

Research into Structured & Treated Water

Selected plant studies showing how treated water can influence plant growth and living systems

Why this short review?

A growing body of experimental work has asked a simple but intriguing question: **can changing the way water is treated change the way plants grow?** The studies below used water described as *structured*, *vortex-processed*, coherent-structured or otherwise specially prepared. Across several plant species, researchers have reported measurable changes in yield, plant dimensions, biomass, photosynthetic pigments, water-use efficiency and the microbial communities around roots. The results are not uniform, but they show that water treatment can be a biologically meaningful experimental variable.

A very old relationship with special waters

Long before modern laboratory research, people recognised that not all waters seemed the same. For at least 3,000 years, particular springs and mineral waters have been valued for their special and healing qualities - from ancient Greek healing sanctuaries to the great Roman spa traditions.

Many of these places developed around naturally occurring springs whose waters became renowned for their effects on health and wellbeing. The tradition continues today in mineral-water and spa therapies throughout Europe and elsewhere.

Modern research approaches water from a different direction, but an intriguing question remains: can differences in water itself produce measurable differences in living systems? Plant experiments provide one way of investigating that question under controlled conditions.

Selected studies

1. Lettuce - structured water and hydroponic yield (2021)

Butter-head lettuce was grown hydroponically using nutrient solutions prepared with tap water or water described as structured. The structured-water treatment produced a **6.7% higher average marketable yield**. The researchers also reported more photosynthetic pigments and approximately twice the carotenoid content in the structured-water group, together with differences in mineral composition. Vitamin C was higher in the tap-water group, showing that the response was not simply an improvement in every measured characteristic.

Source: Gluch M. et al. (2021), Impact of Structured Water on Yielding and Quality of Lettuce (*Lactuca Sativa* L.) Growth Using Hydroponic System, International Journal of Agricultural Science 6, 81-86.

[Open original PDF](#)

2. Tomato - vortex-processed irrigation water (2013)

A Swedish University of Agricultural Sciences pilot study compared young tomato plants grown with nutrient solution made from vortex-processed water against untreated water. **Plant height, stem width and internode length were significantly different** in plants grown with vortex-processed water. Leaf area and fresh and dry weight did not show the same treatment effect, and the author discussed possible conventional explanations, including a small difference in electrical conductivity. Even with those qualifications, the experiment demonstrates that changing the treatment of irrigation water coincided with measurable changes in plant development.

Source: Vagnell M. (2013), Effect of vortex-processed water on tomato (*Solanum lycopersicum*) plants, Swedish University of Agricultural Sciences.

[Open university study record](#)

3. Cucumber, basil and tomato - growth and root-zone microbes (2019)

Researchers in Romania compared untreated tap water with several preparations of water described as structured. They reported **significantly higher plants and greater total biomass in selected structured-water treatments**, especially for basil. They also found significant changes in bacterial counts and species numbers in the rhizosphere. This is particularly interesting because the measured response extended beyond plant size to the living microbial community surrounding the roots.

Source: Enache F. et al. (2019), Stimulation of Plant Growth and Rhizosphere Microbial Communities by Treatments with Structured Water, Scientific Papers, Series B, Horticulture, LXIII(1), 365-370.

[Open original PDF](#)

4. Red lettuce - coherent-structure and hybrid water (2026)

A 2026 study in Scientific Reports compared deionised control water with coherent-structured water and hybrid water in hydroponically grown red lettuce. The authors reported substantial differences in growth and physiology. For example, the **leaf area ratio was 35% higher** in the coherent-structured-water treatment than the deionised-water control, while combinations involving hybrid water and selenium produced increases in aerial and root fresh weight. Differences were also reported in chlorophyll, transpiration and water-use efficiency. The experiment involved both water type and selenium, so individual outcomes need to be interpreted within that design, but it provides a recent example of water treatment being associated with marked biological differences.

Source: Chalipa F. et al. (2026), Enhancement of red lettuce growth and photosynthesis through the use of coherent-structure and hybrid water sources supplemented with sodium selenate, Scientific Reports.

[Open article via DOI](#)

5. Radish - a contrasting result (2014)

A University of Arkansas experiment tested radishes grown with tap water or water described as structured, alongside different levels of poultry-litter biochar. Here, **radish growth responded negatively to structured water in almost every circumstance**. This contrasting result is valuable rather than inconvenient: it shows that treated water can change biological outcomes without implying that every treatment will benefit every plant under every condition.

Source: Allen J. et al. (2014), The influences of poultry litter biochar and water source on radish growth and nutrition, Discovery 15(1), 4-10.

[Open article via DOI](#)

The striking point: treated water can change growth

Taken together, these experiments show that **the way water is treated can be associated with measurable changes in living plants**. Reported differences include **yield, height, stem development, biomass, leaf area, photosynthetic pigments, water-use efficiency and root-zone microbial communities**. The direction and size of the response vary between treatments and species - exactly what one would expect in an emerging field involving living systems. The important point is that the question is experimentally testable, and measurable differences have repeatedly been observed.

Why this deserves further research

Water in living systems is not merely a static chemical formula. It flows, forms interfaces, interacts with minerals, nutrients, surfaces and biological membranes, and participates continuously in growth and metabolism. The studies above do not provide one universal explanation for the observed effects, but they demonstrate that altering water treatment can coincide with significant and measurable biological responses. That makes the relationship between water treatment and living systems a worthwhile field for continued, carefully controlled research.

Note concerning the AQUA-VORTEX™

The studies cited here investigated other water-treatment methods and did not test the AQUA-VORTEX™. They are presented as background research into the broader question of whether differently treated water can influence living systems, not as proof of the AQUA-VORTEX™ or its proposed mechanism.

Prepared August 2026 | Original research links are included above.