CO₂ Supplementation for Greenhouses

Whether it’s leafy greens, vegetables, fruits, or flowers, Praxair’s CO₂ system can help achieve larger and more consistent plant yield by elevating and maintaining optimum CO₂ levels in the greenhouse. Using Praxair pure CO₂ gas rather than combustion methods allows for independent control of CO₂ levels in the greenhouse. In addition, there are no poisonous combustion products that are detrimental to the plants.

Cut Operating Costs, Increase Crop Production

Safely and consistently elevated CO₂ levels in a greenhouse make for healthy plants. Praxair’s CO₂ system delivers beneficial carbon dioxide directly into the greenhouse in a controlled and monitored way to ensure achieving excellent plant growth, improved yield, stronger stems, and a reduction in overall operating costs. An alternative method to CO₂ generation and injection is using combustion generated CO₂ from heaters or boilers. This process can result in harmful by-products to plants such as NOₓ and CO generated as a result of the combustion process. Praxair’s CO₂ system not only avoids the generation of the harmful products produced during combustion, but also provides proper humidity control within the greenhouse. Whether covering one acre or dozens of acres in the greenhouse, Praxair’s system allows for uniform distribution, and can be designed to meet the needs of the variety of plantings being grown.

Features of the Praxair System

- Uniform distribution throughout the greenhouse
- Easily controlled levels of the CO₂ in the greenhouse atmosphere
- Flexibility to accommodate a variety of plantings
- Installation without disruption to the growing schedule
- Practical know-how from the leading CO₂ supplier

Benefits of a Controlled CO₂ System

- No major capital investment
- Maintains optimum CO₂ concentration for plant growth
- Produces more blossoms and fruit per plant
- Increases total amount of crops
- Increases growth rate Reduces need for winter ventilation
- Reduces operating expenses

<table>
<thead>
<tr>
<th>Crop</th>
<th>CO₂ (ppm)</th>
<th>% Yield Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomato</td>
<td>1000</td>
<td>30 – 38</td>
</tr>
<tr>
<td>Cucumber</td>
<td>620</td>
<td>34</td>
</tr>
<tr>
<td>Peppers</td>
<td>450-500</td>
<td>15</td>
</tr>
<tr>
<td>Lettuce</td>
<td>1000</td>
<td>25 – 40</td>
</tr>
</tbody>
</table>

*Source: Elly Nederhoff – Hort. Research
CO₂ Improves Plant Growth

On average, the air around us has approximately 400 ppm of carbon dioxide. Studies show that plants may stop growing if CO₂ levels decrease below 150 ppm. Ideal CO₂ levels for growing vegetables range between 450 and 1200 ppm. CO₂ can be introduced in either liquid or gaseous form through various means including ventilation systems or simple ducting. CO₂ levels are then continuously monitored for safety and uniformity and accurately controlled to achieve the desired results. We have the technical expertise and experience in the greenhouse industry to design an optimized CO₂ injection system to ensure plants are getting the CO₂ they need to improve the overall yield.

Controlled Atmosphere Success

Praxair has worked with many greenhouses with a variety of sizes, locations, and crops including a new greenhouse growing microgreens, leafy greens, and herbs distributing products to local restaurants. The customer needed CO₂ supplementation to help improve their year around yield. They preferred to use liquid CO₂ as their supplementation source as opposed to combustion generated CO₂ in an effort to limit undesirable by-product exposure to the plants and release into the environment. The Praxair team worked closely with the customer to select the appropriate injection system and system controls. The team helped design the CO₂ distribution system inside the greenhouse to ensure the plants received the optimal amount of CO₂.

Liquid or Gaseous CO₂ Injection – Praxair Handles Both

Praxair offers two different ways of injecting your pure CO₂ into your greenhouse – liquid or gas. Liquid CO₂ injection is a highly efficient way of injecting CO₂ directly into your HVAC air duct system. The unique design allows the system to inject the liquid CO₂ without out the need of gasifying it first. The liquid CO₂ converts partially to gas CO₂ and partially to dry ice snow which sublimes rapidly in the air duct. This option comes with a safety package that controls the temperature and flow in HVAC air duct for your peace of mind.

The second option is when liquid CO₂ is vaporized using a steam, hot water or electrically heated vaporizer resulting in gaseous CO₂ injected into the greenhouse through perforated tubes or mixed with air before injection.

A Wealth of Experience and Support

- When you choose Praxair, you’re selecting a support team that includes:
- Experienced scientists, engineers and customer service professionals
- A complete array of services is available as a part of Total System Approach
- Food scientists and engineers with extensive CO₂ knowledge

Dedicated 24 hour service force for quick system disruptions

It’s everything you need to improve the quality and yield of your greenhouse products.

Contact Praxair Today

For more information about atmosphere and gas applications developed from years of industrial gas research with atmosphere, cryogenic and process gases, call Praxair at 1-800-PRAXAIR or visit our website at www.praxairfood.com

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