International Journal of
Basic and Applied Sciences

(A peer reviewed International Journal)

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International Journal of Basic and Applied Sciences, Vol. 1 No. 2. pp. 163-165. 2277-1921. 2012

ISSN *2277 – 1921*

Article type *Full Length Research Article*

Submission date *31 December 2012*

Acceptance date *30 March 2012*

Publication date *15 April 2012*

Article URL *http://www.crdeep.org/category/ijbas*

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International Journal of Basic and Applied Sciences Vol. 1 No. 2. 2012. Pp. 163-165

Full Length Research Paper

The Prevalence of Parasitic Infestation on commonly sold vegetables in Gwagwalada Market, F.C.T, Abuja.

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ABSTRACT
The prevalence of parasite infestation of Nigerian commonly sold vegetables in Gwagwalada market of the Federal Capital Territory, Abuja was studied. A total of sixty four (64) samples of vegetables were examined. The vegetables collected were washed in normal saline solution and left to stand for twenty four (24) hours. The debris was decanted off and subsequently centrifuged at 750rpm and the supernatant was decanted off and the sediment was examined under x 10 and x 40 microscope after adding a lugol's iodine stain. Results obtained showed that the parasitic infestation rate was 60.00%, 42.90%, 58.30%, 25.00%, 22.20%, 71.40% and 72.70% for spinach, water leaf, carbage, lettuce, *Tetrapleura*, pumpkin leaf and carrot respectively. The parasites encountered included *Ascaris* (33.30%), *Taenia* (18.20%), *Trichuris* (12.10%) *Strongyloide*s (6.10%), Hookworm (24.40%) and *Enterobius* (6.10%). The study also revealed that the highest monthly prevalence rate of parasitic infestation of 57.10% was recorded in November with no significance difference ($p \geq 0.05$, df=2) among the months.

Keywords: *Prevalence, Vegetables, Parasitic, Infestation, Gwagwalada, F.C.T.*

INTRODUCTION
Vegetables can be grouped according to the edible part of each plant; leaves (lettuce), stalks (celery), roots (carrot), tubers (potato), bulbs (onions) and flowers (broccoli) (Jean, 2003). In addition, fruits like tomatoes and seeds such as the pea are commonly considered vegetables. Vegetables and fruits are rich in vitamins, minerals, fibre, phytochemicals and at the same time low in calories (Uguru, 2008). Furthermore, vegetables are best eating soon after harvesting to prevent nutrient loss. It is true that many countries including Nigerians are becoming aware of the immense benefits of consuming vegetables as exceptional sources of calcium, iron, vitamins A and C as well as riboflavin (Uguru, 2008). However, experts say over 60 percent of vegetables in the market are reserviours of disease-causing germs and warned on their adequate cleaning before eating (Adegbola, 2007). In recent years, there has been an increase in the number of reported cases of food-borne illness linked to fresh vegetables which is a major way in the transmission of intestinal parasites (Daryani, *et al*., 2009).

Infection acquired through direct ingestion of infective eggs or cyst is intimately linked with the level of personal hygiene and sanitation in the community (Smyth, 2004), the lack of latrines and inadequate sewage disposal facilities has been known to contribute to the spread of infective stages of the parasites thereby bringing about a widespread contamination of food and drinks (Olzem and Sener, 2005). It has also been discovered that infections can also be acquired through contaminated unwashed fingers, insects, wind in dry conditions and or circulation of bank notes (Adegbola, 2007; Matur, *et al*., 2010). Several surveys in different parts of the world showed that vegetables can be agents for transmission of protozoan cysts and oocysts of *Giardia*, *Entamoeba*, *Cyclospora*, *Toxoplasma* and *Isospora* and helminthes eggs and larvae of *Hymenolepsis*, *Taenia*, *Fasciola*, *Toxocara*, *Ascaris*, *Trichostrongylus*, *Strongyloides* and Hookworm (Dvuong, *et al*., 2007).

According to Adegbola (2007), the method of fertilizing vegetables farms with animal waste and contaminated irrigated water as well as handling method both by the farmer, vegetable vendors and consumption of vegetables that were not thoroughly washed makes them avenues which people can contact infections. When irrigation water flow into vegetables fields, the ova of worms make their way into the water through human waste deposits. The hatched larva is sometimes found on leafy vegetables such as carrots and cabbage that are often eaten raw. However, Kozan, *et al*. (2007) found out that no helminthes or developmental parasitic stage was recovered in treated water as opposed to the untreated water used to irrigate vegetables.

MATERIALS AND METHODS
Study Area
The Federal Capital Territory is located geographically at the centre of Nigeria. It lies between latitude $8^0 02$" and $9^o 25$''N; Longitude $6^0 45$" and $7^0 45$"E. The FCT falls in the semi-seasonal equatorial climate zone with associated contrasting wet and dry periods.

Collection of Samples
Seven different vegetables were collected randomly from three different vegetable sellers within the Gwagwalada market and were conveyed to the Biology laboratory of the department of Biological sciences, University of Abuja for processing and analysis.

Processing of Samples

The vegetable samples were washed in 100ml of physiological saline solution and left to stand for about one hour. The solution was then centrifuged for about 5 minutes at 750rpm after which the supernatant was decanted off and the sediment was left for laboratory analysis (Cheesbrough, 1998).

Laboratory Analysis

The sediment was placed in a clean grease free slide and one drop of lugol's Iodine stain was added. It was then covered with a cover slip and observed under x 10 and x 40 objectives for identification of the possible ova or cyst present in the vegetables (Cheesbrough, 1998).

Identification of Parasites

The various cyst or eggs of the parasites were identified by their morphological characteristics such as the shapes and sizes of the eggs using Soulsby, (1982) and Cheesbrough, (1998) as a guide.

Statistical analysis

Chi-square test was used to calculate for any significant difference in prevalence of parasitic infestation. Values of $P \leq 0.05$ were considered significant.

RESULTS

Table 1, revealed that out of a total of sixty four (64) vegetables collected, 33 (51.60%) were infested with parasites. Among the vegetables infested were spinach 6(60.00%), water leaf 3 (42.90%), Carbage 7 (58.30%). Lettuce 2 (25.00%). *Tetrapleura* 2 (22.20%), Pumpkin leaf 5 (71.40%) and carrot 8 (72.70%). There was no significant difference ($p \geq 0.05$, df=6) in infestation rate among the vegetables sampled.

Table 1: Percentage prevalence of parasitic infestation on vegetables sold in Gwagwalada market FCT Abuja.

Vegetables	No examined	No infested	% Prevalence
Spinach	10	6	60.00
Water leaf	7	3	42.90
Carbage	12	7	58.30
Lettuce	8	2	25.00
Tetrapleura	9	2	22.20
Pumpkin leaf	7	5	71.40
Carrot	11	8	72.70
Total	**64**	**33**	**51.60**

Table 2, showed a total of seven different parasite eggs were encountered in the study, which include the following *Ascaris* 11(33.30%), *Taenia* 6(18.20%), *Trichuris* 4(12.10%), *Strongyloides* 2(6.10%), Hookworm 8(24.20%) and *Enterobius* 2(6.10%).

Table 2: Distribution of parasites found infesting vegetables sold in Gwagwalada market, FCT Abuja.

Parasites	No found	Percentage rate of infection (%)
Ascaris	11	33.30
Taenia	6	18.20
Trichuris	4	12.10
Strongyloides	2	6.10
Hookworm	8	24.20
Enterobius	2	6.10
Total	**33**	**100**

The monthly prevalence rate of parasitic infestation of commonly sold vegetables in Gwagwalada market, indicated that out of 24 samples collected in September, 10(41.70) were infected with parasitic eggs, in October 13(50.00%) of the 26 vegetables collected were positive of parasites while in November, of the 14 vegetable samples collected 10(57.10%) were positive for parasitic infestations (Tables, 3).

Table 3: Monthly Distribution of parasitic infestation rates of commonly sold vegetables in Gwagwalada market, FCT, Abuja.

Month	No of Samples	No infested	% prevalence
September	24	10	41.70
October	26	13	50.00
November	14	10	57.10
Total	**64**	**33**	**51.60**

DISCUSSION

The present study has shown that investigation on the seven commonly sold vegetables used routinely for human consumption in Gwagwalada Abuja FCT revealed several parasitic stages infesting these vegetables. The consumption of raw vegetables plays an important role in the transmission of human parasitic infections (Anuar, 1997). The recovery of the parasitic stages from the vegetables consumed as the source of contamination may be helpful in indicating the incidence of intestinal parasites among a given community. The highest parasitic eggs were recovered from carrot (72.70%) followed by pumpkin leaf (71.40%). Similar results were obtained

earlier by Al- Binali, *et al*, (2006). This finding may be attributed to the fact that the use of untreated or partially treated human faeces in the cultivation and propagation of these vegetables largely remains a practice in several communities. The least prevalence rate (22.20%) was recorded in *Tetrapleura* and this is because the vegetable species does not require much human intervention in form of manure application for its cultivation.

Among the parasites encountered, *Ascaris* had the highest infestation rate among the vegetables examined (33.30%). The reason is not farfetched as the parasite is known to lay large no of eggs and its resistance to environmental factors such as temperature and other harsh conditions. This is similar to findings of Ogbulo, *et al*. (2009) who suggested that these germs do not only infest vegetables while in the field, but as well through contaminated wash and ineffective hygiene practices by vegetables farmers and vendor. Proper sanitary measures can play a significant role in reducing the abundance and distribution of these parasites on vegetables.

Furthermore, the highest prevalence rate 51.10% was obtained in November, the reason being that farmers depend solely on irrigated water to wet their farms as well as the use of animal manure for the cultivation of the vegetables paving way for the introduction of cysts or eggs of these parasites unto the vegetables (Adegbola, 2007; Ogbulo, *et al*., 2009). However, there was no significant difference ($P \geq 0.05$) between the monthly distributions of infestation rate of commonly sold vegetables in Gwagwalada market of Federal Capital Territory, Abuja.

AKNOWLEDGEMENT

The authors wish to thank Mr David Aiyejina, Mrs Naomi Adelabu, Mallam Jubril Mustapha, Bukar Ayuba and Mrs Adedokun of the Department of Biological Sciences Laboratory for their technical assistance.

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