Enteroparasites in vegetables marketed in Rio Branco, Acre, Western Brazilian Amazon

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ABSTRACT

We analyzed the presence of human enteroparasites in vegetables marketed in Rio Branco, Acre state, in Brazil. We sampled 30 units of lettuce (Lactuca sativa) and 30 units of arugula (Eruca sativa) from supermarkets and free markets in the city. The samples were analyzed by spontaneous sedimentation technique to search for parasitic forms. Helminth eggs were detected: superfamily Ancylostomatoidea, Trichuris trichiura and Taenia sp.; and nematode larvae, as well as protozoan cysts: Isodamoeba bütschlii, Endolimax nana, Entamoeba coli, Blastocystis hominis, Isospora spp., Giardia duodenalis and E. histolytica. These results indicate that the consumption of these vegetables in nature may pose a risk to the health population, and education regarding proper handling and hygiene is necessary.

Keywords: intestinal parasites, Lactuca sativa, Eruca sativa, Amazonia.

Introduction

Vegetables are a well-known vehicle for transmission of human pathogens, particularly those that are ingested in nature (BERGER et al., 2010). The presence of parasites on marketed vegetables is related to productive chain, sanitary conditions during production, storage, transportation and handling (ABREU et al. 2010; FERNANDES et al., 2015). These parasites are related to neglected diseases that are common throughout the world and lead to many public health problems (BRASIL, 2005).

Some studies carried out in the Southeast and Central-West of Brazil have diagnosed protozoa and helminths that can cause human parasitosis, in different sort of vegetables, being the lettuce (Lactuca sativa) the most studied and consumed in the country (MACHIEL et al., 2014; SILVA et al., 2017; AMBROZIM et al., 2017). In the Brazilian Amazon there are few published studies about the occurrence of enteroparasites in vegetables (NOVACKI et al., 2017; RODRIGUES et al., 2020), and in Acre state, only one survey led in Cruzeiro do Sul (CAVALCANTI; CORRÊA, 2010).

In the state of Acre, most commercialized vegetables originate from small farms which do not follow any criteria for control or treatment of their produce. Therefore, the objective of this work was to analyze the occurrence of enteroparasites in vegetables used for crude consumption and universally available in supermarkets and open-air fairs in Rio Branco.

Material and Methods

The municipality of Rio Branco (09º59'11'S, 67º49'52"W) capital of the state of Acre (AC), is located in the North region of Brazil, southwest of the Amazon region. The original vegetation in the region is Amazonia biome. The climate is equatorial, with temperatures varying from 24 to 32 °C and annual rainfall between 1877 and 1982 mm comprising the months of October to March. The economy is based on agriculture and extractivism (IBGE, 2019).

During April 2015, we obtained a total of 60 samples (30 samples each of lettuce and arugula). For each vegetable, 15 samples were from four supermarkets, and 15 were from four open street markets. The choice of supermarkets and open streets markets was made for convenience and randomly, in different neighborhoods of Rio Branco. The samples were collected in the morning, individually packaged in disposable plastic bags, placed in polystyrene boxes, and sent to Acre Central Public Health Laboratory (Laboratório Central de Saúde Pública do Acre – LACEN-AC) for parasitological analysis.

Twenty leaves were removed from each sample, and placed in a plastic tray containing 1000 mL of distilled water. With the aid of a brush, the leaves were washed according to the technique described by Oliveira and Germaino (1992). Then, the liquid from each wash was filtered using a paraffiler in a conical cup and was left to settle for 24 hours. At the end of the sedimentation time, the supernatant was discarded and 0.1 mL of the pellet was removed, placed between a slide and cover sheet, and stained with lugol solution. The material was examined by 10x and 40x optical microscopy using four slides of each sample.

Results and Discussion

All 60 samples were contaminated with some type of parasite (Table 1), with the predominant contamination by protozoans, mainly by commensal parasites such as Isodamoeba bütschlii, Endolimax nana and Entamoeba coli. Among the parasites found, on lettuce was the vegetable that was contaminated with all of them. In the arugula analyzes, no eggs of Trichuris trichiura and cysts of Isospora spp were visualized.
Vegetable contamination by parasites usually occurs through the soil and water used for irrigation and washing, or directly from producers and manipulators (ARBOS et al., 2010; MELO et al., 2011). The predominance of protozoans in our samples may be due to that the small producers who supply Rio Branco usually water their hydroponics cultures with well water and irrigation dams. The main source of contamination of vegetables is through water contaminated with human or animal faecal material (ARBOS et al., 2010). The living conditions of horticulturists are often precarious, with deficient sanitary conditions, which may result in them being carriers of enteroparasites (SILVA et al., 2010).

In other studies, the parasitic contamination rates among vegetables also were found to be high, with amoebas of the genus Entamoeba being more prevalent than nematoids and hookworms (ARBOS et al., 2010; NOMURA et al., 2015; LACERDA et al., 2020), similarly to our results.

Our results also demonstrated a high percentage of infection by nematode larvae. In other locations in the country, such as Montes Claros (Minas Gerais), wherein the authors found a significant number of samples of positive lettuce with Strongyloides stercoralis (SÁ et al., 2019), as well as in Londrina (Paraná), with samples of lettuce and almond positive for larvae of different species of nematodes (NOMURA et al., 2015).

Among the vegetables sampled, only one (arugula) was found to be contaminated with Taenia spp. eggs, this is still worrying, as the eggs of T. solium can cause neurocysticercosis in humans, which can lead to severe sequelae or even death (MARTINS-MELO et al., 2017).

The high percentages of commensal enteroparasites found in this study deserve attention even if they are not considered pathogenic, or may only be pathogenic in immunocompromised persons or in stress conditions, as in the case of Blastocystis hominis (PABORIBOUNE et al., 2014) and Isospora spp. (SILVA-BARBOSA et al., 2012). The presence of these enteroparasites can be indicators of low sanitation conditions since these vegetables are contaminated with fecal waste. Therefore, requires rigid inspection at production and sales points as well as educational awareness for producers and consumers regarding the importance of the cultivation ecosystem and sanitization of these foods.

Conclusion

Our results show a high percentage of enteroparasites contamination in vegetables marketed in Rio Branco, which may expose the population to the risk of transmission by these parasitic agents. Thus, these findings alert to the need for further studies with a wider range of supermarkets and open street markets, in order to better measure the contamination of these parasites in vegetables for human consumption in Rio Branco.

Acknowledgments

The authors thank to Laboratório Central de Saúde Pública de Rio Branco, Acre (LACEN-AC) for the availability of the laboratory to carry out the analysis.