

Generating a Cleaner Future for Agriculture

Our gases and solutions help farmers increase productivity and income in a sustainable way. They build crop resilience and enable producers to adapt to the impact of climate change. They also help mitigate climate change by reducing or eliminating greenhouse gas emissions.

Greenhouse CO₂ enrichment

Optimise atmospheric CO₂ levels in your greenhouse!

CO₂ assimilation is key to the photosynthesis process that stimulates the growth of your crops.

Maintaining optimum levels of atmospheric CO₂ in your greenhouse can be a valuable practice which can deliver an increase in yield of up to 20% - 40%.

In sealed greenhouses or closed environments, crops use ambient CO₂ to grow. If you do not add an extra supply of CO₂ above its atmospheric level, the level eventually drops and crop development will be limited.

At the same time, inside greenhouses, when the plants' CO₂ consumption is greater than the supply from greenhouse openings, the CO₂ concentration will fall below the atmospheric level (400 ppm). This limits the photosynthesis process and therefore plant growth.

The ambient CO₂ (the naturally occurring level of CO₂) concentration of 400 parts per million can occur in a properly ventilated greenhouse. However, in sealed greenhouses the concentration is much lower than ambient during the day and much higher at night due to plant respiration and microbial activity.

Whether you need a simple CO₂ enrichment programme, or a dynamic enrichment strategy our experts can help you achieve the ideal CO₂ concentration for your plants to grow successfully.

Greenhouse CO₂ enrichment is a circular solution. The CO₂ we supply is captured in large quantities from industrial and renewable sources. This is then processed for delivery in a variety of delivery modes depending on your needs.



Benefits:

- Significantly increases the photosynthetic efficiency of your plants, and the crop yield
- Avoids vegetative interruption during periods of maximum solar radiation
- Provides optimum uniformity of fruit size and characteristics
- Increases the foliar surface

Applications:

- Greenhouses
- Indoor (vertical) farming



Irrigation with CO₂-enriched water

Boost plant growth with carbonated irrigation water

One of the key functions of carbon dioxide is to lower the pH of water, which can also lower the pH of soil, increasing the availability of some nutrients.

Adding CO₂ to irrigation water has been proven to be a very beneficial technique. Dissolving CO₂ in the water leads to significant improvements in irrigation equipment, as well as important benefits for farmers.

How it works:

CO₂ is injected into the irrigation water to control its pH through an automated nutrient control system. This automatic pH control reduces maintenance and downtime, and can be integrated into existing installations.

The CO₂ supplied by Air Products is a by-product recovered and captured in large quantities from industrial and renewable processes.

Benefits:

- Acidification of irrigation water changes the solubility of micronutrients and facilitates their uptake by plants/crops
- Increase in crop production and yield
- Increases fruit quality, size and number
- Improves soil porosity, which promotes better root development
- Eliminates the need to handle strong acids
- Safety and pH stability improve irrigation system maintenance by preventing incrustation in drippers
- Reduces over-acidification through accurate pH control
- A sustainable solution

Applications:

- Indoor farming
- Outdoor farming
- Greenhouses



Oxifertigation for plant growth

Improve your crop's root system

In soilless culture, the root system is confined to a small area. Under these conditions, there is an accelerated loss of water and oxygen in the root zone.

To improve the availability of oxygen in the roots of soilless crops, a technique called oxyfertigation has been developed, which involves adding high concentrations of dissolved oxygen to the irrigation water.

Oxygen depletion in the root system can lead to various plant disorders: chlorosis, reduced growth, root necrosis, and reduced yields. Soilless cultures create conditions that can favour O₂ deficiency in the root system, including:

- Volume restriction of the growing medium
- High root density
- Low levels of air-filled porosity
- High salt concentration
- Nutrient solutions with low dissolved oxygen concentration
- High temperatures.

Adding oxygen to the irrigation water counteracts these conditions.

The high frequency irrigation commonly used in soilless culture means that O₂ dosing through the nutrient solution can be carried out according to the respiratory needs of the roots.

Benefits of oxygenating water in soilless culture:

- Improved culture yields
- Improved root system performance
- Applicable to any type of crop
- Nutrient solutions with high dissolved oxygen concentration

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The oxygenation technique is easy to apply, and can be incorporated into an existing installation
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Applications:

- Greenhouses
- Outdoor and indoor farming
- High density, intensive crops
- High root density crops
- Soils with low porosity
- High salt concentration
- Low dissolved O₂ in nutritive solutions
- High temperature environment



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Please contact us for any additional information and to discuss your needs:

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