

1. INTRODUCTION

Salmonella species (*Salmonella* spp.) are Gram-negative, facultative anaerobe, motile and rod-shaped bacteria belonging to family Enterobacteriaceae (Krieg and Holt, 1984). *Salmonella* Typhoid and Paratyphoid caused by several species of *Salmonellae* infections are recognized world wide as important food born human diseases. Approximately 13 million cases of Paratyphoid infections occurs world wide annually (Murugkar *et al.*, 2005). Unfortunately poultry meat is the major source of food borne *Salmonella* Paratyphoid infection (Mayrhofer *et al.*, 2003).

In addition to the public health impact, infections with *Salmonella* spp. in poultry cause serious economic losses due to high rate of mortality (4-50%), loss of weight and decreased in egg production (Hoop, 1997).

Herikstad *et al.* (2002) considered *Salmonella* Enteritidis (*S. Enteritidis*) is the most common species of *Salmonellae* that isolated from human world wide, however European Food Safety Authority (EFSA, 2007) accounted *S. Enteritidis* and *Salmonella* Typhimurium (*S. Typhimurium*) for most zoonotic salmonellosis associated with food of animal origin. The latest mentioned species were accounted for almost 80% of identified serovars in human in 2006 (Collard *et al.*, 2008).

Besides good hygiene and bird's husbandry practice, several methods have been currently employed to reduce *Salmonellae* infections in poultry farms, such as the use of antimicrobials, using of competitive exclusion products and development of vaccines (Lillehoj *et al.*, 2000).

Control of *Salmonellae* infections using antimicrobials emerges the problem of antimicrobial resistance (Zhang-Barber *et al.*, 1999 and Smith *et al.*, 2002). Therefore, alternative safe strategies are emerged to overcome this important problem. There are a number of live and killed *Salmonella* vaccines used commercially worldwide with some success. Live attenuated *Salmonellae*

vaccines could be hazardous because of residual virulence caused by insufficient attenuation (uncertain safety), so its use is prohibited in several countries (Arnon *et al.*, 1983, Barrow *et al.*, 1990 and Barrow, 2000). Inactivated *Salmonella spp.* vaccines had been developed and induced good protection for birds against *Salmonellae* colonization in internal organs with reduction of the organism faecal shedding (Timms *et al.*, 1990, Gast *et al.*, 1993, Nakamura *et al.*, 1994, Miyamoto *et al.*, 1999, Liu *et al.*, 2001, Clifton-Hadley *et al.*, 2002, Khan *et al.*, 2003, Okamura *et al.*, 2007 and Inoue *et al.*, 2008)

Reducing intestinal colonization with *S. Enteritidis* during the grow-out period is crucial to improve the microbiological quality during processing as well as for consumer health (Vugia, 1993). So, using of competitive exclusion compounds (probiotics) is now used safely to prevent enteric infections especially with *Salmonellae* in newly hatched chicks with successful results (Fuller, 1997, Tellez *et al.*, 2001, Ayed *et al.*, 2004, Madian and Wafaa, 2006, Higgins *et al.*, 2007b and Revolledo *et al.*, 2009).

The present work was designed to cover the following points:

- I- The incidence of *Salmonella spp.* infections in apparent healthy and diseased broiler chickens farms of Damietta governorate, Egypt.
- II- Serotyping of *Salmonellae* isolates.
- III- Evaluation of the role of the locally prepared killed *S. Enteritidis* vaccine (bacterin) for prevention of *S. Enteritidis* in broiler chickens.
- IV- Evaluation of the role of a commercial probiotic preparation in the prevention of *S. Enteritidis* infection in broiler chickens.