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Summary: The study determined the prevalence of Salmonella spp., in the slaughterhouse environment, and products of a vertically integrated company in Crete. From 30/11/2001 to 11/6/2002 we visited the plant 7 times and collected 250 samples. The pigs originated from the company’s near by farm. During operations and after 75-100 pigs were processed we collected 185 samples. The prevalence of Salmonella spp in 4 visits was 9.09, 15.22, 6.38 and 2.13 % respectively. The prevalence in scalding tank overflow water, floors, workers’ hands, workers’ knives, livers tank, pork carcasses, livers, and tongue surfaces and ileoceacal lymph nodes and caecal contents samples was 14.2% (range: 0-50), 11.1% (0%-50%), 0%, 0%, 0%, 2.5% (0-10), 2.5% (0-20), 2.5% (0-20), 15% (0-40) and 35% (0-80) respectively. The prevalence in 3 visits and collection of 66 samples before the onset of operations was 22.7, 31.8 and 9.1 % respectively. The prevalence in the laraige area, the drains, cutting saw, knives, plastic door panels, workers aprons and offal baskets surfaces was 44.4% (range 0-67), 33.3% (20-40), 0%, 11.1% (0-33.3), 8.3% (0-33.3), 22.2% (0-33.3), and 11.1% (0-33.3) respectively. Only S.Infantis has been isolated. Caecal prevalence of 60-80% did not correlate with increased prevalence on carcasses and livers in the same sampling day. Isolated strains were resistant to Rifampin and Nitrofurantoin and sensitive to 35 other antimicrobials. Prudent use of antimicrobials mostly for therapeutic purposes was initiated in 1999. Rifampin and Nitrofurantoin have never been used.

Keywords: Contamination, prevalence, pork, Greece, antimicrobials

Introduction: Salmonellosis remains a global human health problem including Greece and the island of Crete (Schmidt and Tirado 2001; Maraki et al., 2003). Foods of animal origin are most commonly implicated as a source with pork contributing to 5-30% of all foodborne cases. The incidence rate/100,000 inhabitants in Greece was 18.4, in 1994, and 8.8 in 1998. S.Enteritidis frequency was 79.2% in 1993 and 68.7% in 1998. S.Typhimurium was 14.1 and 24.9% and S.Infantis 3 and 0.5%respectively. In Crete in 2001 and 2002 the frequencies for S.Enteritidis were 63.8 and 73.8 %, for S.Typhimurium 17 and 8.7%, and for S.Infantis (3rd most common) 2.1 and 2.9% respectively. S.Infantis was not isolated in 1995-8 (Schmidt and Tirado 2001; Tsentelis, 2003). In this study we investigated the prevalence of Salmonella spp., in the slaughterhouse of a vertically integrated company in Crete, processing >80,000 pigs/year.

Materials and Methods: Slaughtered pigs were raised in a near by farm and were transported to the slaughterhouse’s stable 24 hours before processing. Using swabs we collected surface samples from the environment and products before and after the processing started. The methodology for isolation/identification of Salmonella spp., has been reported (Limpitakis et al.,1999a).

Results: During operations 184 samples were collected. The prevalence of Salmonella spp for each of 4 visits (11/2001 and 1,4,5/2002) was 9.1, 15.2, 6.4 and 2.1 % respectively. The prevalence in samples from floors, workers’ hands, workers’ knives, scalding tank overflow water, liver tank water, pork carcasses, livers, and tongue/arynx surfaces, caecal contents and lymph nodes were 11.1(0-50), 0, 0, 14.2 (0-50), 0, 2.5 (0-10), 5 (0-20), 5 (0-20), 35 (0-80), and 15 (0-40) % respectively. Salmonella spp was found in 21.2% of 66 environmental samples collected in 3 visits (3,4,6/2002) before the onset of operations. The prevalence for each visit was 22.7, 31.8 and 9.1 % respectively. The prevalence in the laraige area, drains, cutting saw, knives, plastic door panels, workers aprons and offal baskets surfaces...
was 44.4 (0-67), 33.3 (20-40), 0, 11.1 (0-33.3), 8.3 (0-33.3), 22.2 (0-33.3), and 11.1 (0-33.3) % respectively. Only 
*Salmonella Infantis* has been isolated which was resistant to Rifampin and Nitrofurantoin but not to 35 other 
antimicrobials.

**Discussion:** Limpitakis et al., (1999) study of 2 slaughterhouses in N. Greece reported higher prevalence of 
*Salmonella* spp during the warmer than cooler months. This was attributed to greater stress of 
animals during transportation and laraige in the hot Greek summers and probably to loading more pigs per truck than usually, to meet the increased tourist season demand for meat. Environmental 
*Salmonella* spp., multiplication was not excluded. In multivariate logistic regression models with 
random effects the proportion of *Salmonella* positive carcasses in a sampling round was associated 
among others with the slaughterhouse, the period of the year the sampling was done, the sampling 
round (early or later in the slaughtering time), the sampling day and the results from testing the 
various environmental samples. (Limpitakis et al., 2001c). Our study was too short to allow identification 
of weather effects. Climatic conditions in Crete are milder and less fluctuating than in N. Greece to 
show impact on the ecology of *Salmonella* spp. Berens at al.,(1997) estimated that about 70% of 
carcass-contamination results from pigs themselves being carriers and about 30% from other carrier 
pigs. In two visits 60 and 80% of the caecal contents and 40 and 20% of lymph nodes were positive. 
These figures did not correlate with environmental and product *Salmonella* prevalence those particular 
days. In 4 visits the caecal prevalence was 60, 80, 0 and 0% respectively, indicating the need for a 
better understanding of *Salmonella* spp., ecology in the farm. The isolation of only *Salmonella* differs 
from 22 serotypes identified by Limpitakis et al., (1999), with *Salmonella Infantis* (6.7%) being the 5th 
most frequent. No *Salmonella Enteritidis* was isolated. *Salmonella Typhimurium* DT 104 was isolated for the first time in the country. The 
sensitivity of *Salmonella Infantis* to 35 antimicrobials is of interest. Since 1999 the company limits the use of 
antimicrobials. Tetracyclines, sulfonamides and microlides are not used. Those used are rotated 
annually and their use is interrupted 4 months before slaughtering. Rifampin and Nitrofurantoin have 
ever been used. Limpitakis et al., (1999) observed resistance to many important antimicrobials. 
Resistance of *Salmonella* spp, from diarhooeal cases in Crete, to Tetracycline, Ampicillin, Chloramphenicol, 
Sulfamethoxazole/Trimethoprim, Gentamycin and Neomycin was exhibited by 40.7, 36, 4.7, 3.5, 0.4, 
and 0.2% of the strains respectively.

**References:**


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