PREVALENCE OF PARASITES ON VEGETABLES IN JALINGO, TARABA STATE, NIGERIA

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ABSTRACT

A study on the prevalence of parasites on vegetables was carried out in Jalingo, Taraba State, Nigeria. A total of 450 vegetable samples were obtained from five (5) different types of vegetable, using a randomized design. Samples were examined using concentration method. The result showed a prevalence of 39.1% of parasites. *Telfairia occidentalis* (Fluted Pumpkin) had the highest contamination (52%) of parasites and *Daucus carota* (Carrot) had the least (24%) contamination of parasites. Statistical analysis showed a significant association ($p>0.05$) between the distribution of various parasites on different vegetable types. It is recommended that proper cleaning and careful handling of vegetable be adopted as means of reducing the risk of infection from consumption of vegetables

Keywords: Parasites, Protozoan, Helminths and Vegetables.

INTRODUCTION

Parasitic diseases have remained endemic in rural communities of developing countries with significant economic and public health consequences (Odikamnoro, 2008).

Parasitic infections cause considerable morbidity which affect nutritional status especially in children leading to malnutrition, growth retardation, anaemia and other complication (WHO, 1994).

More than 40 million people worldwide are infected with protozoan or helminth parasites and more than 10% of the world population is at risk of these infections (WHO, 2006; Damen *et al.*, 2007).

Poor sanitation, repeated exposure to contaminated water perpetuate the cycle of transmission of parasit diseases (Odikamnoro, 2008).

Vegetables are major sources of vitamins, minerals and dietary fiber. They play a major role in the nutritional livelihood of populace (Su and Arab, 2006). Epidemiology studies have indicated that areas of the world where intestinal disease are endemic in the population and where raw untreated wasted water is used to

irrigate vegetables, the consumption of such vegetables may lead to parasitic infection (Ayer *et al.*, 1992). Vegetables become potential sources of human parasite infection through contamination during their growth, collection, transport, processing or preparation (Slifko *et al.*, 2009). Vegetables are often contaminated by eggs of intestinal helminths where human and animal feaces are extensively used as fertilizer and reused of waste. The reserve river water contains a substantial percentage of municipal refuse and sewage and the rain waters are highly polluted with human and animal feaces which represent high risk to farmer and consumer of vegetables (Damen *et al.*, 2007).

The trend in many countries towards eating raw or slightly cooked vegetables in order to maintain the taste and nutritional value increases the likelihood of infection by human intestinal parasites. Also the demand for more raw vegetables becomes a problem when they are contaminated by parasites (Su and Arab, 2006, Slifko *et al.*, 2009). This study was designed to evaluate the prevalence parasites on common vegetables species sold in Jalingo, Taraba State, Nigeria.

MATERIALS AND METHODS

Study Area

The study was carried out in Jalingo Local Government Area of Taraba State. It is located between 8^0 47^I - 9^0 01^I N and 11^0 9^I - 11^0 30^I E. The rainy season begins in late April and ends in October; while the dry season starts in Mid-October and ends in April. The area has an annual mean rainfall of about 1,200mm with a mean temperature range of 29 – 38^0C. The relative humidity ranges between 35 – 45%in dry season.

Jalingo has two rivers (Mayo Gwoi and Lamurde) which are tributaries of River Benue. The major ponds in Jalingo are Vendu nange, Vendu ginnaji, Jekedafari, Worusambe Vendo-Joda and Vendu larmurde. These are all sites for irrigated farming.

It was observed that people do defecated in rivers and their banks, which could easily contaminate the water sources that are used for irrigation thereby exposing the vegetables to contamination in these areas.

Collection of Vegetables Samples

Five different vegetables species were purchased from the open market these included *Amaranthus* sp (African Spinach), *Lactuca sativa* (lettuce), *Daucus carota* (Carrot), *Brassica olaracea* (Cabbage) and *Telfairia occidentalis* (Flutted pumpkin). A total of (450) four hundred and fifty of these vegetables were purchased at random from October to December from five different markets within Jalingo metropolis namely, Jalingo Main Market, Mayo Gwoi Market, Sabon Gari Market, Mile Six Market and Bera-Koffai Market. These markets are situated at least 5km apart and were selected because majority of vegetable farmers sell their produce in these markets. Vegetables were put in a labelled sterile polythene bags, in an ice pack and transported to the laboratory for examinations.

Processing and Examination of Vegetable Samples

Vegetable samples bought were taken to the laboratory of the department of Biological Science Taraba State University for examination. The fresh vegetables were stored in refrigerator before analysis. Vegetables were analyzed using the method described by Jeffrey *et al.*, (1998) and

Gaspard and Schwartzbrod (1991) for the removal or elution of parasitic larva, cysts and eggs in fresh vegetables in determining infestation. In this method the experimental protocol consisted of elution of the parasite from vegetable substrate and concentration.

Elution of parasite was achieved by washing the vegetables with cationic detergent hyamine solution containing glass powder suspension in 50/50 (100 – 200mm borosilicate pyrex particles) and then rinsing with water. Concentrate of the parasites was done by centrifugal floatation techniques described by Soulby (1982). The preparation was filtered through wet gauge into a clean centrifuge tube and centrifuged at 2 rpm for 2 minutes.

The supernatant was discarded into disinfection Jar and Sediment was mixed and a drop was applied on the center of a clean grease tree glass slide, a clean glass cover slip was placed gently to avoid air bubbles and over flooding preparation was examine under the microscope for parasites using x10 and x40. Reference to atlas of parasitology by Cheesbrough (2005) was used for identification of parasites, cysts, oocyst, eggs and larvae. Prevalence and mean intensity were calculated using the method reported by Margolis *et al.* (1982).

RESULTS

The result show out of 450 vegetables examined 176 were found to be infested with parasites. It showed overall prevalence of 39.1% of parasites on vegetables with *Telfairia occidentalis* (52%), *Brassica olaracea (44%)* and *Lactuca sativa* (45%) showed high prevalence and high mean intensity of infestation of parasite. Table 1

The cyst and oocyst of protozoa, (*Entamoeba* sp. *Giardia* sp. *Balantidium* sp. and *Cryptosporidium*) eggs and larvae of helminths. (*Ancyclostoma* sp. *Ascaris* sp. *Trichostrongyloides* sp. and *Taenia* sp) were found to infest vegetables. Statistical analysis showed a significant association ($P>0.05$ χ^2 43.77) between various parasite distribution on various vegetables. Table 2

DISCUSSION

The detection of parasites on vegetables has a significant public health implication because some of the vegetables are processed and eaten uncooked which could lead to infection and disease. Vegetables examined showed a prevalence 176 (39.1%) of parasitic infestation which is in proxy with results of Damen *et al.*, (2007) and Odikanmnora, (2008) who reported 36% of parasitic contamination of vegetables in Jos and 38% at Abakaliki.

Telfairia occidentalis, (Flutted Pumpkin) recorded the highest number of infection while *Dacus carota* (Carrot) had the least number (24%) of infestation. This could be due to the nature of the surfaces of the vegetables. *Telfairia occidentalis*, and *Lactuca sativa* have broader leaves that touch the ground or soil thereby making them more prone to parasitic infestation.

The protozoan (*Entamoeba* sp. *Gairdia* sp. *Crysptosporidium*) and helminth (*Ascaris* sp and *Acylostoma* sp.) found in this study were similar to parasites isolated by other researcher, Robertson and Gjerde (2000), Al-shawa and Mwafy (2005) who reported that vegetables purchased at open markets were contaminated with helminths eggs and protozoan cysts.

The presence of *Entamoeba* sp. oocyst of *Cryptosporidium*, *Gairdia* sp., *Ascaris* sp. and *Trichostronggloide* sp. are considered an indicator for local health status because these parasites inhabit animal and human intestine and their presence on vegetables

indicates contaminations with animal and human feacal matters.

Table 1: Prevalence of Parasites on vegetables in Jalingo, Taraba state, Nigeria (N=450)

Vegetable	Number Infested	Number of Parasites	Prevalence (%)	Mean intensity
T. occidentalis (n=100)	52	128	52	2.46
B. oleracea (n=50)	22	52	44	2.36
L. sativa (n=100)	45	89	45	1.97
Amaranthus sp (n=100)	33	62	33	1.88
D. carota (n=100)	24	33	24	1.38

Key

n=number of each vegetable types

N=Total number of vegetables

Table 2: Distribution of Parasite on Vegetable

	Parasite on Vegetable									
	Protozoan				Helminths					
Vegetable N = 450	Es	Bs	Gs	Oc	Ac	Ss	As	Ts	Ta	Total
T. occidentalis	40	12	06	20	02	16	22	06	04	128
B. oleracea	14	01	01	10	09	0	09	08	0	52
L. sativa	24	07	11	21	07	06	09	04	0	89
Amaranthus sp.	20	09	07	13	03	01	05	03	01	62
D. carota	07	01	02	03	09	05	04	02	0	33
	105	30	27	67	30	28	49	23	05	364

($P>0.05$ χ^2_{tab} 43.77 χ^2_{cal} 89.26)

Key

Es *Entamoeba* sp.
Bs *Balantidum* sp.
Gs *Giardia* sp.
Ss *Strongyloide* sp.
As *Ascaris.*
Oc Oocyst *Cryptosporidium*
Ac *Aclystoma* sp.
Ts *Trichostrongyloides* sp.

Ta *Taenea* sp.

CONCLUSION

The study indicated that vegetables sold in Jalingo, Taraba state, harbours parasites, therefore there is potential risk of acquiring these parasites through consumption of improperly washed vegetables. To reduce transmissions of intestinal parasites, proper cleaning and handling of vegetables should be adopted. There is need to intensified enlightenment campaign to the public on the necessity of food sanitation and personal hygiene.

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