

## H<sub>2</sub> Fertilization: Is this the Benefit of Crops In Rotation?

### Description

The beneficial effect on crop growth from inter-cropping with legumes is recognized the world over. The more efficient utilization of growth resources leads to yield advantages and increased stability compared to sole cropping. Researchers at Queen's University believe they have developed a technique that mimics the benefits of crop rotation: a "chemical-free" and effective way to improve crop growth by 10-30% without rotating crops. The researchers enhanced the soil's activity by pre-treating or treating in-situ the soil with hydrogen.

Experimental results obtained to-date indicate that plant growth significantly improved as indicated by the plant's ability to grow faster, larger and/or more vigorously relative to a plant in an untreated environment. In wheat barley, head production was advanced by a few days. With spring wheat, growth of both root and shoot were more than 30% greater ( $p \geq 0.01$ ) in treated soil than in untreated soil. Similar growth results were obtained with barley, soybean and canola.



Figure 1: Plant grown in enhanced soil (left)



Figure 2: Wheat grown in enhanced soil (far right)

Hydrogen appears to have the effect of enhancing 30% more plant growth by promoting rhizobacteria (PGPR). One aspect of the technology is a process to identify and isolate these PGPRs.

### Potential Areas of Application:

- "Super soil" or potting soil ideal for backyard gardener / community fields garden / municipal garden
- Crop Soil Additive or inoculants for large scale application

### Main Advantages:

- The growth of various plants in a crop trial is enhanced by 10-30% or more.
- Hydrogen is benign and non-toxic.
- The results appear to be independent of soil source, however better quality soils showed greater improvement.

**Stage of Development:**

Data demonstrating growth enhancement is available upon request.

**Status of Intellectual Property:**

- US 6 848 212, “Methods For Enhancing Plant Growth Using Hydrogen Gas”, Layzell et al. Issued February 1, 2005.
- US 7 162 834, “Methods For Enhancing Plant Growth Using Hydrogen Gas”, Layzell et al. Issued January 16, 2007.

**Status of Commercialization**

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