

Parasitic Contamination of the Mint and Turnip Irrigated By Untreated Wastewater in Sidi Yahia Gharb (Morocco)

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Abstract:

The purpose of this study is to assess the parasites load of contamination of two vegetable crops (turnips and mint) irrigated with wastewater in Sidi Yahia through qualitative and quantitative parasitological analysis. Samples of mint and turnips have respective average concentrations of 4.71 eggs/100g and 4.3 eggs/100g. The main parasites identified are: *Capillaria* sp. *Nematodirus* sp. *Ankylostoma* sp. *Toxocara* sp., *Enterobius vermicularis*, *Ascaridia galli*, *Uncinaria stenocephala*, *Eimeria* sp., *Entamoeba coli*, and strongyles. Parasitological concentrations of the irrigation effluent are higher compared to World Health Organization (WHO) and Moroccan Standard Committee values for irrigation waters.

Key words: wastewater, vegetables, parasites, Sidi Yahia of Gharb, Morocco

Introduction:

Morocco, like other African arid and semi-arid are faced problems of rapid population growth and water stress (less than 1000m³/hab./an) (World Bank, 1985). The wastewater used for irrigation without treatment is a potential source of bacterial contamination, viral and parasitic. (Schwartzbrod, J. and Banas S.; 2003, El Guamri and Belghyti, 2008)

As the WHO (1989) requires a pre-treatment of the wastewater and establishes standards for reuse in agriculture in order to protect farmers and consumers on one hand but also the environment and biodiversity of other hand.

The mint and turnips were chosen for their regular use in dietary habits in Morocco. The aim of our study is to assess the degree of parasitic contamination of two vegetable crops (turnips and mint) irrigated with wastewater in Sidi Yahia through a qualitative analysis and quantitative parasitological.

Materials and study methods:

Samples of mint and turnips were obtained randomly from the market traders of the city of Sidi Yahia Gharb.

The markets were also selected randomly on all city markets. Thus samples of 100g of mint and turnips were purchased at random. The samples are returned to the laboratory and analyzed using a technique of determining the flotation parasitic worm burden. (In-Nsom Zamo, 2003).

Protocol:

Samples of mint and turnips were weighed and rinsed with Tween 80 to 0.1%.

The eluate was recovered and centrifuged at 2500 rpm for 5 minutes.

The centrifugation pellet is given in twice its volume of zinc sulphate.

The meniscus recovered is transferred to a cell of Mac Master.

The cell of Mac Master is allowed to stand 2 minutes before microscopic observation. (In-Nsom Zamo, 2003).

Results :

The quantitative results are represented in the figures below.

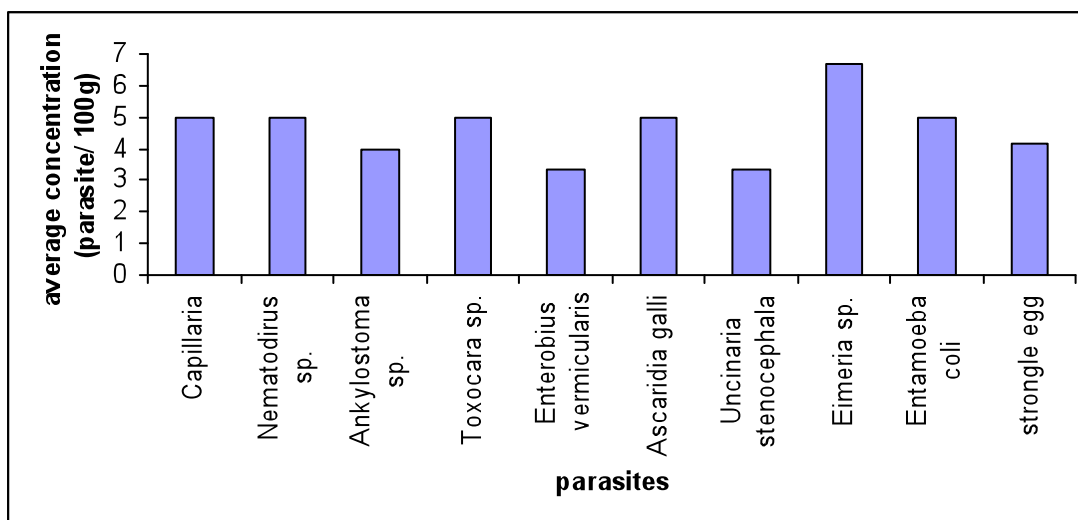


Figure No. 1: Average concentration parasitic of mint

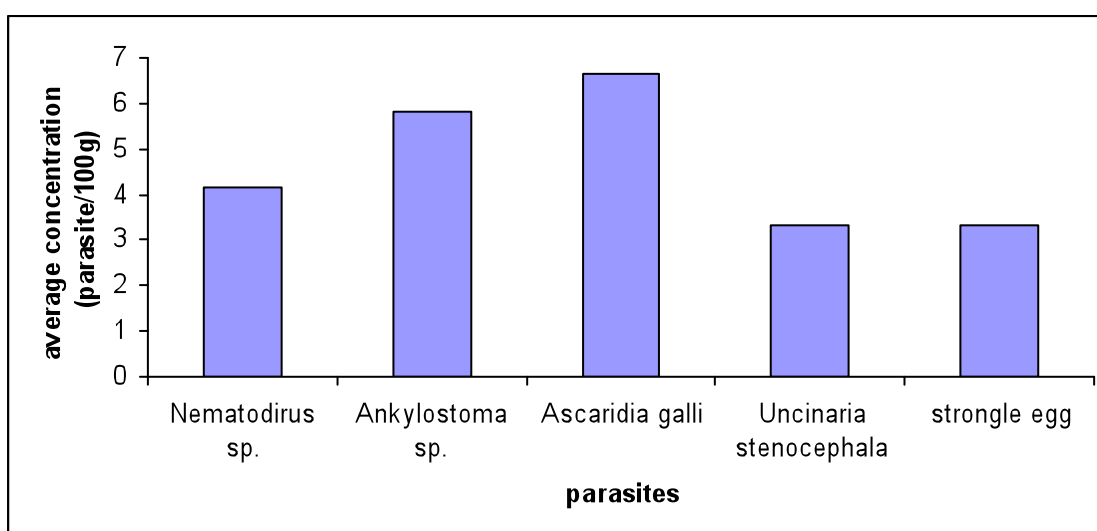


Figure 2: Average concentration parasitic of Turnip

The figures above show a variety of parasitic and a difference in the parasite load from one culture to another.

The parasites belong to the groups of nematodes and protozoa and eggs of strongyles with a strong preference for the group of nematodes.

Samples of mint and turnips are the respective mean concentrations of 4.71 eggs per 100g and 4.3 eggs per 100g. But at the mint, have registered more types of parasites than the turnip.

Discussion:

There is a predominance of nematode eggs in relation to protozoan cysts in all samples analyzed. This is explained by the fact that nematodes have a higher survival in the environment. Wastewaters used for irrigation are the source of this pollution in parasite cultures. Our work is in agreement with those of (Peterson et al., 2001) during their work on the contamination of crops

irrigated with wastewater sewage and drinking water, partly or totally processed. These low average concentrations obtained during the analysis of mint and turnips are also highlighted in other studies worldwide (Robertson et al. 2001; Bouhoum et al., 2002, Nsom-Zamo 2003, Raghavachari S. and Durgadas N., 2004, Abouelouafa et al., 2009) and can be explained by the fact that the survival of micro-organisms depends on heat, radiation and humidity (Rose, 1986; Shuval et al., 1986)

The survival of parasites in the area of crop will be much shorter because the parasites are less well protected against light and drying, but may survive long enough to risk contaminating people who handle or consume products especially when time survival is longer than the growth cycle, as is often the case with vegetables. (WHO, 1989)

The parasite concentrations are very low but should in no way obscure the fact that the risk of contaminating the consumer remains as micro-organisms identified with the exception of *Entamoeba coli* is a commensal species are the vast majority pathogens.

This can be explained by the dense foliage of mint that protects cysts and eggs of parasitic cope with hostile environmental conditions. Our work is consistent with those of Shuval et al. (1986), the parasitic contamination of lettuce.

Indeed, the whole development of the mint is at ground level and thus the leaves of mint are in direct contact with raw sewage at each irrigation. In addition, the morphology of the mint leaves overlapping on each other, protecting the eggs of helminths against conditions unfavorable to their survival and persistence, such as sunlight, desiccation, wind (Stein et al., 1990). Contamination may arise is at different levels namely consumers, farmers, operating personnel and the immediate vicinity of the irrigated area. (Ait Hamou R. et al., 2000).

Conclusion:

The state of unhealthiness caused by agricultural reuse of untreated wastewater in Sidi Yahia Gharb, is a serious danger to both people and the environment. That practice led to contamination of crops by helminth eggs and protozoan parasites represented by the genera *Capillaria* sp. *Nematodirus* sp. *Ancylostoma* sp. *Toxocara* sp. *Enterobius vermicularis*, *Ascaridia galli*, *Uncinaria stenocephala*, *Eimeria* sp., *Entamoeba coli*, and strongyles.

In light of our work, the recommendations we have chosen are the following: Prohibit the use of wastewater is not an easy step to consider because the ban would only make more difficult the monitoring and regulation, then it would result in the current economic climate, enormous economic problems for growers of countries concerned by this practice.

This will be beneficial to develop a synergy between environmental sanitation and urban irrigation (peri)-urban.

Thus not only the health risks they would be mitigated, but production could be increased and the drinking water resources saved.

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