Mini Review
Open Access

Lactococcus garvieae: emergent pathogen usually misidentified as *enterococcal* species

Abstract

Due to its many phenotypic similarities to *enterococci, Lactococcus garvieae* is frequently misidentified as *Enterococcus* spp. Initially recognized as a low virulence organism, the species has increasingly been isolated from both animal and human clinical specimens. Its clinical relevance has also increased due to the identification of important antimicrobial resistance profiles, including plasmid encoded resistance..

Keywords: *lactococcus garvieae, enterococcus* spp, infections, foodborne disease, antimicrobial resistance

Volume 3 Issue 2 - 2018

Cynthia Annes Rubião, Eliana de Fátima Marques de Mesquita

Department of Food Technology,Veterinary College, Fluminense Federal University, Brazil

Correspondence: Cynthia Annes Rubião,Veterinary College, Department of Food Technology, Fluminense Federal University, Lab. do Pescado,Vital Brazil Street, 64, St. Rosa, Niterói, RJ, Brazil, Tel 24230-340, Email cynthiaar01@gmail.com

Received: September 01, 2017 | **Published:** June 04, 2018

Introduction

Lactococcus garvieae is a Gram-positive, non-motile, non-pigmented, facultatively anaerobic, catalase-negative, pyrrolidonyl arylamidase (PYR) positive coccus. It grows at 10°C, at pH 9.6 and may grow at 45°C and on 6.5% NaCl. It can hydrolyze esculin in the presence of bile and produce alpha hemolysis on blood agar. It ferments glucose, mannitol, maltose and fructose but does not ferment arabinose, raffinose and sorbitol, what is a significant differentiation to *enterococci*.[1–4] Normal growth at 45°C, on 6.5% NaCl and at pH 9.6 caused *L. garvieae* to be misidentified as a new species called *Enterococcus seriolicida*.[5] These atypical phenotypic characteristics combined to genotypic heterogeneity led to the identification of two subspecies: *L. garvieae* subsp. *garvieae* and *L. garvieae* subsp. *bovis*.[6] The reliable and conclusive identification of *L. garvieae* can be performed using matrix-assisted laser desorption ionization-time of flight mass spectrometry (Maldi-TOF-MS), which is extremely quick and simple.[3,7]

Lactococcus garvieae is frequently isolated from fish and marine animals, but has also been isolated from humans, cows, buffalos, pigs, birds, cats, dogs and horses. It has also been isolated from environmental samples from water bodies and sewage.[8,9] It can also be found as a contaminant in many types of foods such as beef, pork, poultry and turkey meat and meat products, milk and dairy products, broccoli, celery, salads, vegetables, cereals, wheat flour.[10]

Lactococcus garvieae has been considered an emerging bacterial pathogen with increasing relevance for both human and veterinary medicine. Classically, it is described as a pathogen of fish and seafood and as the causative agent of multisystemic lactococcosis in aquaculture rainbow trout, eel, yellowtail and prawn. It can be thecausative agent of subclinical mastitis in brazilian water buffalos raised for milk production and pneumonia in pigs. It has also been identified as the etiological agent of distinct human diseases such as infectious endocarditis, liver abscess, infective spondylodiscitis, osteomyelitis, peritonitis, diverticulitis and gastroenteritis associated to the consumption of raw seafood.[11–14]

Comparisons of *Lactococcus garvieae* strains genomes isolated from cases of human infections and from a variety of food products (fish, seafood, meat, milk and dairy products) indicated a close genetic relationship, suggesting that human infections by *L. garvieae* are foodborne-related.[8] Some authors have already confirmed the presence of antimicrobial resistant strains of *L. garvieae* in fish for human consumption[15] and multidrug resistance plasmids were identified in human clinical isolates of *L. garvieae*.[16] There is a recent report of urinary tract infection caused by a strain of *Lactococcus garvieae* resistant to gentamycin, clindamycin and bacitracin, suggesting a development of an important antimicrobial resistance profile in human infections.[17] Often, this a result of a selective pressure due to the extensive use of antimicrobial drugs, which increases both the complexity of the infection treatment and the risk of antimicrobial resistance transmission.

Conclusion

The importance of *Lactococcus garvieae* as human pathogen has been growing as strains previously reported as *Enterococcus* spp. were reidentified as *Lactococcus garvieae* with multidrug resistance in some cases. The dissemination of the knowledge about the species and the identification of possible sources of *Lactococcus garvieae* infections can aid in the prevention of many diseases in humans and animals.

Acknowledgments

None.

Conflict of interest

Author declares no conflict of interest.

Refereneces

1. Facklam R, Elliott JA. Identification, classification, and clinical relevance of catalase-negative, Gram-positive cocci, excluding the *streptococci* and *enterococci*. *Clin Microbiol Rev*. 1995;8(4):479–495.
2. Teixeira LM, Merquior VLC, Vianni MCE, et al. Phenotypic and genotypic characterization of atypical *Lactococcus garvieae* strains

isolated from water buffalos with subclinical mastitis and confirmation of *L. garvieae* as a senior subjective synonym of *Enterococcus seriolicida. Int J Syst Bacteriol*. 1996;46(3):664–668.

3. Heras Cañas V, Pérez Ramirez MD, Bermudez Jiménez F, et al. *Lactococcus garvieae* endocarditis in a native valve identified by MALDI-TOF MS and PCR-based 16s rRNA in Spain: a case report. *New Microbes New Infect*. 2015;5:13–15.
4. Gibello A, Galán-Sánchez F, Blanco MM, et al. The zoonotic potential of *Lactococcus garvieae*: an overview on microbiology, epidemiology, virulence factors and relationship with its presence in foods. *Res Vet Sci*. 2016;109:59−70.
5. Kusuda R, Kawai K, Salati F, et al. *Enterococcus seriolicida* sp. nov., a fish pathogen. *Int J Syst Bacteriol*. 1991;41(3):406−409.
6. Varsha KK, Nampoothiri KM. *Lactococcus garvieae* subsp. bovis subsp. nov., lactic acid bacteria isolated from wild gaur (*Bos gaurus*) dung, and description of Lactococcus garvieae subsp. garvieae subsp. nov. *Int J Syst Evol Microbiol*. 2016;66(10):3805−3809.
7. Reguera-Brito M, Galán-Sánchez F, Blanco MM, et al. Genetic analysis of human clinical isolates of *Lactococcus garvieae*: relatedness with isolates from foods. *Infect Genet Evol*. 2016;37:185−191.
8. Aguado-Urda M, Cutuli MT, Blanco MM, et al. Utilization of lactose and presence of the phospho-β-galactosidase (lacG) gene in *Lactococcus garvieae* isolates from different sources. *Int Microbiol*. 2010;13(4):189–193.
9. Pot B, Devriese LA, Ursi D, et al. Phenotypic identification and differentiation of *Lactococcus* strains isolated from animals. *Syst Appl Microbiol*. 1996;19(2):213–222.
10. Ferrario C, Ricci G, Borgo F, et al. Genetic investigation within *Lactococcus garvieae* revealed two genomic lineages. *FEMS Microbiol Lett*. 2012;332(2):153–161.
11. James PR, Hardman SM, Patterson DL. Osteomyelitis and possible endocarditis secondary to *Lactococcus garvieae*: a first case report. *Postgrad Med J*. 2000;76(895):301–303.
12. Mofredj A, Baraka D, KloetI G, et al. *Lactococcus garvieae* septicemia with liver abscess in an immunosuppressed patient. *Am J Med*. 2000;109(6):513–514.
13. Yiu KH, Siu CW, To KK, et al. A rare cause of infective endocarditis: *Lactococcus garvieae*. *Int J Cardiol*. 2007;114(2):286–287.
14. Chan JFW, Woo PCY, Teng JLL, et al. Primary infective spondylodiscitis caused by *Lactococcus garvieae* and a review of human *L. garvieae* infections. *Infection*. 2011;39(3):259–264.
15. Raissy M, Ansari M. Antibiotic susceptibility of *Lactococcus garvieae* isolated from rainbow trout (*Oncorhynchus mykiss*) in Iran fish farms. *Afr J Biotechnol*. 2011;10(8):1473–1476.
16. Aguado-Urda M, Gibello A, Blanco MM, et al. Characterization of Plasmids in a Human Clinical Strain of *Lactococcus garvieae*. *PLoS ONE*. 2012;7(6):e40119.
17. Tatvam TC, Farhan D. Reviewing the Emergence of *Lactococcus garvieae*: A Case of Catheter Associated Urinary Tract Infection Caused by *Lactococcus garvieae* and *Escherichia coli* Coinfection. *Case Rep Infect Dis*. 2017:1–4.