TITLE: GENOMIC ANALYSIS of RESISTANCE to BENZALKONIUM CHLORIDE IN *LISTERIA MONOCYTOGENES* ISOLATED FROM FOOD AND CLINICAL SAMPLES.

AUTHORS: JUNQUEIRA, R.M.[1,2]; PEREIRA, R.C.L.[1]; CAMPELO, A.R.[1]; ASSEF, A.P.D.C.[2]; VALLIM, D.C.[1]

INSTITUTION: 1. LABORATÓRIO DE ZOONOSES BACTERIANAS, INSTITUTO OSWALDO CRUZ, FIOCRUZ, RIO DE JANEIRO, RJ (AV. BRASIL 4365, PAV. ROCHA LIMA, 3º ANDAR, CEP 21040-900, RIO DE JANEIRO – RJ, BRAZIL); 2. LABORATÓRIO DE PESQUISA EM INFECÇÃO HOSPITALAR, INSTITUTO OSWALDO CRUZ, FIOCRUZ, RIO DE JANEIRO, RJ (AV. BRASIL 4365, PAV. ROCHA LIMA, 3º ANDAR, CEP 21040-900, RIO DE JANEIRO – RJ, BRAZIL)

ABSTRACT:

Listeria monocytogenes is a gram-positive foodborne bacterial pathogen that causes the infection listeriosis, a severe illness that may result in sepsis, meningitis, encephalitis, and preterm birth, stillbirth or spontaneous abortion. *L. monocytogenes* is often found in food-associated environments where it can persist for years, resulting in food contamination and consequent human infection. Benzalkonium chloride is a quaternary ammonium biocide widely used as a disinfectant in the food industry, and resistance to benzalkonium chloride is thought to be a major factor for *L. monocytogenes* persistence in that environment. The aim of this study was to evaluate the presence of benzalkonium chloride resistance determinants through whole genome sequencing of 48 *L. monocytogenes* strains isolated from food (21 strains) and clinical samples (27 strains) from Brazil. A genomic analysis demonstrated that all strains presented the *Lde* gene and the *sug* operon (*sugR*, *sugE1*, *sugE2*). The *mdrL* gene and the *bcrABC* cassette were present in 27 (56,25%) and 6 (12,5%) strains, respectively. The genes *qacA*, *qacC*, *qacH*, *emrC* and *emrE* were not found in this analysis. Minimum inhibitory concentrations (MICs) of benzalkonium chloride was determined by agar dilution method. Strains containing the *bcrABC* cassette showed a MIC of 16 mg/l (5 strains) and 32 mg/l (1 strain), while all other strains present MIC values less than 8 mg/l. Sequence analysis demonstrated the *bcrABC* cassette presence on a pLM80-like plasmid (1 strain) or a

plasmid similar to pLI47-2 from *L. innocua* (5 strains). To the best of our knowledge, this is the first description of the presence of *bcrABC* in benzalkonium chloride resistant *L. monocytogenes* strains from Brazil, and the first description of a pLI47-2 like plasmid. containing the *bcrABC* cassette.

Keywords: *Listeria monocytogenes*, whole genome sequencing, biocide resistance, benzalkonium chloride resistance, bcrABC