Introduction to aquaponics

What is aquaponics?

Aquaponics is a symbiotic food production system that combines aquaculture; which is the raising of aquatic animals such as fish, crayfish or prawns in a controlled environment, with hydroponics; which is growing plants in controlled water conditions. [1]

The combination of aquaculture and hydroponics results in fish water being passed through the plant bedding material. This makes aquaponics a 'closed system' and one where water will not be wasted.

In traditional aquaculture and hydroponics systems water is constantly replaced. This practice is ultimately unsustainable. In a world of growing water shortages, water wastage is a major environmental and social issue that requires immediate critical attention.

Water issues

Disposal offish waste in aquaculture is the most critical issue for this industry. Once the levels of waste get too high, even with bio filters, the water becomes toxic for the aquatic life. The only solution is to remove and replace approximately 20% of the water. In commercial freshwater aquaculture there are methods where fish waste is filtered and recirculated, but the need for water changes remain.

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In hydroponics, the plants grow in water, but water alone is not enough and mineral nutrients, such as nitrate, sulphate and phosphate, need to be added to the water for the plants to grow. Although hydroponics can reduce water consumption up to 80% of traditional soil-based food production, the biggest single issue is maintaining water quality. Plants can deplete nutrient solutions in different spans of time, meaning that water can become saturated with certain nutrients or salt very quickly. This can happen in as little as 5 days. A water change process is often used to counteract this situation.

Aquaponics is called a symbiotic process because the waste from the fish is processed within the system and then relocated to feed the plants. The end result is that the water that is passed back to the fish tank is cleaned. This brings together the best parts of aquaculture and hydroponics to create a sustainable fish and vegetable garden in your very own backyard.

The process is simple, but there is still a vital need for maintenance so that the system remains stable and balanced. This course shows the step-by-step approach to create and maintain a balanced system from fish to plants in a backyard aquaponics system.