

Nanobubble Irrigation Improves Chilli Yield, Fruit Quality & Crop Uniformity



Case Study: Khairabad Farm | Punjab

Location:	Trial Period:	Results:
Khairabad, Punjab	2 months	• 15% Higher Chilli Yield • 5–8% Increase in Fruit Caliber • Early Flowering & Fruiting • Improved Fruit Quality • Healthier, More Uniform Crop Growth
Application:		
Farm Pond Irrigation for Chilli Cultivation		
Unit installed:		
Nanokriti NanoAqua Oxygen Nanobubble Generator		



Green chilli production requires healthy root development and efficient nutrient uptake throughout the crop cycle to achieve high yields and premium fruit quality. To enhance irrigation water quality, a Nanokriti NanoAqua Oxygen Nanobubble Generator was installed in the farm irrigation pond at Khairabad, Punjab. Oxygen nanobubble-enriched water was supplied through the existing irrigation system for a two-month trial without requiring any modifications to the farmer's cultivation practices.

Why Root-Zone Oxygen Matters

A Nanokriti NanoAqua Oxygen Nanobubble Generator was installed in the irrigation pond supplying water to the chilli field. Throughout the trial, irrigation water was enriched with oxygen nanobubbles before being delivered through the farm's existing irrigation network. The technology was integrated into the existing irrigation system, requiring no changes to routine farming operations.



Results & Key Findings:

Improved Vegetative Growth: Plants exhibited stronger vegetative growth throughout the trial. Higher dissolved oxygen in the irrigation water supported better root respiration and nutrient uptake, resulting in healthier and more vigorous plants.

~15% Increase in Yield: Overall chilli yield increased by approximately 15%. Improved root-zone oxygen availability enhanced plant growth, fruit development, and overall crop productivity throughout the cultivation period.

5–8% Increase in Fruit Caliber: Harvested chillies showed a 5–8% increase in fruit caliber. Enhanced oxygen availability supported better water and nutrient transport during fruit development, leading to larger and more uniformly developed fruits.

Earlier Flowering & Fruit Initiation: Flowering and fruit initiation occurred earlier than under conventional irrigation. Improved root health and efficient nutrient absorption enabled the plants to transition to the reproductive stage sooner.

Improved Fruit Quality: The fruits exhibited better colour, firmness, and overall market quality. Healthier root activity contributed to more uniform fruit development and improved crop quality.

Why Oxygen Nanobubbles Made the Difference

Unlike conventional bubbles that rapidly escape from water, oxygen nanobubbles remain suspended due to their nanoscale size and neutral buoyancy. This allows dissolved oxygen levels to remain elevated for longer periods. When applied through irrigation, the oxygen-enriched water improves root-zone oxygen availability, enhancing root respiration, nutrient uptake, and rhizosphere microbial activity. Together, these effects support healthier plant growth, improved fruit development, and higher crop productivity.

Conclusion:

The Khairabad trial demonstrated that oxygen nanobubble-enriched irrigation water can significantly improve chilli crop performance while fitting seamlessly into existing farming practices. The technology supported healthier plant growth, earlier reproductive development, improved fruit quality, and higher yields, highlighting its potential as an effective solution for commercial chilli cultivation.



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