



# SPINACH

Aurora Treatment Report



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# SPINACH

*Spinacia oleracea*

GROWN Vertical Farms, Greenhouse, Open Field

GERMINATION 3-7 Days

HARVEST 30-40 Days

## Description

Spinach (*Spinacia oleracea*) is a herbaceous plant and a superior supplier of vitamin A, vitamin K, manganese, magnesium, folic acid, iron potassium and dietary fibres. Its leaves are eaten both raw and cooked.

Spinach is susceptible to multiple seed borne pathogens. Each of those fungal pathogen could be particularly devastating to crop yields. It has been seen that *Fusarium* can cause ~60% -80% yield losses, *Anthraco*se ~30%-40%, *Stemphylium* ~50% - 60% and *Cladosporium* ~30%.

## Aurora Process

The Aurora process is specifically designed to increase seed health by removing pathogens and increasing germination rates. The seeds are exposed to Activated Air™ – which includes a high level of “RONS” (Reactive Oxygen and Nitrogen Species). These actively disinfects the seeds and boosts growth vitality rates and speed - ensuring increased yield for the grower.

### Caveats

*This treatment protocol was not fully optimised to the seed/pathogen pair; an off-the-shelf protocol was used. There may have been scope for optimisations; additionally, as Zayndu are continuously improving the Aurora product range, it is likely that improved results could be achieved if these tests were re-run now. Please contact your sales rep if you'd like more details.*

## Pathogens

- *Fusarium*
- *Anthraco*se
- *Stemphylium*
- *Cladosporium*

## Processing Details

Aurora Model Z10-1

Treatment Protocol Z10-08x23

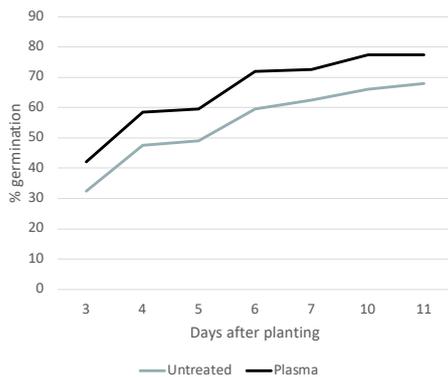
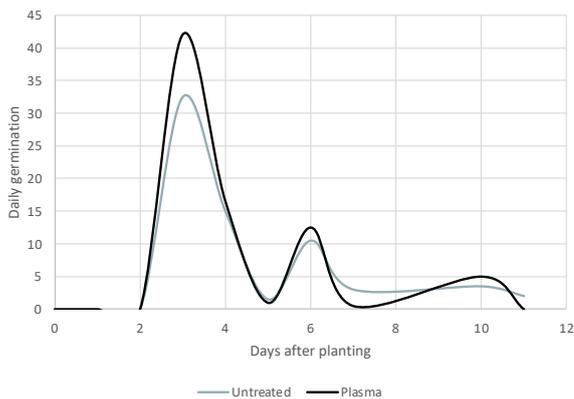
Date of Treatment January 2022

Required Activated Air™ treatment levels treatment levels reached within the laboratory, under standard operation conditions. Pathology and germination tests were carried out in accordance with industry standard operating procedures (ISTA protocols).

# SPINACH

## Germination

Total germination of the seeds improved significantly compared to the untreated seeds. An increase from 9% to 15% saving both time (reduces cultivating seeds that fail) and money (reduces amount of seeds purchased).



In addition to increasing the total amount of successfully germinated seeds, the process also increased the speed of germination.

This improvement enables better prediction of harvestability, with the entire crop germinating within a shorter timeframe than untreated seeds.

## Summary

In this example, the Aurora treatment reduced pathogen load significantly. Germination was increased from 80% to 95% and accelerated by approximately 1.5 days. Overall yield was not tested to harvest date, but seedlings showed significantly increased vigour.

For more details or to arrange an evaluation please contact our team below

## Pathogens

The seeds were tested for fungal pathogens before and after plasma treatment.

We have been able to reduce the fungal load in the seed batch from 37% to ~4-5%. This results in reducing/eliminating the contaminations from seed-borne pathogens which can damage young plants and limit overall yield.

