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Detection and isolation of *Listeria* spp. and *Listeria monocytogenes* in ready-to-eat foods with various selective culture media

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ABSTRACT

The objectives of this study were to determine the prevalence of *Listeria* spp., specifically *Listeria monocytogenes* in ready-to-eat (RTE) foods and ascertain the efficiency of detecting *L. monocytogenes* with different selective culture media. A total of 396 RTE food samples were purchased from hypermarkets and streetside hawker stalls to examine the presence of *Listeria* spp. and *L. monocytogenes*. The presumptive isolates were characterized biochemically and were further confirmed by Polymerase Chain Reaction (PCR). Out of 396 samples, *Listeria* spp. was detected in 71 (17.9%) samples in which 45 (11.4%) were positive for *L. monocytogenes*. Among the studied RTE foods, salads and vegetables had the highest prevalence (14.7%) of *L. monocytogenes*, followed by chicken and chicken products (13.2%), beverages (10%), eggs and egg products (9.5%), beef and beef products (6.7%), lunch boxes (6.7%) and seafood and seafood products (6.7%). Both *Listeria* selective agar and PALCAM agar displayed a low sensitivity and specificity in *L. monocytogenes* detection compared to CHROMagar™ *Listeria* which demonstrated 96.9% of sensitivity and 99.1% of specificity in *L. monocytogenes* detection in naturally-contaminated foods. In conclusion, this work revealed consumption of RTE foods as a potential risk of listeriosis in this region. The high contamination rate of *L. monocytogenes* in salads and vegetables from hypermarkets and streetside hawker stalls was of great concern due to emerging fresh produce-borne *L. monocytogenes* globally. The scenario warrants further surveillance and action by the local authority to control the incidence of *L. monocytogenes* contamination in RTE foods.

1. Introduction

Listeria monocytogenes is a Gram positive, non-spore forming, aerobic to facultative anaerobic psychrotrophic bacteria with low C + G content (Monk, Gahan, & Hill, 2008) and high mortility rate (Mead et al., 1999). It has the ability to cause severe diseases in humans and animals. *L. monocytogenes* is ubiquitous and can be found in foods, water, soil, vegetables as well as animals and humans (Cocolin et al., 2005; Liu, 2008).

L. monocytogenes is the causative agent of listeriosis and is transmitted to susceptible individuals via consumption of contaminated foods (Wesley, 1999). The major population group at risk for invasive listeriosis are the immunocompromised such as pregnant women, new born babies, elderly people and AIDS patients (Kuhn, Scortti, & Vázquez-Boland, 2008). Recently, in the USA, human listeriosis attributed to consumption of contaminated cantaloupe was reported (CDC, 2011). Also, smoked fish, cooked marinated products, meat products, and vegetables were found to be contaminated with *L. monocytogenes* (Meloni et al., 2009).

Numerous food surveys conducted in Malaysia had reported on the detection of *L. monocytogenes* in various types of foods, including raw and RTE foods (Marian et al., 2012), raw salad vegetables (Ponniah et al., 2010), burger patties (Wong et al., 2011) and vegetarian burger patties (Wong et al., 2012). However, the actual incidence of foodborne listeriosis cases in Malaysia is not known. There is no official data on food poisoning/infection caused by *L. monocytogenes* in Malaysia because *L. monocytogenes* is rarely tested in the food poisoning/infection cases. Nonetheless, the recent outbreaks of foodborne listeriosis in USA and other countries and the high prevalence of *L. monocytogenes* in local foods have drawn the attention of local authorities on the possible widespread of *L. monocytogenes* in the country.

In Malaysia, a wide variety of local foods sold by street hawkers is a major source of RTE foods for the locals. On the other hand,

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