



## Prevalence of *Yersinia enterocolitica* from food and pigs in selected states of Malaysia

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### ABSTRACT

The aim of this study was to determine the prevalence of *Yersinia enterocolitica* and its bioserotypes from food and pigs in Malaysia. Fifty-eight raw porcine (raw pork meat, internal organs and other parts) and 48 non-porcine food (raw beef, poultry products, seafood, vegetables, tofu, and pasteurised milk) from wet markets located in Kuala Lumpur, Selangor, Perak, and Pahang were examined for the presence of *Y. enterocolitica*. Specimens (nasal, oral and rectal swabs) from 165 pigs (from nine farms) located at central and northern parts of Malaysia were also collected for *Y. enterocolitica* detection. Presumptive isolates were characterised biochemically and further confirmed by PCR. Out of 58 raw porcine food, *Y. enterocolitica* was detected in 7 (12.1%) samples in which raw pork meat (whole meat) had the highest prevalence 5/21 (23.8%), followed by raw pork liver 1/5 (20.0%) and raw pork intestine 1/8 (12.5%). No *Y. enterocolitica* was isolated from the 48 non-porcine foods. Overall, two pathogenic (bioserotypes 3 variant/O:3 and 1B/O:8) and one non-pathogenic (bioserotype 1A/O:5) *Y. enterocolitica* strains were isolated from food. Out of 165 pigs examined, 3 (1.8%) pigs were carriers for *Y. enterocolitica*. All 3 pigs were asymptomatic grower pigs from Penang, carried *Y. enterocolitica* bioserotype 3 variant/O:3. Post-enrichment PCR approach gave a higher prevalence, 60.3%, 41.7% and 27.9% for porcine food, non-porcine food and pigs, respectively. Both pathogenic and non-pathogenic *Y. enterocolitica* were present in our domestic pigs and food. Improper food handling and processing may cause cross contamination of this pathogen to humans, affirms a potential risk for public health.

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### 1. Introduction

*Yersinia enterocolitica* is a bacterium which belongs to *Enterobacteriaceae* that is widely found in natural environments. It is psychrotrophic and has the capability to survive and multiply in cold (Annamalai & Venkitanarayanan, 2005; Neuhaus, Francis, Rapposch, Görg, & Scherer, 1999). It is enteropathogenic and causes gastrointestinal problems such as acute enteritis with fever, bloody diarrhoea and pseudo appendicitis, which frequently leads to unnecessary laparotomy in humans (Vlachaki, Tselios, Tsapas, & Klonizakis, 2007). *Y. enterocolitica* is notified as the third most important foodborne enteric pathogen in Europe after campylobacteriosis and salmonellosis (European Food Safety Authority & European Centre for Disease Prevention and Control, 2012).

Young children and infants are the most susceptible age group (Rosner, Stark, & Werber, 2010).

In United States, it is estimated that *Y. enterocolitica* causes over 115,000 infections annually (Scallan et al., 2011). In Europe, there were 6776 reported yersiniosis cases in humans during 2012 (European Food Safety Authority & European Centre for Disease Prevention and Control, 2012). Reports on the incidence of yersiniosis in Southeast Asian countries are few. However, in the recent report of Ananchaipattana et al. (2012a, 2012b), *Y. enterocolitica* was reported present in some Thai food (beef, shrimp and tofu). This suggests a risk of human infection when such contaminated food is consumed in this area.

*Y. enterocolitica* is ubiquitous in the nature and is routinely isolated from animals, food and environment (Fredriksson-Ahomaa & Korkeala, 2003). Among the sources, swine is reported as a major reservoir for *Y. enterocolitica*. The bacterium is often present in the oral cavity of pigs especially tonsils, intestinal content, faeces and lymph nodes (Fondrevez et al., 2010; Gutler, Alter, Kasimir, Linnebur, & Fehlhaber, 2005; Liang et al., 2012; Nesbakken,

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