SPINACH

Zayndu Cold Plasma Treatment Report

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SPINACH

Spinacia oleracea

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.

GROWN Vertical Farms, Greenhouse, Open Field

GERMINATION 3-7 Days

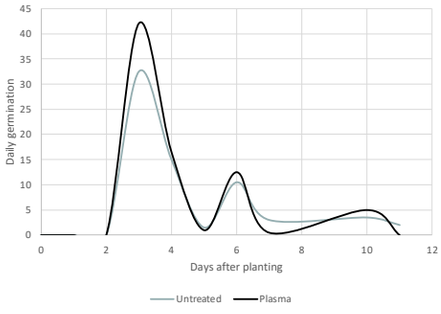
HARVEST 30-40 Days

Germination

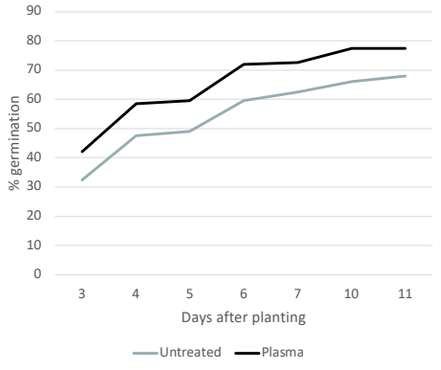
Total germination rate increased up to 15% (*cultivar dependent*) compared to untreated seeds, saving both time (*reduces cultivating seeds that fail*) and money (*reduces amount of seeds purchased*).

Untreated Treated

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.



Biomass Increase

Per Plant/Variety (post treatment)

Variety	A	B	C	Avg
% Increase	13.1%	16.66%	10.2%	13.32%

Processing Details

Zayndu Model	Z10-1
Treatment Protocol	Z10-08x23SO

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

Caveats

This treatment protocol was not fully optimised and used an off-the-shelf protocol. There may have been scope for optimisations; additionally, as Zayndu are continuously improving their 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.

Summary

In this example, the cold plasma treatment increased germination 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

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SEED EVALUATION

Zayndu operates a seed testing facility to demonstrate the performance of the Activated Air treatment on plant health and germination.

We generate quantitative data, comparing germination and growth rates for a seed batch before and after the treatment.

Seed testing is performed using highly sensitive tests within controlled environments and in accordance with the International Seed Testing Association's (ISTA) updated guidelines and protocols.

If you are interested in evaluating your own seeds for protocol optimisation and performance reporting, please contact our business development team on +44(0)1509 276225 or email sales@zayndu.com

- Germination analysis
- Growth rate evaluation
- Bespoke treatment optimisation

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ZAYNDU SYSTEMS

- Advanced Seed Health Systems for CEA
- Cold plasma boosts seed health and crop yield
- Using only air and electricity, no added chemicals
- Options for 1kg and 2.5kg batch size
- Low operating power consumption (typically <200W)
- Designed for Vertical Farms & Greenhouses

Designed for the needs of vertical farms and greenhouses, Zayndu CEA systems are intended to support and improve crop productivity by boosting seed vigour without the need for additional fertilisers.

Harnessing the power of nature, the low energy cold plasma systems re-create the natural phenomenon that is lightning (plasma) in a controlled enviroment and only require a standard office electric outlet (110V or 240V options).

Treatment costs are amongst the cheapest in the industry.

THE COLD PLASMA PROCESS

Zayndu's seed health process uses cold plasma to boost overall seed health. It is effectively a priming process, improving germination rates and speed, ensuring increased yield for the grower.

In the process, seeds are placed in a drum, containing only air. The Zayndu system generates cold plasma within the drum. This in turn creates "Activated Air", which is a blend of Reactive Oxygen and Nitrogen Species (or RONS for short). This delivers a boost to seed vigour. At the end of the process, the Activated Air is returned back to normal atmospheric air.

Process control is critical. Sensors measure humidity, temperatures, pressures, and gas concentrations throughout the system and use sophisticated control algorithms designed to deliver consistent results. The monitoring systems also highlight areas which may need maintenance in the future, helping to ensure that every treatment is done effectively.

The treatment is both cool and dry – no water is introduced in the process, and the advanced cold-plasma systems used ensure the seeds are not exposed to temperatures outside of 18-24°C.

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