

FOOD SAFETY STUDY OF LEAFY GREENS IRRIGATED WITH TILAPIA FARM EFFLUENTS IN TAMAULIPAS.

Pablo González-Alanis* Juan I. Gutierrez-Olguín, Hilario Ezqueda-Palacios, Héctor H. Gojon-Báez, Gabriel Aguirre-Guzmán, Francisco M. Guzmán-Saénz, Kevin M. Fitzsimmons.

Facultad de Medicina Veterinaria y Zootecnia
 Universidad Autónoma de Tamaulipas
 Cd. Victoria Tamaulipas, México.
 pablogl204@gmail.com

Epidemics of *Escherichia coli* and other related gastro-intestinal pathogens has been a common problem worldwide. Several outbreaks were traced to consumption of fresh vegetables (spinach, lettuce, green onions). For most of the cases, the vector was thought to be contamination from human or animal wastes applied through irrigation water. Very few studies have been conducted to determine any health hazards that may result from aquaponic systems. The use of UV (ultraviolet) systems is a reliable alternative to disinfect water. The determination of the efficacy of the UV during the tilapia and vegetable production in integrated systems (Aquaponics indoors and ground ponds outdoors) were evaluated.

The present research studied water and plants samples from both systems over 2 years period to determine the presence of total and fecal coliforms, salmonella and enterococci.

And if the UV treatment makes a difference. A number of organisms were counted and reported. Fish and plants were grown during summer, fall and winter at different intervals. Water and plants samples were collected from indoors and outdoors systems and analyzed using standard methods NOM (Mexican official standard methods).

Water samples from indoor and outdoor systems were found contaminated with total and fecal coliforms in measurable numbers. However, tests for *Salmonella*, *E. coli* and Enterococci were negative. In conclusion UV treatment did significantly reduce levels compared with non-treated for fecal and total coliforms. The absence of *Salmonella*, *E. coli* and Enterococci in both systems suggested that further studies using gastro intestinal pathogens should be conducted in order to determine if the low cost UV system is effective in these production conditions. And if management strategies to improve food safety for consumers of crops grown in integrated production systems are suitable to be implemented.

INDOORS					
WATER SAMPLES					
TOTAL COLIFORMS			FECAL COLIFORMS		
Tank	Mean	SD	Tank	Mean	SD
1	0.207	0.3	1	0.112	0.1
2	0.609	0.4	2	0.599	0.1
3	0.157	0.1	3	0.118	0.1
4	0.748	0.3	4	0.452	0.1
5	0.192	0.2	5	0.137	0.1
6	0.854	0.4	6	0.618	0.2

OUTDOORS			
WATER SAMPLES			
TOTAL COLIFORMS			
Mean	SD	Mean	SD
4.5	4	5.5	5

INDOORS									
Lettuce					Spinach				
			Mean	SD				Mean	SD
UV	Roots	TOTAL COL	0.15	0.1	UV	Roots	TOTAL COL	0.1	0
		FECAL COL	0.1	0.1			FECAL COL	0.09	0
	Leafs	TOTAL COL	0.14	0.1	UV	Leafs	TOTAL COL	0.03	0.1
		FECAL COL	0.08	0			FECAL COL	0.12	0.1
NT	Roots	TOTAL COL	0.09	0	NT	Roots	TOTAL COL	0.12	0.1
		FECAL COL	0.11	0.1			FECAL COL	0.01	0
	Leafs	TOTAL COL	0.06	0	NT	Leafs	TOTAL COL	0.11	0
		FECAL COL	0.06	0			FECAL COL	0.16	0.1

OUTDOORS											
Lettuce					Spinach						
			Mean	SD				Mean	SD		
1	UV	Roots	TOTAL COL	0.15	0.14	1	UV	Roots	TOTAL COL	0.07	0.04
			FECAL COL	0.11					FECAL COL	0.08	0.04
	Leafs	TOTAL COL	0.15	Leafs		TOTAL COL	0.1	0.06			
		FECAL COL	0.1			FECAL COL	0.09	0.06			
2	NT	Roots	TOTAL COL	3.31	3.41	2	NT	Roots	TOTAL COL	4.57	3.96
			FECAL COL	3.58					FECAL COL	3.86	3.79
	Leafs	TOTAL COL	4.37	Leafs		TOTAL COL	3.79	3.73			
		FECAL COL	3.65			FECAL COL	3.44	2.89			