HELMINTHES AND PROTOZOA OCCURRENCE IN RAW VEGETABLES PRODUCED IN UMUARAMA, PARANÁ STATE

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GARCIA[1], J.L.; JAHN[2], T. R.; FERMO[3], E. É.; SILVA DAS NEVES[3], U.; PURETZ[3], E. Evaluation of helminthes and protozoa in raw vegetables produced in Umuarama, Paraná State. *Arq. ciên. vet. zool.* UNIPAR, 7(1): p. 7-10, 2004.

ABSTRACT: Vegetables are the most important infection source of enteroparasites to human beings. The objective of this paper was to evaluate the vegetable enteroparasites occurrence in vegetables from rural producers in Umuarama, Paraná State, Brazil. A hundred thirty tree samples were evaluated, and 25 (18.8%) were positive to the presence of parasites. Among those 8/71(8.4%) rough lettuce, 6/33 (18.2%) smooth lettuce, 8/18 (44.4%) wild chicory and 3/11(27.3%) of chicory. Analyses of samples have shown helminthes in 23/133 (17.3%) and protozoa in 6/133 (4.5%). The major helminthes and protozoa observed were *Ascaris* sp (9.7%), Ancilostomatidae (9.7%), *Enterobius vermiculares* (1.5%), *Strongyloides* sp (0.75%), *Entamoeba* sp (3.75%) and *Giardia* sp (0.75%). Enteroparasite vegetable contaminations observed in the present work show either the necessity of government control to improve vegetable sanitary conditions, and the importance to adopt control methods before consumption by the population.
KEY WORDS: occurrence, parasites, vegetables

OCORRÊNCIA DE HELMINTOS E PROTOZOÁRIOS EM HORTALIÇAS PRODUZIDAS EM UMUARAMA, PARANÁ

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RESUMO: As hortaliças são as principais vias de transmissão de enteroparasitos para os seres humanos. O objetivo do trabalho foi avaliar a ocorrência de enteroparasitos em hortaliças cultivadas por produtores rurais do município de Umuarama, Paraná, Brasil. A pesquisa avaliou 133 amostras de hortaliças, sendo que 25 (18,8%) foram positivas para algum tipo de parasito, dentre estas 8/71(8,4%) foram de alface crespa, 6/33 (18,2%) de alface lisa, 8/18 (44,4%) almeirão, 3/11 (27,3%) de chicória. A análise das hortaliças evidenciou helmintos em 23 (17,3%) e protozoários em 6 (4,5%) das 133 amostras. Os parasitos observados foram *Ascaris* sp (9,7%), Ancilostomatidae (9,7%), *Enterobius vermiculares* (1,5%) e *Strongyloides* sp (1,5%) entre os helmintos e *Entamoeba* sp (3,7%) e *Giardia* sp (0,7%) entre os protozoários. Estes dados demonstram a necessidade da realização de medidas preventivas sobre as hortaliças, pelas autoridades sanitárias e consumidores, para diminuir o risco de infecção por parasitos através desta via de transmissão.
PALAVRAS-CHAVE: hortaliças, ocorrência, parasitos

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RESUMEN: Las hortalizas son las más importantes fuentes de transmisión parásitos a los seres humanos. El objetivo de este trabajo fue evaluar la ocurrencia de transmisión de parásitos en hortalizas producidas por productores rurales en Umuarama, Paraná, Brasil. La investigación analizó 133 muestras de hortalizas y 25 fueron positivas para algún parásito, entre estas 8/ 71 (el 8,4%) fueron de lechuga flamenca, 6/ 33 (el 18,2%) de lechuga lisa, 8/ 18 (el 44,4%) ("almeirão" este término no hay correspondiente en lengua española porque esta verdura es propia de clima tropical. Creo que lo mejor será dejarla en bastardilla {itálico} y si se quiere hacer una nota de pie de página) almeirón y 3/ 11(27,3%) de achicoria. El análisis de las hortalizas evidenció helmintos en 23 (el 17,3%) y protozoarios en 6 (el 4,5%) de las 133 muestras. Los parásitos observados fueron *Ascaris* sp (el 9,7%), Ancilostomatidae (el 9,7%), *Enterobius vermiculares* (el1,5%) y *Strongyloides* sp (el 1,5%) entre los helmintos y *Entamoeba* sp (el 3,7%) y *Giardia* sp (el 0,7%) entre los protozoarios. Estos datos demuestran la necesidad de la realización de medidas preventivas sobre las hortalizas, por las autoridades sanitarias y consumidores, para disminuir el peligro de infección por parásitos a través de esta vía de transmisión.
PALABRAS-CLAVE: hortalizas, parásitos, ocurrencia

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Introduction

The prevalence of enteroparasites in the human population is still a serious problem of public health in Brazil. The enteroparasite prevalences of 15.5% and 52.5% have been observed in daycare and elementary school children (GIRALDI *et al.*, 2001). Additionally, TAVARES-DIAS & GRANDINI (1999) observed parasite infestation occurrence of 44.4% of people aged between 0-68 years old. The development of a country can be evaluated by the quality of consumed food. From this point of view, contaminated vegetables are the biggest source of enteric diseases in human beings (WHO, 1989). Helminthes and protozoa parasites are the most important etiologic agents consumed in raw vegetable (MOTA *et al.*, 1983). In nature consumption of vegetable is relevant due to the fact that they are usually irrigated with contaminated water (OLIVEIRA & GERMANO, 1992a). Irrigated water samples from different sources have been examined in Campinas (Brazil) and showed 11.8% (0-25%) of fecal contamination (SIMÕES *et al.*, 2001).

The risk of vomit and diarrhea cases in human beings was associated with water comsuption, which was directly related to the quantities of water ingested. This fact was explained by fecal contamination of the water (PAC SA *et al.*, 1998).

In spite of the importance of enteroparasites contamination in fresh vegetables, there are few reports in national and international literature about it.

Fresh vegetables have been evaluated for enteroparasite presence, and mainly Ancylostomatidae, *Strongyloides* sp and *Ascaris* sp were observed (GELLI *et al.*,1979; HERNANDEZ *et al.*, 1981; MICHE & MORGANTI, 1983).

MESQUITA *et al.* (1999) and SILVA COELHO *et al.* (2001) have shown an occurrence of 3.9 and 6.2% of the enteroparasites in raw vegetables respectively. However, more comprehensive studies revealed high occurrence of helminthes (32-66%) (OLIVEIRA & GERMANO, 1992a) and protozoan parasites (18-60%) (OLIVEIRA & GERMANO, 1992b). In addition, parasitological examination of vegetable samples showed 14.5-16.6% of contamination range (GUILHERME *et al.*, 1999; SIMÕES *et al.*, 2001).

The purpose of this study was to evaluate the occurrence of helminthes and protozoan parasites in chicory (*Chichorium endivia*), lettuce (*Lactuca sativa*) and wild chicory (*Chichorium* sp) cultivated by rural producers in Umuarama, Paraná State.

Material and Methods

Umuarama municipality is located in the northwest of Paraná State, whose population is of approximately 90,960 people (IBGE, 2000). A hundred thirty tree fresh vegetable samples were obtained between November 1999 and May 2000 directly from eight rural producers randomly chosen among 30 producers. Epidemiologic aspects were evaluated in each property. Samples of 104 lettuce (*Lactuca sativa*), rough (n=71) and smooth (n=33) strain , 18 wild chicory (*Chichorium* sp) and 11 chicory (*Chichorium endivia*) were collected, packed individually in polystyrene sterile bags and sent to the zoonosis laboratory of Universidade Paranaense. They were processed following the methodology described previously (OLIVEIRA & GERMANO, 1992a).

Briefly, the leaves of each sample were detached and the tail discarded together with deteriorated leaves. A saline solution of 300 mL with 0.005% of Extran MA02® was used to wash the leaves in a tray, helped by a brush. After washing all leaves, they were discarded and the saline solution filtered through 2 layers gauze, collected in a conic flask and left to rest for 24 hours. Supernatant was discarded and 30 mL of the bottom of the flask were transferred to a 50 mL conic tube. To complete the total volume (50 mL) of the tube, the flask was washed twice with 10 mL of saline solution. The material was centrifuged at 700 xg for 1 min to sediment the parasites and discard the supernatant. A solution of zinc sulphate (density = 1,200) was added to the pellet obtained, and centrifuged at 500 xg for 1 min. The liquid of the upper part of the tube was collected and examined microscopically between a coverslip and a glass slide .

Qui-square was used to analyze statistical differences among the samples, and $p<0.05$ was considered as significant.

Results and Discussion

Ambient precipitation and temperature average was 100.4 ± 58.8 mm and 24.5 ± 2.65 °C respectively throughout the experiment. Twenty five (18.8%) of out 133 samples evaluated were positive to the presence of parasites, among them 8/ 71 (8.4%) rough lettuce, 6/ 33 (18.2%) smooth lettuce, 8/ 18 (44.4%) wild chicory and 3/ 11 (27.3%) chicory (Table 1). There was statistical difference among wild chicory than other vegetables ($p< 0.05$). Similar results were observed by GUILHERME *et al.* (1999) and SIMÕES *et al.* (2001) that showed an enteroparasite occurrence in vegetables of 16.6% and 14.5% respectively. These results are very dissimilar to those verified previously by OLIVEIRA & GERMANO (1992ab) that observed an occurrence range of 32-66%. However, the latter authors worked in a period (April – October) when vegetable irrigation is more intensive, and contamination risk is high. This aspect can explain the lower occurrence observed in this work.

The contamination of vegetables is associated with the ambient condition in which they are cultivated (OLIVEIRA & GERMANO, 1992a). Considering these aspects, some characteristics of the producers were investigated. All eight producers used irrigation, but the water source was different, four mines, two wells, one artesian well and one river. Furthermore, animals with access to the vegetable garden were observed in 7 properties. Despite this fact, all producers had positive vegetables, and it was not possible to associate these epidemiologic aspects with parasite occurrences.

Washing vegetables before consumption can partially avoid infection caused by parasites (SILVA COELHO *et al.*, 2001). The vegetable samples were collected in rural properties to evaluate the contamination of these "in situ".

Analyses of the samples showed helminthes in 23/133 (17.3%) and protozoa in 6/133 (4.5%). Five vegetables have shown simultaneously more than one helminthes, and one of it had more than one protozoa. The major helminthes and protozoa observed were *Ascaris* sp (9.7%), Ancilostomatidae (9.7%), *Enterobius vermiculares* (1.5%), *Strongyloides sp*

Table 1 - The enteroparasites occurrences observed in vegetables samples collected in Umuarama, Paraná, Brazil, 2000

Vegetable strain	Positive (%)	Negative (%)	Total (%)
Smooth lettuce	6 (18.2)a	27 (81.8)	33 (100)
Wild chicory	8 (44.4)a	10 (55.6)	18 (100)
Chicory	3 (27.3)b	8 (72.7)	11 (100)
Total	25 (18.8)	108 (81.2)	133 (100)

(a: b) $P< 0.05$

(0.8%), *Entamoeba* sp (3.8%) and *Giardia* sp (0.8%)(Table 2).

These results are very similar to studies reported previously (OLIVEIRA & GERMANO, 1992a,b; GUILHERME *et al.*, 1999; SIMÕES *et al.*, 2001). Additionaly, evaluation of parasites in vegetables in Maringá city, located in the same region of this experiment, verified higher occurrence of Ancylostomatidae, *Strongyloides*, *Ascaris*, *Entamoeba* and *Giardia* (GUILHERME *et al.*,1999).

The prevalence of Ancylostomatidae and *Ascaris* in the human population of North and Northwest of Paraná is higher (GUILHERME *et al.*, 1999; GIRALDI *et al.*, 2001), and the results observed here might confirm that major sources of human infection by enteroparasites occur by vegetable ingestion. However, the frequency of vegetable and human parasites in a place may not be necessarily the same (OLIVEIRA & GERMANO, 1992).

Table 2 - The helminthes and Protozoa parasites occurrences observed in rough lettuce, smooth lettuce, wild chicory and chicory samples collected in Umuarama, Paraná, Brazil, 2000

Parasite	Rough lettuce (n=71)	Smooth lettuce (n=33)	Wild chicory (n=18)	Chicory (n=11)	Total (n=133)
Ancilostomatidae	6 (8.5%)	3 (9.0%)	4 (16.6%)	0	13 (9.7%)
Ascaris sp	4 ((5.6%)	3 (9.0%)	4 (16.6%)	2 (9.0%)	13 (9.7%)
Enterobius sp	1 (1.4%)	1 (3.0%)	0	0	2 (1.5%)
Strongyloides sp	0	0	0	1 (9.0%)	1 (0.8%)
Entamoeba sp (4n)	2 (2.8%)	0	1 (5.5%)	1 (9.0%)	4 (3.0%)
Entamoeba sp (8n)	1 (1.4%)	0	0	0	1 (0.8%)
Giardia sp	0	1 (3.0%)	0	0	1 (0.8%)

The parasites verified in this experiment might indicate a animal or/and human fecal contamination (OLIVEIRA & GERMANO, 1992a,b; SIMÕES *et al.*, 2001). This aspect is important by the fact that other pathogens may infect human beings by vegetable consumption (WHO, 1989; PAC SA *et al.*, 1998).

Conclusion

Enteroparasite vegetable contaminations observed in the present work show either the necessity of government control to improve vegetable sanitary conditions, and the importance to adopt control methods before consumption by the population.

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