

**International Journal of Medical Science and Clinical Inventions**

Volume 1 issue 8 2014 page no. 393-401 ISSN: 2348-991X

Available Online At: <http://valleyinternational.net/index.php/our-jou/ijmsci>**Salmonella Sp. In Eggs Yokels Of Free Fairs**Lilian Carla Carneiro<sup>1</sup>, Silvânia Maria Oliveira<sup>2</sup>, Rosangela Coelho Quintana<sup>3</sup><sup>1</sup>Molecular Biology Institute of Paraná \_ IBMP[carlacarneirililian@gmail.com](mailto:carlacarneirililian@gmail.com)<sup>2</sup>State University of Goiás UEG \_ Unu Morrinhos

Corresponding author:

Lilian Carla Carneiro. Address: Molecular Biology Institute of Paraná \_ IBMP

[carlacarneirililian@gmail.com](mailto:carlacarneirililian@gmail.com)**Abstract:**

*Salmonella are Gram negative bacilli that cause gastric diseases and may to be transmitted by the eggs. Being a public health problem, this paper had like objective to realize an eggs bacteriological evaluation in free fairs and to evaluate the perception of consumer knowledge about the sanitary quality of the eggs. Of the 50 samples analyzed, 24% were positive in MacConkey agar and 22% in Salmonella-Shigella agar. It was found that there is little consumption of eggs and lack of knowledge about the quality and nutritional value of eggs, requiring further clarification of its features. The results shows the people not eats many eggs, the frequently of people that of eats eggs is twice or three times per week, in media 23 eggs per month. The size of the egg is important for to know if the chicken is young or old, how bigger is the egg more old is the chicken. A questionnaire was realized and 96% of interviewers answered that the size of egg is not important; but the information is important because the old chicken puts egg of soft shell and this egg have more chance of contamination. Other question was if the color do egg influence on quality of food, in general the answers were no, this affirmation is correct. Was observed that the people worries with the quality of the product, although, sometimes the consumers not knows the characteristics of a good product.*

**Key words:** salmonellosis, microbiological quality, hygienic and sanitary.

**Introduction**

The eggs are used as ingredients in many food products (ALLEONI and ANTUNES, 2001). Among these are cakes, meringues, sausages and pastry products, and products made homemade mayonnaise base (BARON et al., 2004). The egg is an important item in the food

because it is an important source of animal protein and vitamin A (RODRIGUES & SALAY, 2001), is a low cost product, so accessible to the majority of human population (ANDRADE et al., 2004). Chicken eggs are protected from the outside by three structures that prevent entry of microorganisms in that: the membrane waxy outer

shell and its inner membrane (JAY, 2005), making it relatively free of bacteria in comparison with other food (TEO and OLIVEIRA, 2005). However, eggs are mentioned as potential backers of *Salmonella*, causing outbreaks of food poisoning (ANDRADE et al., 2004).

The contamination of eggs by *Salmonella* can occur via horizontal or vertical (TEO and OLIVEIRA, 2005). Vertical transmission occurs when the hens are carriers of the microorganism in its follicle, and transmit them to the eggs (THIAGARAJAN et al., 1994). Since the route is characterized by horizontal contamination of eggs in their contact with the external environment, as the nest, bed, contaminated ration contaminated cages (SOUZA et al., 2002). The *Salmonella* are among the Gram negative bacilli that cause food-borne gastroenteritis. *Salmonella* contamination occurs when there is ingestion of food contaminated with strains of the genus, being characteristic of their habitat the intestinal tract of animals such as birds, reptiles, farm animals and humans (JAY, 2005).

In this context, *Salmonella enterica* spp. serotype *enteritidis* (*S. enteritidis*) more specifically the phage type 4 is the most common cause of salmonellosis in humans (FERNANDES et al., 2003, SANTOS et al., 2003). Cause Human infection with contaminated food by *Salmonella enteritidis*, especially eggs and derivatives, is a major public health problem (SILVA and DUARTE, 2002). Among the symptoms caused by salmonellosis are nausea, vomiting, abdominal

pain, headache, chills and diarrhea that usually appear around shape 12 to 14 hours after eating contaminated food (JAY, 2005). *Salmonella* is considered a pathogenic microorganism linked to eggs and derivatives (SILVA and DUARTE, 2002) can also be found other pathogenic microorganisms, but their serotypes and *Salmonella* that are considered as causes of food borne outbreaks associated with them (TEO and OLIVEIRA, 2005).

Gast (2003) mentions that *Salmonella enteritidis* is an enteric pathogen, the Enterobacteriaceae family, found in foods that cause toxic infections in humans. According to Souza et al. (2002), the poultry industry has been increasingly affected, because when infected birds, represent potential sources of food toxic infections to humans, through consumption of contaminated poultry. Some strains of *Salmonella enteritidis* colonize the channel ovipositor chicken, may cause contamination of the membrane surrounding the yolk during the time the egg is formed (HUMPHREY, 1994).

There were outbreaks of foodborne diseases in many regions of Brazil, occurring contamination by *Salmonella* in various foods, but have shown that *S. serovar enteritidis* is currently the most salmonellosis causes and is found in poultry products (PERESI et al., 1998; GELLI et al., 1998). In the 80's decade there was an increase in cases of infections in relation to consumption chicken and foods prepared with raw or undercooked eggs (RODRIGUE et al., 1990).

According to Andrade et al. (2004), lack of adequate sanitary toilet conditions at the production site contributes to the multiplication of microorganisms in the eggs, thus resulting in the need for research focused on levels of contamination, because it interferes in public health. This study aimed to evaluate the presence of Salmonella in hillbillies eggs sold at fairs frees of Morrinhos-GO city, and assess the perception of consumer knowledge about health quality.

### Material and Methods

We examined 50 samples of chicken eggs from producers of small farms that sell hillbillies eggs. The eggs were collected randomly in the fairs in Morrinhos-GO city. Acquired during normal trading in different points of sale in street markets. Were collected directly from the cards through the hands covered with gloves, packed in plastic bags. Immediately after collection, under normal market were transported to the Laboratory of UEG - Unit University Morrinhos - GO for bacteriological processing the liquid contents (albumen and yolk) (BRAZIL, 2008).

Initially, the eggs were decontaminated with 70% alcohol. Were broken in the chapel and poured the clear over the yolk in sterile plastic bags. Then, an aliquot of 25 g was weighed and added 80 mL of peptone water (KONEMAN et al., 2001) and incubated at 37°C for 24 hours. After 0.1 mL of sample was peaked between Selenite Cystine selective enrichment (WALTMAN, 1998) and in 0.5 mL Rappaport

Vassiliadis (WALTMAN, 1998) and incubated at 37°C for 24 a 48 hours. After the incubation period was seeded with the platinum loop on plates containing MacConkey agar (MISHRA et al., 1997) and Salmonella - Shigella (FORWARD RAINNIE & 1997) and incubated at 37°C for 24 hours.

The samples were evaluated by biochemical tests following: urea (QUADRI et al., 1984), Simmons citrate (SIMMONS, 1926), agar phenylalanine (SEBALD and PETIT, 1997), glucose (HUGH and LEIFSON 1953), lactose (MACFADDIN, 1980), sucrose (SEBALD and PETIT, 1997) and malonate (KONEMAN et al., 2001).

To assess consumer perceptions about the sanitary quality of the egg was elaborated a questionnaire with questions regarding the following aspects: number of eggs consumed per person, how it is consumed, origin and morphological characteristics influence its contamination.

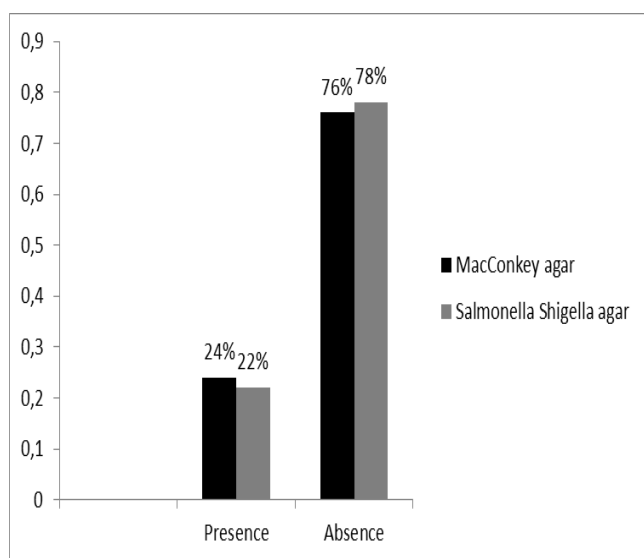
### Results and Discussion

*Salmonella* are found everywhere in nature, with the intestinal tract of man and animals as principal reservoirs. Outbreaks in different countries indicate the existence of common sources of infection (ANDRADE et al., 2004).

Studies have confirmed that *Salmonella* was found in eggs in inadequate storage conditions and food prepared with raw eggs contaminated becoming a serious threat to human

health (HUMPHREY et al., 1989). Contamination of eggs can occur *Salmonella* oviduct and the ovary (MIYAMOTO et al., 1997). However, in most cases the contamination occurs in the cloaca during the passage of eggs. It is known that the number of eggs infected with *Salmonella* decreases with a decrease in the fecal shedding (HOWARD et al., 2012).

In this study, samples were plated on MacConkey agar (MC) (MISHRA et al., 1997) Salmonella - Shigella agar (SS), (FORWARD and RAINNIE, 1997), the data are shown in Figure 1.

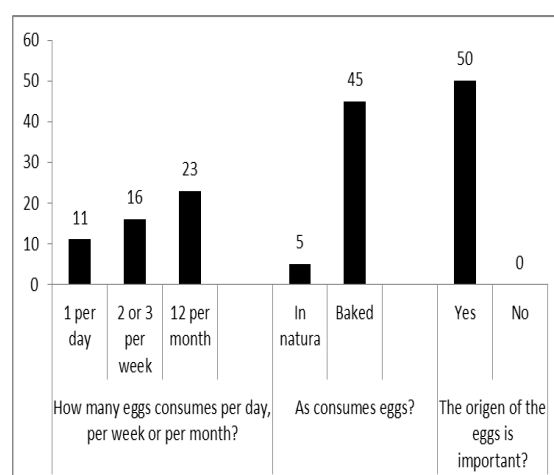


Was observed 24% of the samples positive in agar MacConkey and 22% of positivity in SS agar. The similarity of the results confirms the presence of *Salmonella* spp. on samples analyzed. The negative rate is 76% in MacConkey agar and 78% in SS agar. These data show that the eggs have a good quality index when compared with other results such as ANDRADE et al. (2004) that when analyzing farm eggs sold in fairs of Goiânia, GO and observed an infection rate of 40.44% and

found that 58.18% were positive for *Salmonella* spp. This is important, since it is widely discussed among scientific health problems arising from contamination by *Salmonella* spp. (SILVA and DUARTE, 2002).

The egg is a fresh product and the consumer need have access to information like how the product is transported or stored so that it is better used (ITO, 2007), small producers, like those found on fairs in Morrinhos-GO city, generally do not make use of hygiene required for the production or storage of the product. According to Kottwitz et al. (2008) on Paraná State, Brazil, the egg production by small producers, without adequate sanitation and reuse of packaging for transport of the product, contribute to salmonellosis cases.

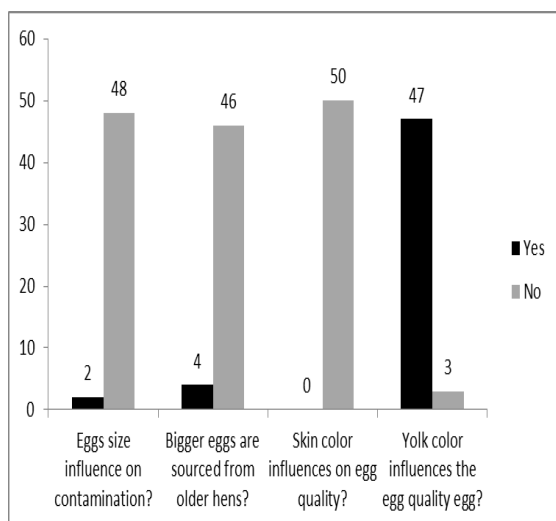
Analyzing the contamination *Salmonella* rate found in the samples, was important to check knowledge consumers about the product they are consuming (Figure 2).



According that the results few people have the habit of to eat eggs regularly (11 people), 16 individuals generally consume eggs two to three times a week. As can be seen, there is little egg

consumption by the population, this low consumption can be derived from the lack of information about egg nutritional values and relationship with the disease as the cholesterol. The consumers have preference by to eat processed eggs; this situation is attributed to organoleptic characteristics, as example the smell.

Most women consumers not given importance on the merits of the product. This fact may interfere on production of that food chain, from the moment that relates origin and quality, a factor which may add value to the egg. (RODRIGUES and SALAY, 2001), aim in their study that the consumers thinks that is important to know the origin of the egg, especially in relation to storage conditions and hygiene. Some morphological characteristics of the egg are essential for consumers to recognize the quality of food (Figure 3).



In this work there is unknown by the interviewees, that the larger eggs are produced by older chicken and have a fragile shell facilitating the passage of microorganisms into the food. Smaller eggs have the thick shell and maintain

quality product for a longer time, making them more useful in the time of buys (MOLAN, 2003). Rodrigues and Salay (2001) show that among the aspects evaluated, more than half of consumers showed equivocal knowledge about the size of the egg and its sanitary quality.

In this study, skin color, although mentioned by more than half of consumers as being associated with the sanitary quality of food, nothing interferes. It was recorded a high percentage of respondents, the packaging and indifferent to the product storage (RODRIGUES AND SALAY, 2001).

The knowledge of the good characteristics for consumption egg should reach both producers, retailers and consumers, which is seen in a product that has important properties for human consumption. In a study developed by Rodrigues and Salay, (2001) most retailers had misconceptions in relation to egg size, skin color, about 50% of respondents have a misconception about the importance of packaging. The traders say the time to market of the egg is important for the sanitary quality. Usually there is loss of the internal quality of the egg according to the decomposition of carbonic acid into carbon dioxide and water.

## Conclusion

The data obtained in this study shows the lack of knowledge among consumers when choosing a good quality egg. The consumer unacknowledged that the color of the yolk, egg

size, the storage time of the product and the type of packaging used for transport and storage can be important factors to reduce the contamination of the feed process. However, despite not knowing basic methods of identification for a good product, consumers express concern about the quality of the egg.

With these results and based on information from other researchers, it is worth emphasizing the importance of sanitary conditions involved in egg quality. Proper procedures should be conducted initially in the production process, which includes good health of the birds, cleaning the nest, reducing the storage time. Other precautions such as storage, transport, reuse of packaging are important, as well as the need for consumers to be aware of the importance of egg quality, since the eggs can be vehicles to *Salmonella* infections and to result in invasive disease, affecting children, elderly and immune compromised.

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**Figure Legende**

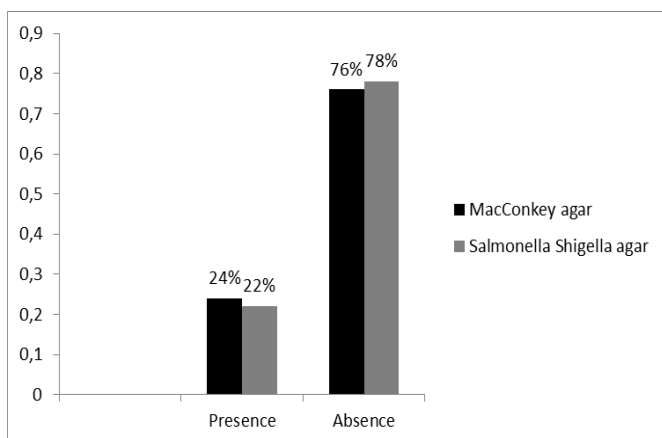
Figure 1- Percentage of positivity and negativity of Salmonella in samples

Figure 2 – Quantity, procedence and eggs conditions by consumers.

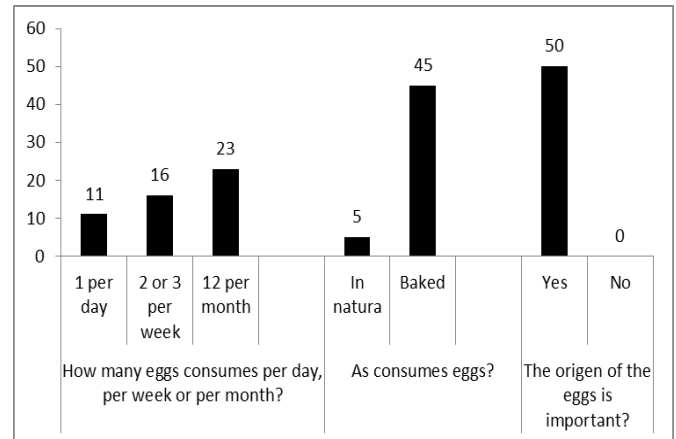
Figure 3 – Results of morphological characteristics of eggs.

**Figures**

**Figure 1**



**Figure 2**



**Figure 3**

