

The College of Graduate Studies and the College of Food and Agriculture Cordially Invite You to a

**PhD Dissertation Defense**

Entitled

*Utilization and Evaluation of Treated Wastewater on the Production Technology of Wheat (*Triticum aestivum* L.) under different Modes of Cultivation*

by

Fatima Hasan AlHamedi

Faculty Advisor

Dr. Mohammed Abdul Mohsen Salem Alyafei, Department of Integrative Agriculture  
College of Food and Agriculture

Date & Venue

5:00 PM (Dubai time)

Sunday, 11 April 2021

Access Link:

<https://eu.bbcollab.com/guest/284238b869fc42d09dac73c5fe079897>

Abstract

In the recent past, the production of wastewater from domestic and industrial sources has been steadily increasing through the population, urbanization, industrial revolution and economic development. In the world, 80% of wastewater consists of several harmful substances and hazardous chemicals that cause many deadly effects to human beings as well as ecosystems. So, the elimination of this toxic substance before discarding into landfills is utilized as an alternative source of water which is an emerging need. Using the treated wastewater for agricultural purposes is an excellent approach for rendering wastewater beneficial. As the quantity of wastewater grows, there is a necessity to redistribute the water in a beneficial way. The treated wastewater plays an enormous role, and it was used for many developing and developed countries due to its ability to eliminate toxins. Based on this hypothesis, our study was focused on designing experiments using treated wastewater resources from Abu Dhabi and Al Ain treatment plants. Three different experiments employed for this study include the hydroponic system, field experiment and open top chamber method. The crop selected for the experiments is Wheat, due to its global demand and dietary value. There are two lines of wheat seeds were used. One advanced line was derived from 33<sup>rd</sup> Elite Spring Wheat Yield Trial (ESWYT) and the other line was derived from the 20th Semi-Arid Wheat Yield Trial (SAWYT). The treated wastewater and soil analysis were studied before and after the cultivation, detailing the physiochemical parameters (pH, electrical conductivity (EC), total nitrogen, total dissolved solids (TDS), specific absorption rate (SAR), trace elements and heavy metals, etc. The outcome of the study was measured by several agronomical related yield parameters including crude protein content, neutral detergent fiber, acid detergent fiber, number of spikes, spike length, number of grains per head, grain yield, kernel weight, chlorophyll content, and the content of beneficial elements and heavy metal accumulation before and after treatment. The overall findings of the study suggested that the growth and yield parameters were improved as a result of irrigation with treated wastewater in the hydroponic experiment. In the open top chamber (OTC) experiment, the information of the morphological traits, coupled with the physiological and biochemical attributes were assessed to understand the plant response mechanisms to the interaction of UV-B and CO<sub>2</sub>. Furthermore, the OTC findings revealed that high CO<sub>2</sub> concentrations alone increased growth parameters, whereas the UV-B treatment had a significant impact on crop growth when compared to the control. The favourable physiochemical nature, an adequate amount of elements, and other physiological factors influenced the growth and yield of the wheat plant. Among the two different sources of treated wastewater, the wheat plants grown in treated wastewater sourced from Al Ain produced a higher yield due to its physicochemical composition.

**Keywords:** Climate change, wheat crop, wastewater; Antioxidant; Hydroponic system; Heavy metals.