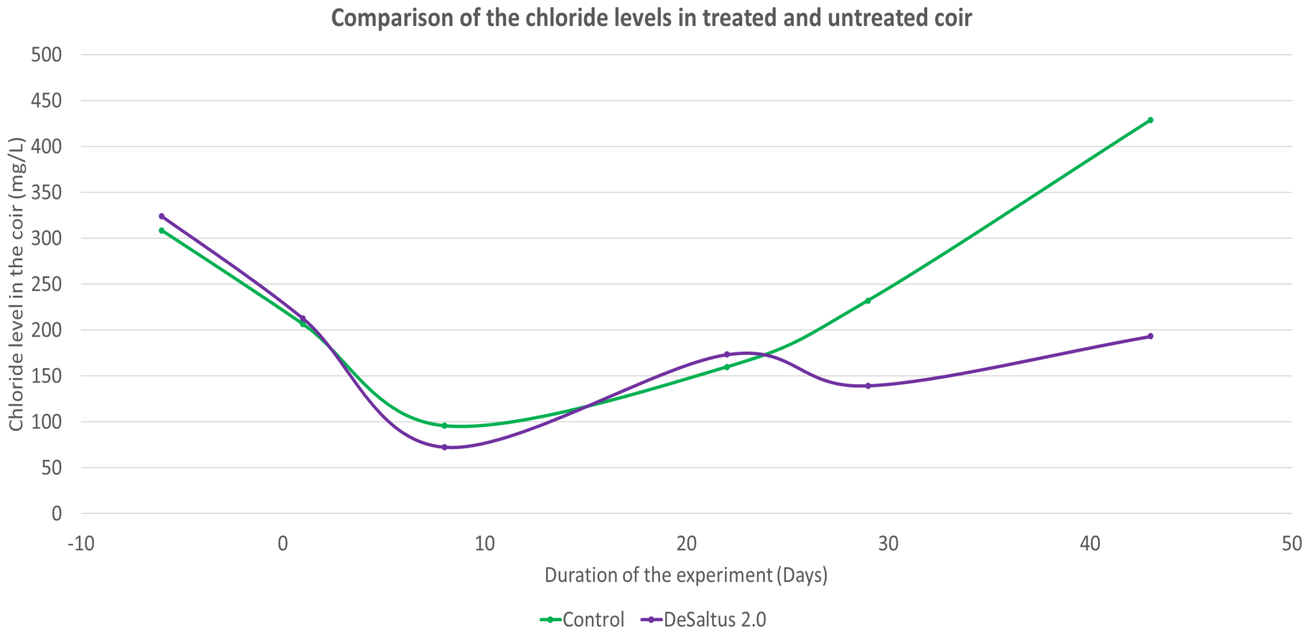
# Raspberry trial methodology

## DeSaltus 2.0

### at New Farm Produce

- Trial Area = 0.75ha substrate pot grown production. The DeSaltus 2.0 treated plot was compared to an untreated plot.
- Starting level of Na in the (borehole) water supply = 20.3 mg/L which the AHDB class as OK for production.
- Applications were made via the stock tank (B) at an equivalent rate of 2.5L/1000L and applied to the crop at a dilution rate of 1:100.
- DeSaltus 2.0 was applied continuously with the fertigation over summer 2021 from early June to middle of August.
- Ca levels in the feed recipe = 100 mg/L.
- The AHDB recommend that Na levels within the compost be <51 mg/L.
- Coir samples were taken from the same treated and untreated coir pots over an eight week period and sent to NRM for nutrient content analysis.




# DeSaltus 2.0

## Coir Analysis

Levels of sodium and chloride within coir samples removed from the control and DeSaltus 2.0 treated plots.

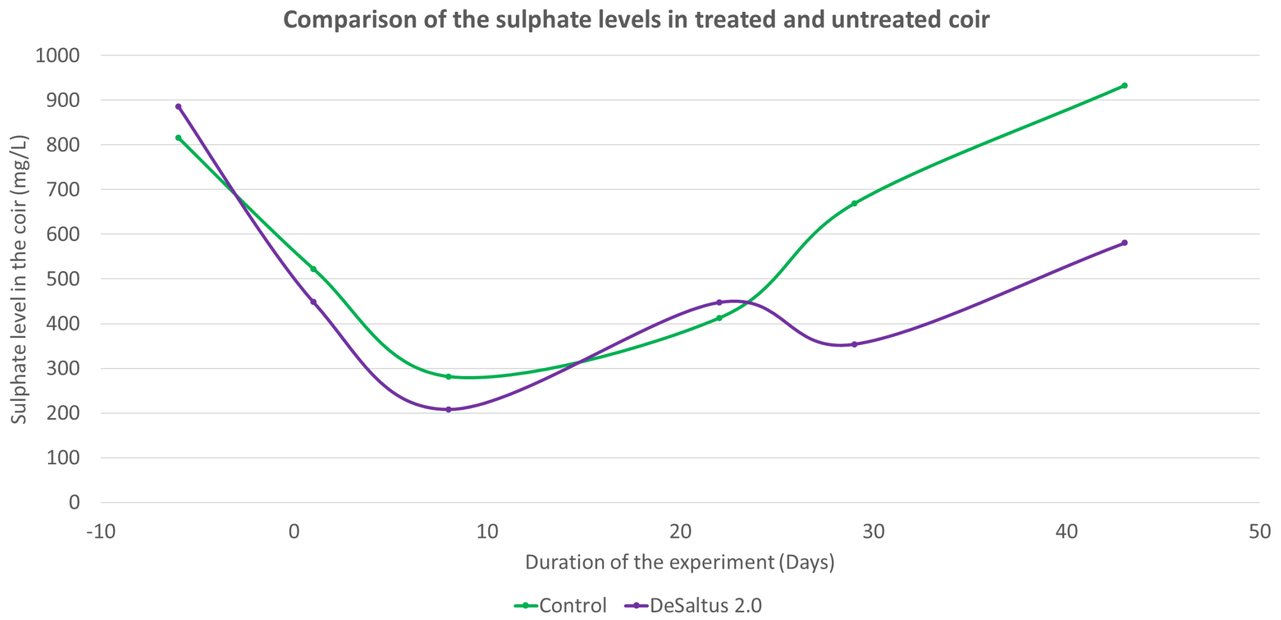
| Percentage change compared to the control at the end of the experiment | |
|---|---|
| **Sodium** | **-53%** |
| **Chloride** | **-55%** |

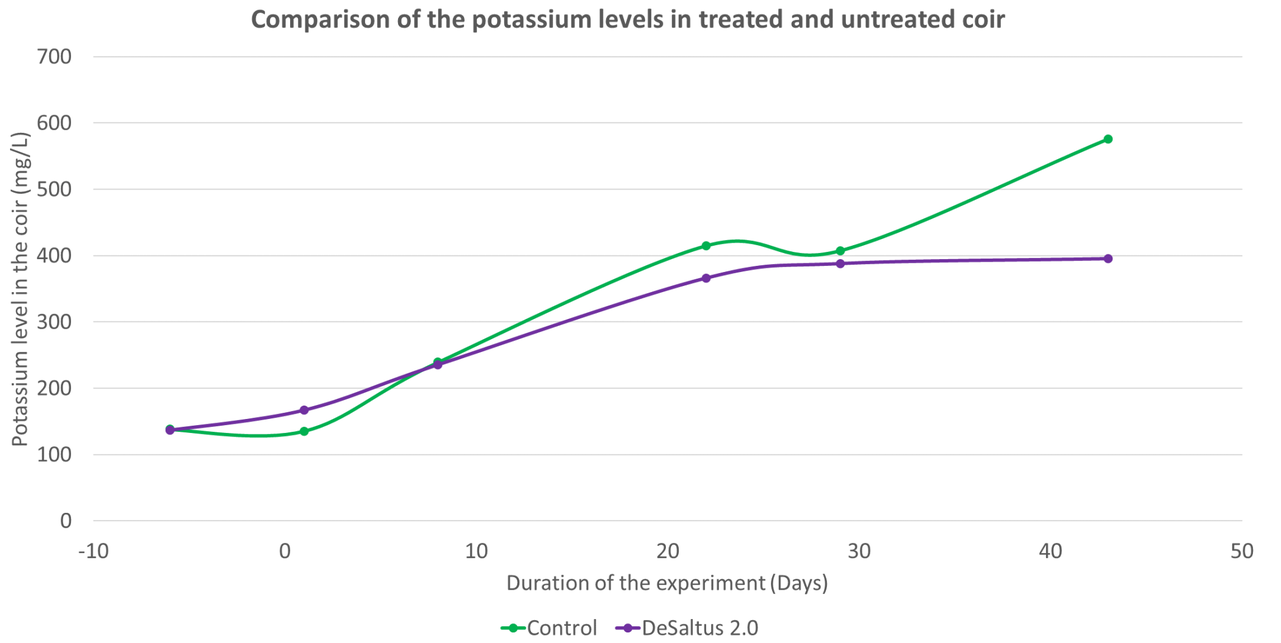
# DeSaltus 2.0

## Coir Analysis

- Levels of sulphate and potassium within coir samples removed from the control and DeSaltus 2.0 treated plots.

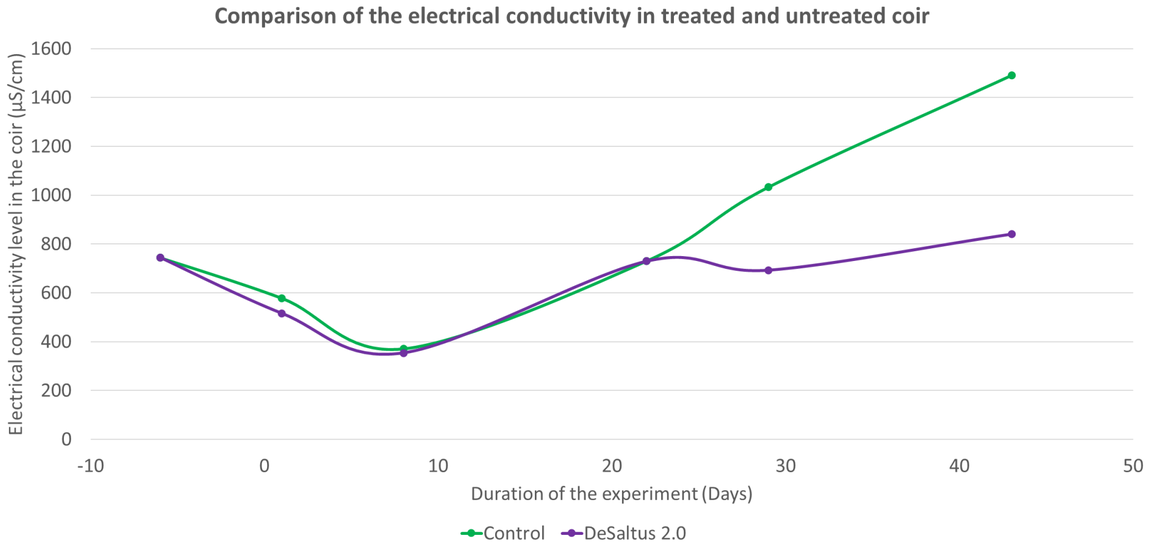
| Percentage change compared to the control at the end of the experiment | |
|---|---|
| **Sulphate** | **-38%** |
| **Potassium** | **-31%** |



# Raspberry trial summary

- DeSaltus 2.0 had an impact on the coir 20-25 days after continuous application.
- Levels of unwanted nutrients were reduced by 38-55% when the DeSaltus 2.0 treated coir was compared to the control.
- Total salts measured by electrical conductivity within the coir was 44% lower in the DeSaltus 2.0 treated pots compared to the control.
- DeSaltus 2.0 has shown itself to be useful for an intensively grown soft fruit crop even when combined with a moderate level of sodium in the water supply.




Electrical conductivity measurements of coir over the duration of the trial

# DeSaltus 2.0 trials summarised

- Total electrical conductivity over the course of the trials decreased by 35% and 44% in strawberries and raspberries respectively in the DeSaltus 2.0 treated plots.

| Percentage change in EC when DeSaltus 2.0 was applied | |
|---|---|
| **Total EC (strawberry trial)** | -35% |
| **Total EC (raspberry trial)** | -44% |

Percentage change in total electrical conductivity (EC) when the DeSaltus 2.0 treated plots were compared to the control at the end of the experimental period in each trial.

- DeSaltus 2.0 is suitable for locations with a high level of unwanted nutrients, particularly Na, in their water supply &/or crops being intensively grown during the summer.
- Peak usage period would be over summer, May - September when crops are grown most intensively with high throughput of nutrients.
- The benefit of applying DeSaltus 2.0 is that a grower can manage the nutrient levels in the coir at the same time as feeding the crop, with no requirement for a specific flushing event. Specific $CaNO_3$ flushing can soften fruit and lead to a deterioration of post harvest fruit quality traits.

# 2022 Raspberry trial methodology

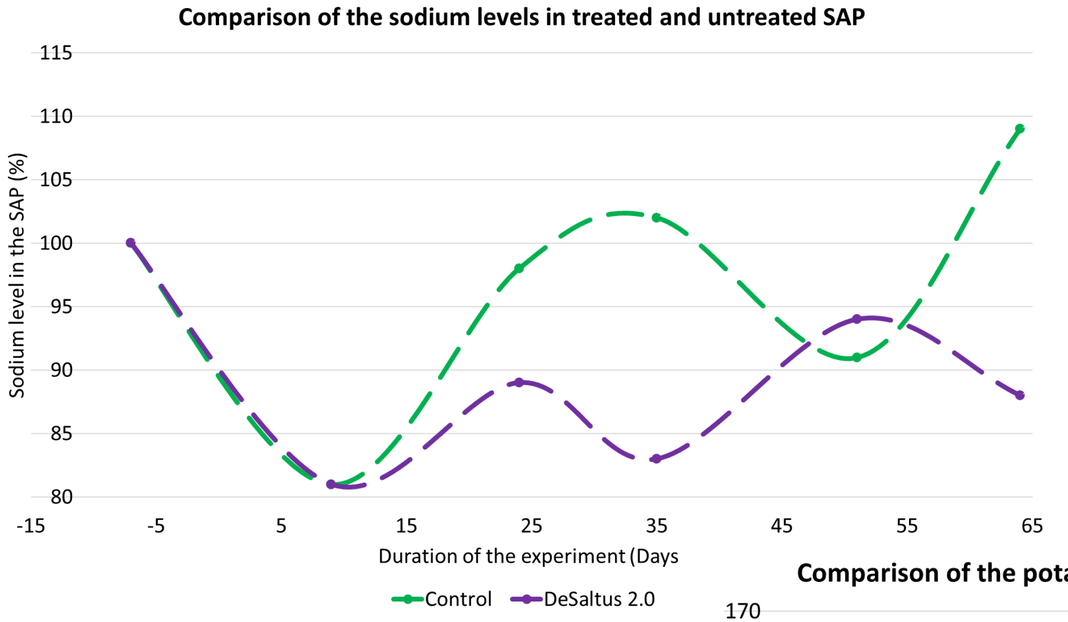
- Trial Area = 0.45ha substrate pot grown production. The DeSaltus 2.0 treated plot (1 row) was compared to an untreated plot.
- Starting level of Na in the (borehole) water supply = 20.3 mg/L which the AHDB class as OK for production.
- Applications were made via the stock tank (B) at an equivalent rate of 2.5L/1000L and applied to the crop at a dilution rate of 1:100 until day 35 and the inclusion rate was doubled.
- DeSaltus 2.0 was applied continuously with the fertigation over summer 2022 from June to August.
- Ca levels in the feed recipe = 103 mg/L.
- Additional drip-in and drain samples were collected in 2022.
- Coir samples were taken from the same treated and untreated coir pots over a 10 week period and sent to NRM for nutrient content analysis.

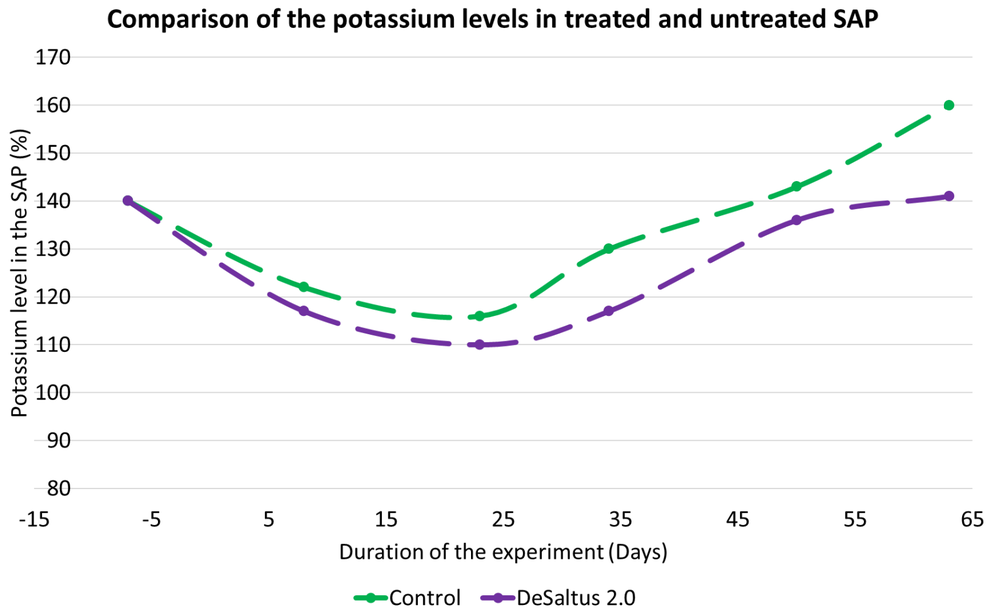
**DeSaltus 2.0**

**at New Farm Produce**

# 2022 Raspberry LC trial (Maravilla)

**DeSaltus 2.0**



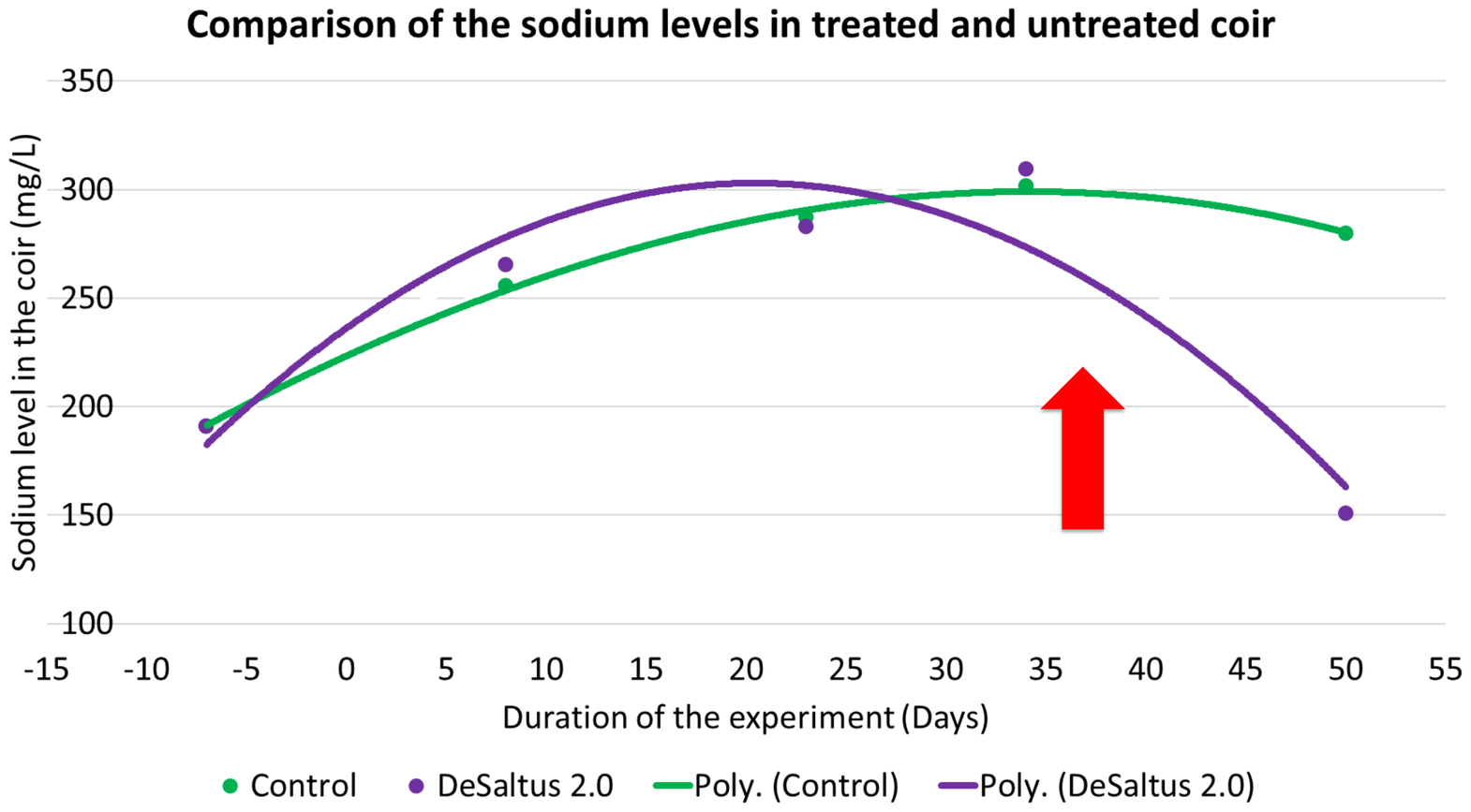




## SAP Analysis

Levels of sodium and potassium within SAP samples collected from the control and DeSaltus 2.0 treated plots.

# 2022 Raspberry LC trial (Maravilla)

**DeSaltus 2.0**




**Coir Na Analysis**

Levels of sodium within the coir samples collected from the control and DeSaltus 2.0 treated plots.

# 2022 Raspberry LC trial (Maravilla)

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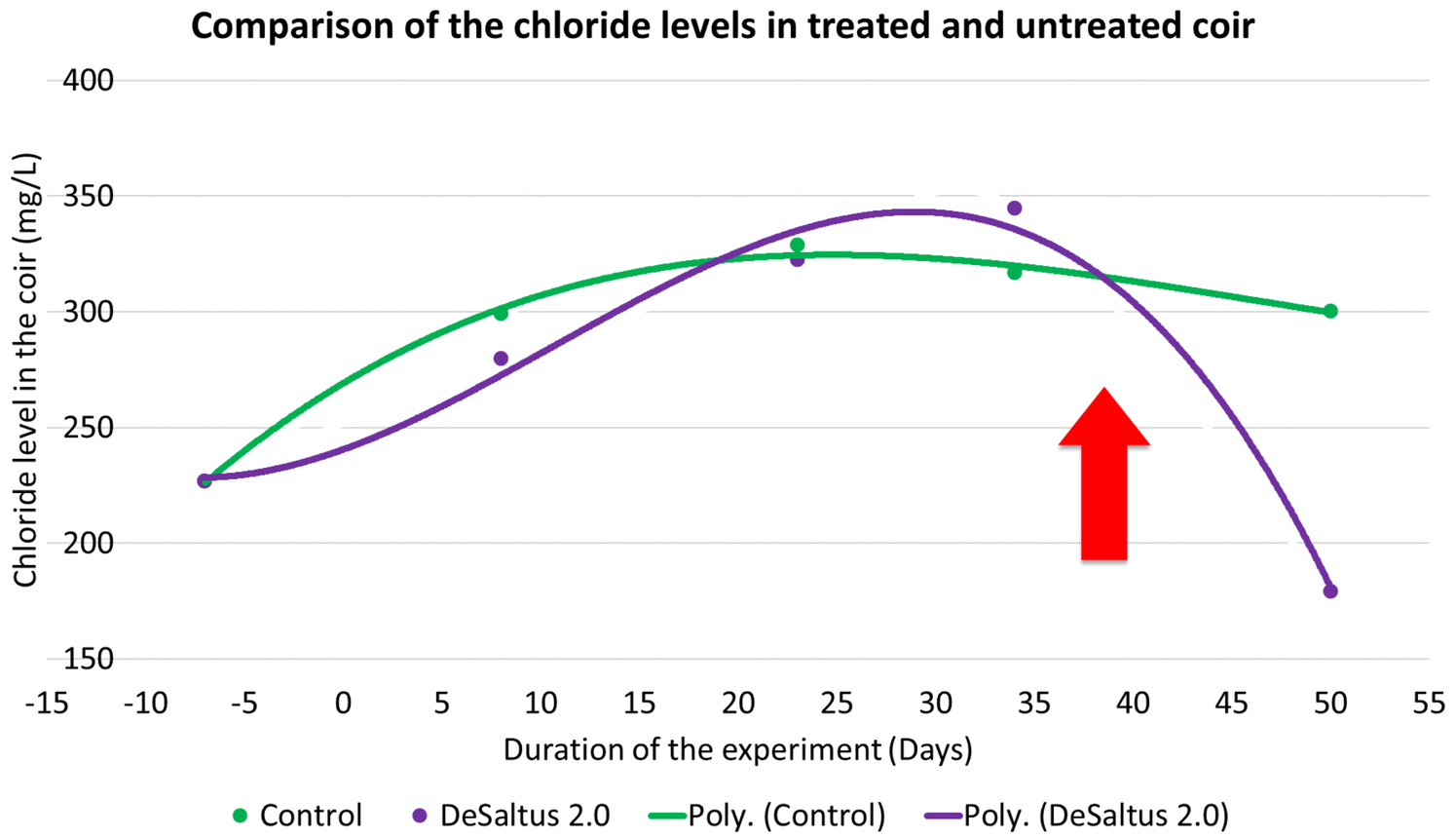
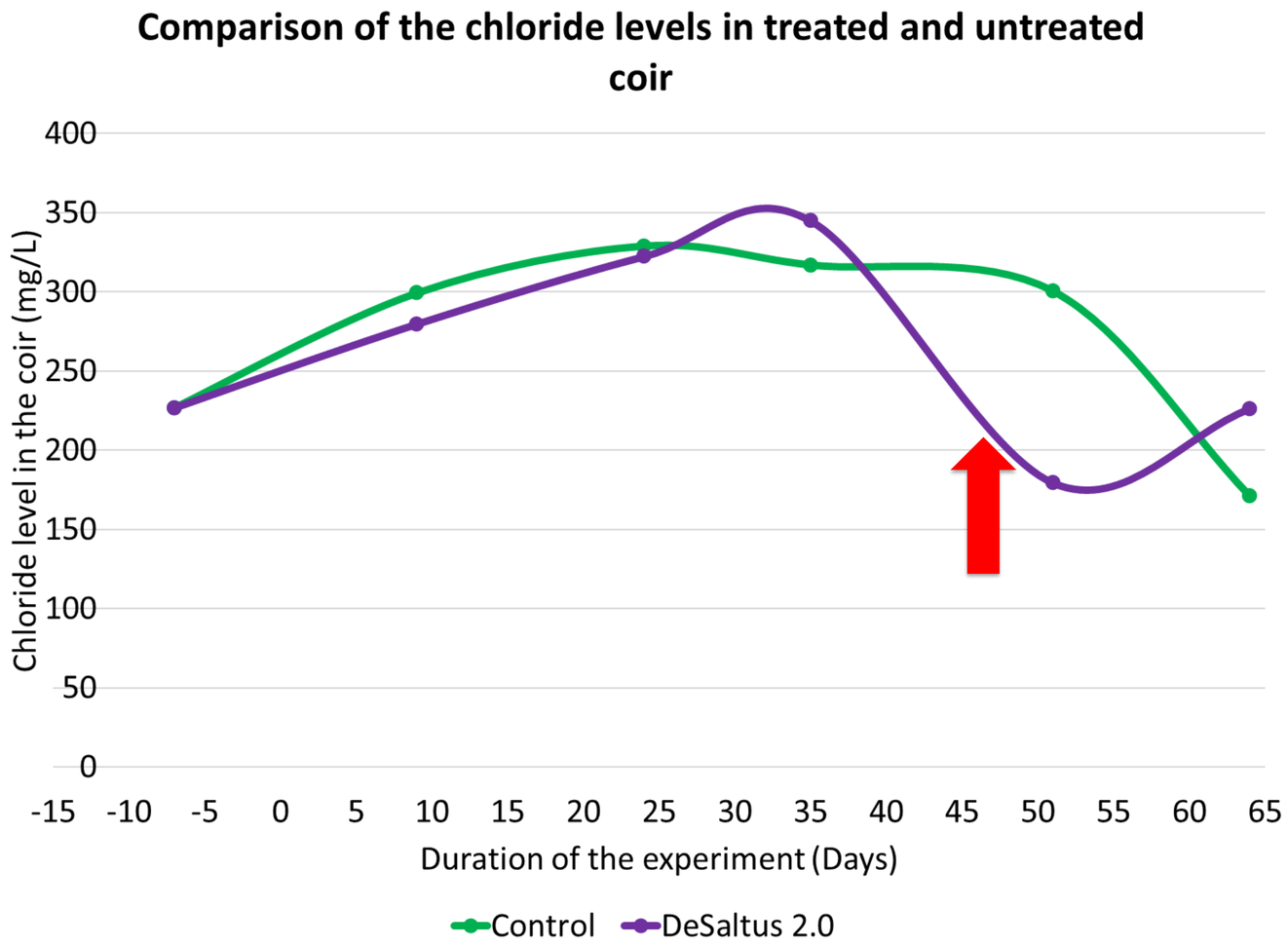



## Coir Analysis

Levels of chloride within coir samples removed from the control and DeSaltus 2.0 treated plots.

# 2022 Raspberry LC trial (Maravilla)

**DeSaltus 2.0**



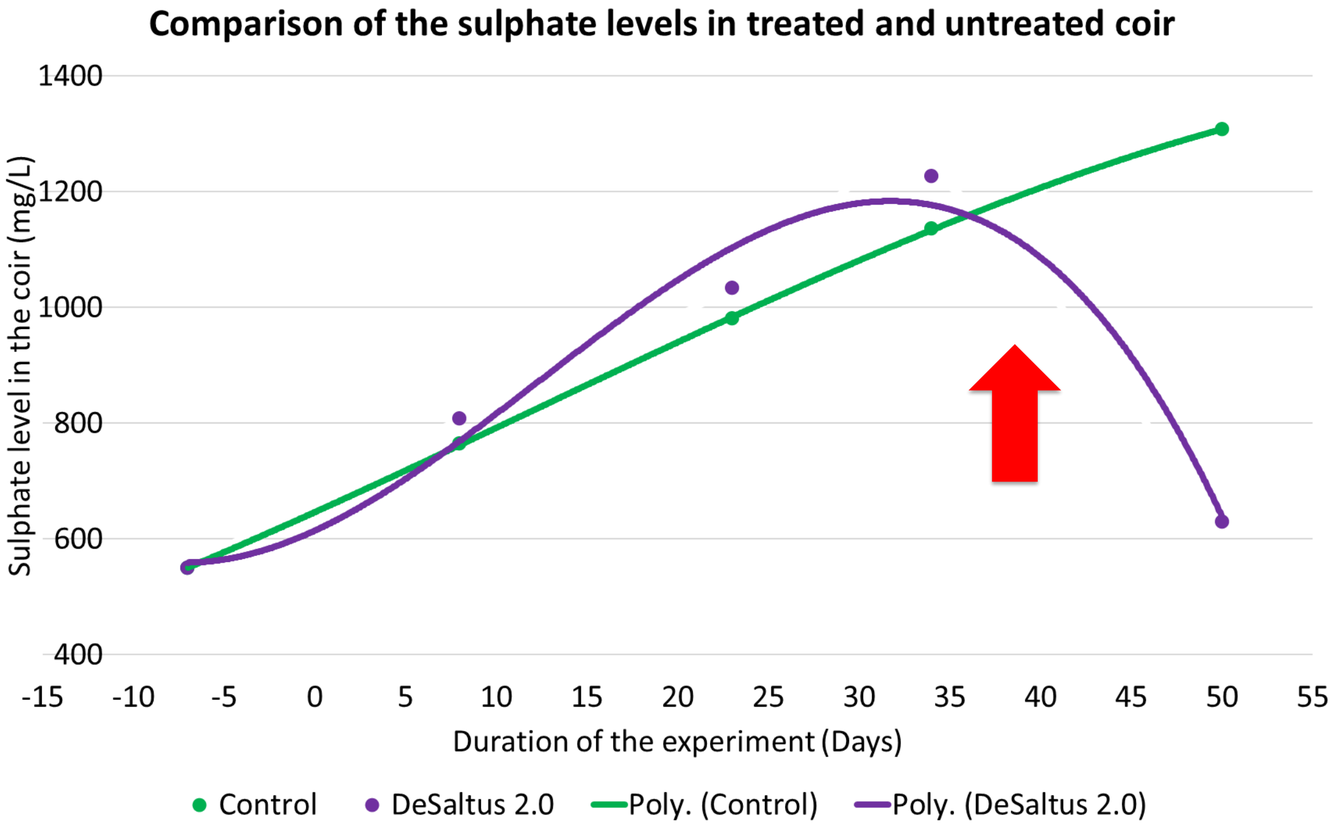

## Coir Analysis

Levels of chloride within coir samples removed from the control and DeSaltus 2.0 treated plots.

# DeSaltus 2.0

## Coir Analysis

- Levels of sulphate and within coir samples removed from the control and DeSaltus 2.0 treated plots.



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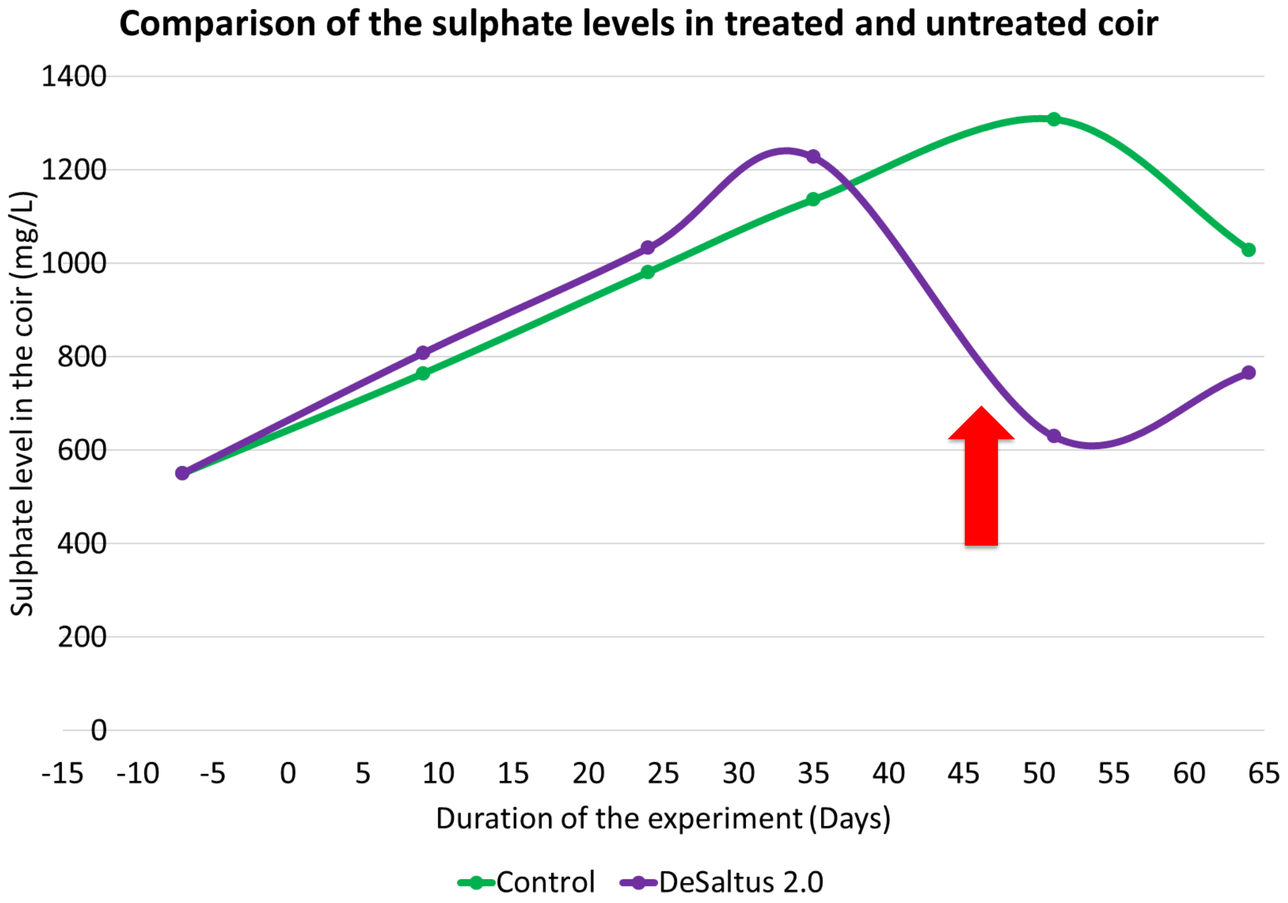
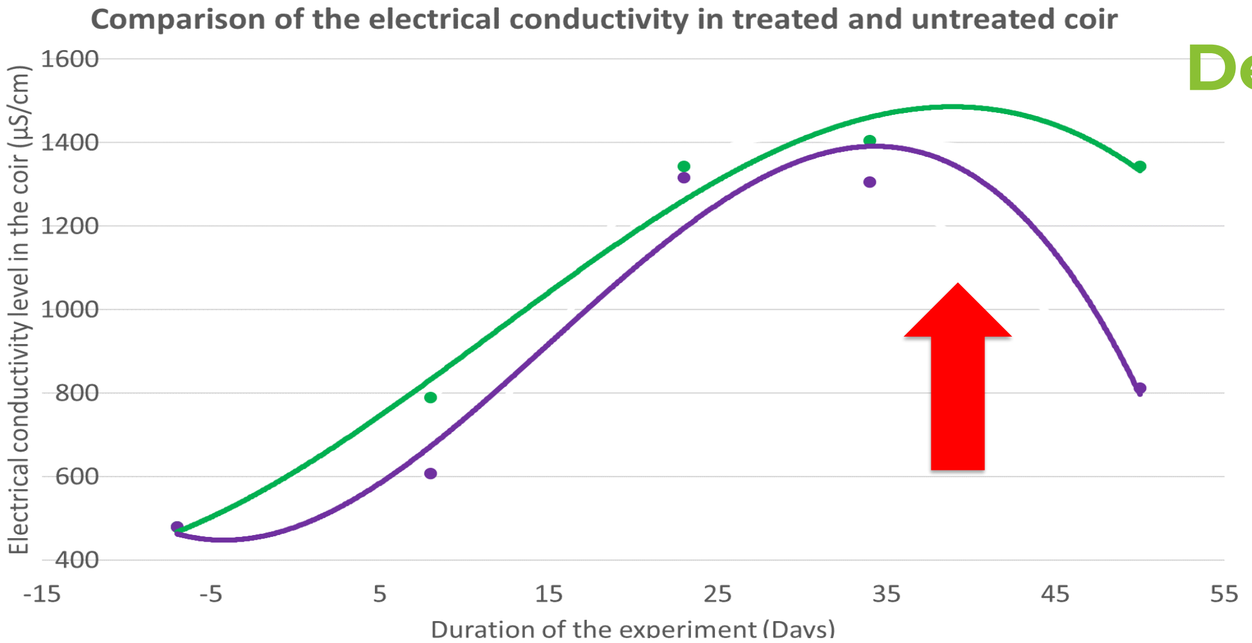
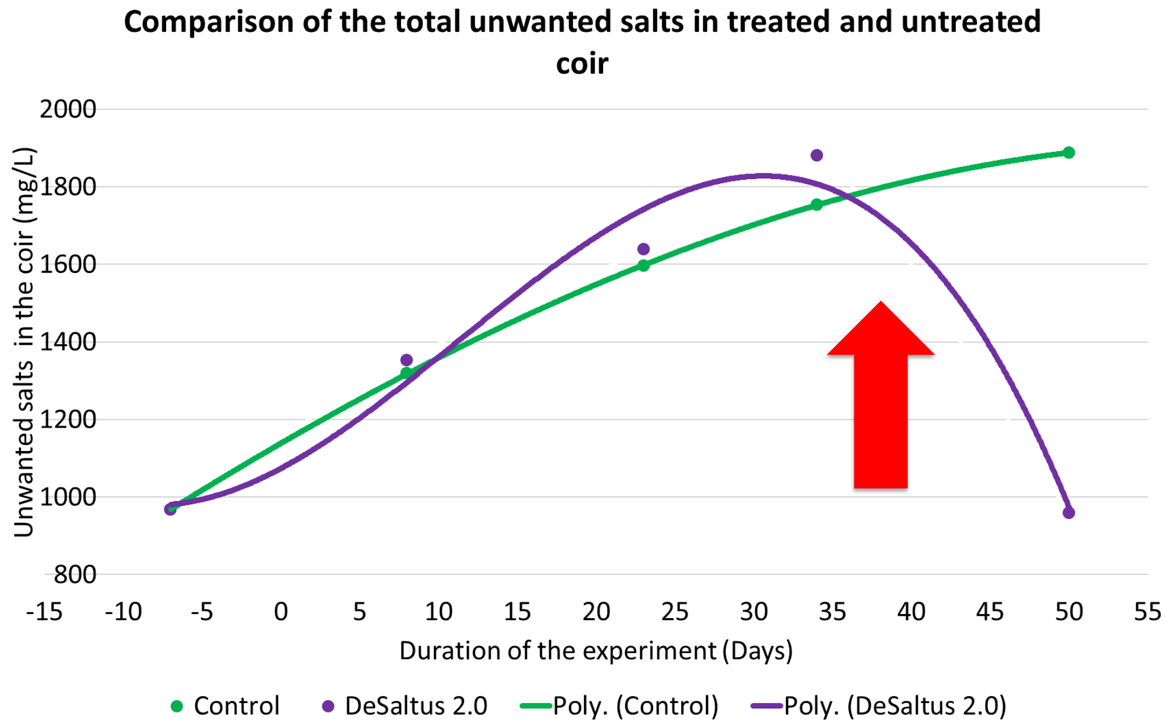


# DeSaltus 2.0

## Coir Analysis

- Levels of total EC and unwanted nutrients within coir samples removed from the control and DeSaltus 2.0 treated plots.



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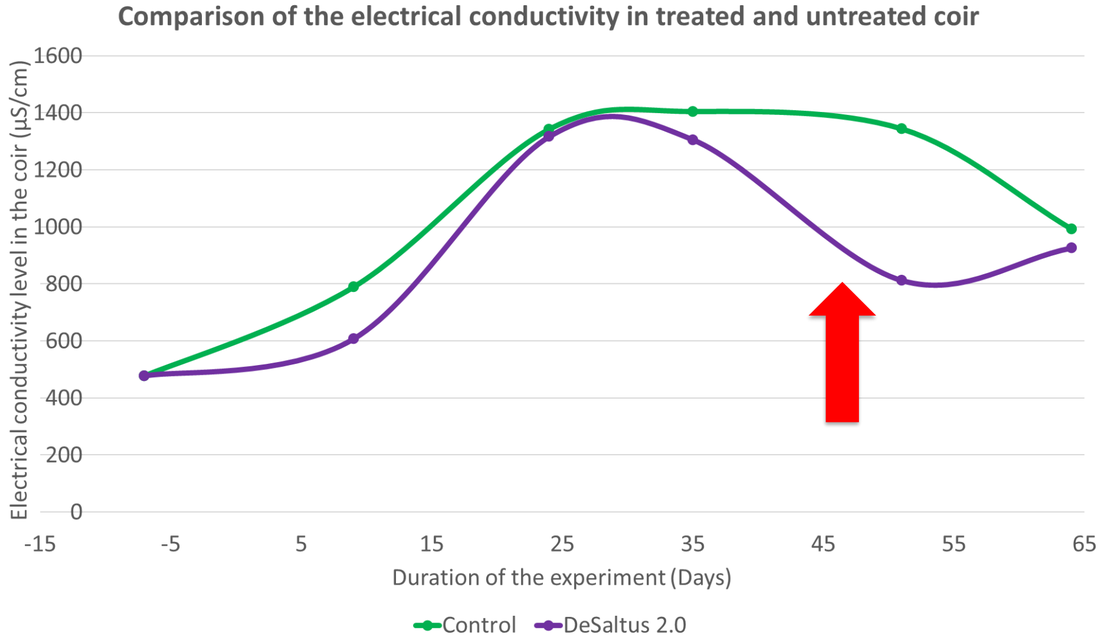
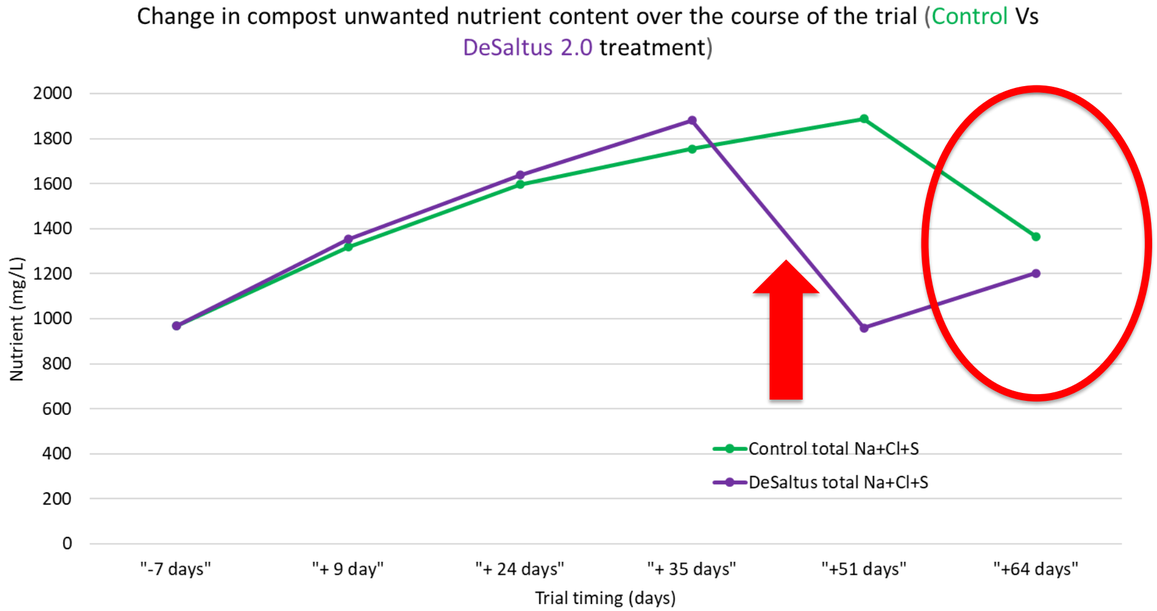


# 2022 Raspberry trial summary

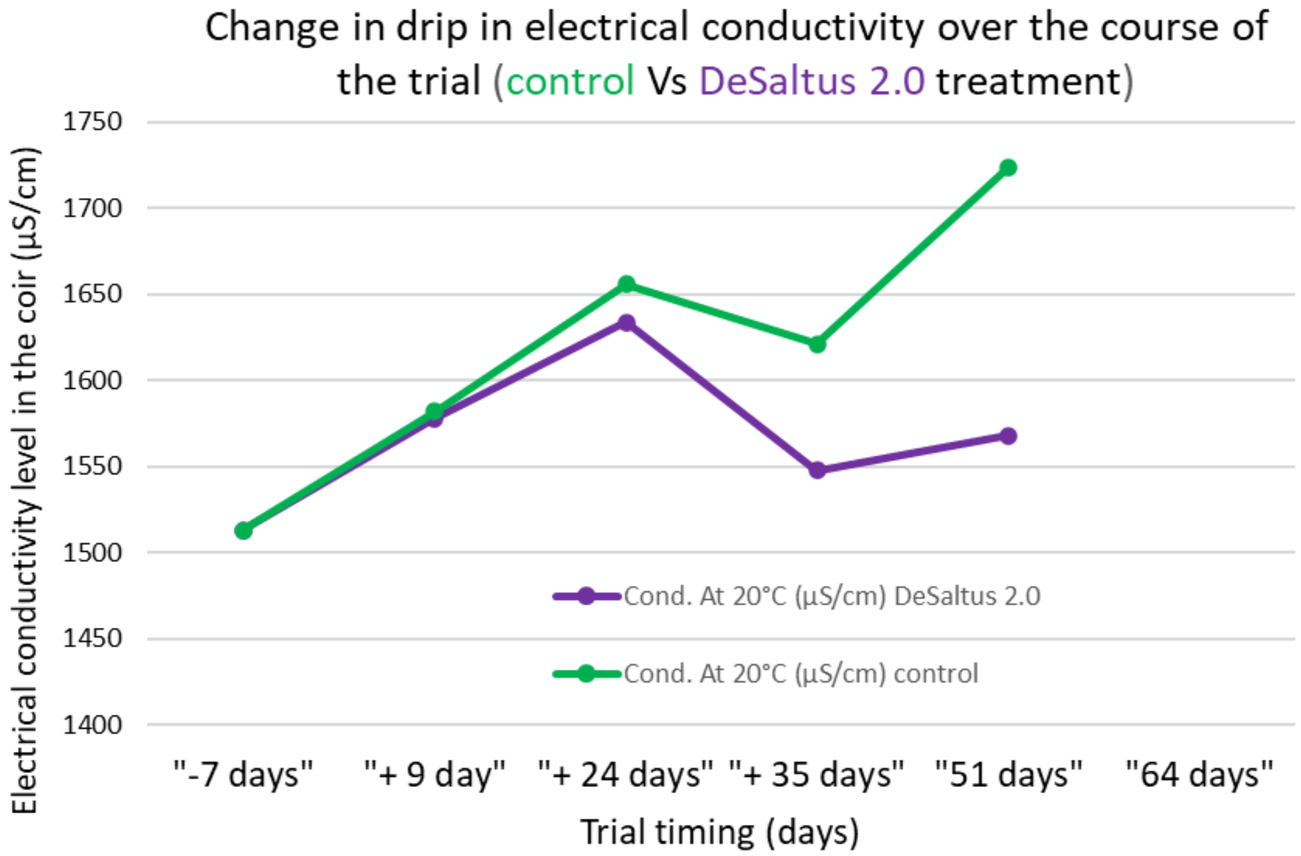
| Parameter | Percentage reduction |
|---|---|
| **Sodium** | 46% |
| **Chloride** | 40% |
| **Sulphate** | 52% |
| **Total EC** | 40% |

Percentage change in salts within the coir on day 51 after the trial began

- The number of cycles & water volume was much higher in 2022, at times twice the volume as in previous trials.
- Doubling the inclusion rate compared to previous years suggests that DeSaltus 2.0 can be used as an in-season, in-feed flushing mechanism to reduce unwanted nutrients from the coir during the most stressful periods of the growth cycle.

# 2022 Raspberry LC trial (Maravilla)

**DeSaltus 2.0**




## Drip-in Analysis

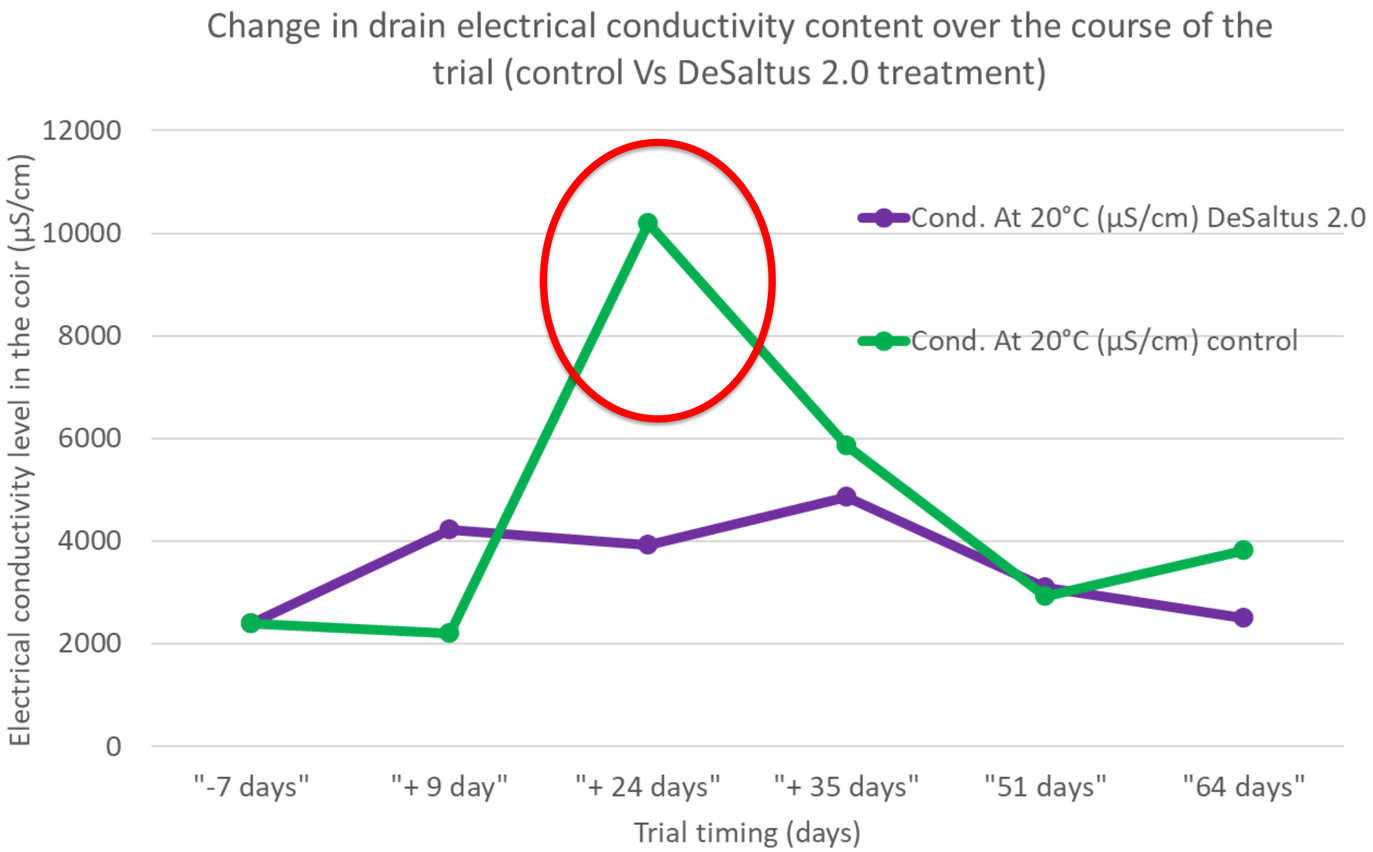
EC drip-in varied over the course of the trial.

There was 255 µS/cm between lines over the course of the trial.

Missing data from day +64, (30/08/22).

# 2022 Raspberry LC trial (Maravilla)

**DeSaltus 2.0**




## Drain Analysis

Total EC levels in the drain over the course of the trial.

Irrigation malfunction on day +24 (21/07/22)?

# KOBRA

Kobra is a fatty amine-based wetter designed to give enhanced coverage and consequent uptake of agrochemicals and foliar nutrients when used as a foliar adjuvant. The improved coverage means drying time is usually 50% quicker than agrochemicals alone. Kobra reduces stains caused by deposition of salts left on leaves from hard water, foliar nutrients and chemicals, When used as a dry wash Kobra significantly improves the visual appearance of fruits and leaves if applied just prioR to harvest or sale. It is particularly suitable for protected edibles, cut flowers and ornamentals. When applied as a growing media wetter/re-wetter, Kobra will give even penetration throughout the growing media and soil, Kobra will provide even wetting and re-wetting of growing media reducing surface tension of the irrigated liquid. The result is smaller or no dry patches as well as less risk of

## Kobra

Adjuvants - ADJ No 14708N


### Use

1. To improve foliar uptake of deposits, fungicides, insecticides and foliar nutrients through better distribution and faster drying

2. As a dry wash to reduce visible residues prior to harvest or sale. For best results apply regularly

3. As a growing media wetter/re-wetter, through drip or overhead irrigation, or as a drench

### Crops

All agricultural, horticultural and forestry crops.

### Pack Size

5, 200, 1000 litres

### Function of Kobra

Kobra is a fatty amine based wetter designed to give enhanced coverage and consequent uptake of agrochemicals and foliar nutrients when used as a foliar adjuvant. The improved coverage means drying time is usually 50% quicker then agrochemicals alone.

Kobra reduces stains caused by deposition of salts left on leaves from hard water, foliar nutrients and chemicals, When used as a dry wash Kobra significantly improves the visual appearance of fruits and leaves if applied just prior to harvest or sale. It is particularly suitable for protected edibles, cut flowers and ornamentals.

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### Composition

A water-miscible concentrate of modified fatty amine and sugar derivatives

| Kobr+A1:J14a Appication Cost Calculator | | | | | | | Key | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Manually updated this cell based on the price of unit size |
| Stock Tank Size | 1000 | | | | | | | Manually updated this cell based on the customers choice of unit size |
| | | | | | | | | Manually change this cell based on the size of the customers stock tank. |
| Unit sizes | Cost (£) | Enter Here selected unit price of Kobra: | Application rates (%) | Volume of Kobra required based on stock tank size | Cost of Kobra Volume | Timing Comments | | |
| 5 | | £ 100.00 | 0.100% | 1.00 | £ 5.00 | First Application | | |
| 20 | £ 100.00 | Kobra Volume: | 0.050% | 0.50 | £ 2.50 | First Application | | |
| 500 | | 20 | 0.050% | 0.50 | £ 2.50 | Quarterly | | |
| 1000 | | | 0.030% | 0.30 | £ 1.50 | Dry Wash | | |
| | | | 0.025% | 0.25 | £ 1.25 | Monthly | | |
| | | | 0.020% | 0.20 | £ 1.00 | Dry Wash | | |
| | | | 0.015% | 0.15 | £ 0.75 | Dry Wash | | |
| | | | 0.010% | 0.10 | £ 0.50 | Weekly | | |
| | | | 0.001% | 0.01 | £ 0.05 | Constant | | |
| | | | | | | | | |

# Catalyst


## Use

On crops grown in peat free growing media. Catalyst provides a range of organic acids and seaweed biostimulants to be incorporated into peat free or biologically degraded growing media. Improves plant rooting and general bioactivity within the root zone. Increases media nutrient and water holding capacity.

## Crops

A variety of horticultural crops grown in peat free growing media

## Pack Size

10 litres

## Function of Catalyst

Catalyst is a unique concentrated formulation of Humic Acids and Seaweeds. Applied directly to growing media either with fertigation nutrients or as a stand alone application. Catalyst acts as a biological primer for peat free growing media or degraded media that plants have diffculty rooting in by providing a range of organic acids beneficial to root growth and beneficial microbial colonisation. Catalyst should be used where plants are struggling to root due to unfavourable rhizosphere conditions.

| Analysis | w/w | w/v |
|---|---|---|
| Humic Acids | 7.3% | 7.5% |
| Seaweed Biostimulant | 63.0% | 65.0% |