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Leuconostoc spp. - Leuconostoc citreum and other species. Importance in the food industry: Isolation in culture; Molecular diagnosis (PCR) Information 07-12-18. Leuconostoc is a genus of lactic acid bacteria (LAB), widely distributed in nature. The bacteria of Leuconostoc spp. are used in the food industry, although some species are also responsible for the deterioration of certain foods. The genus is composed of 24 different species, among which is Leuconostoc citreum, considered the most important of the genus. Leuconostoc bacteria have coccoid morphology, and are organized mainly in chains, although they can be found in pairs. They are facultative, gram-positive, non-mobile, and catalase-negative anaerobic bacteria, which have a relatively low GC content (37-45%). Leuconostoc spp. They are scattered in the environment and have been isolated from plant material and food, such as frozen and fermented meats, fermented vegetables (such as sauerkraut and kimchi) and fermented dairy products (such as cheese, kefir, yogurt). Also, they are used as starter cultures in the fermentation of milk and various vegetables. In addition, bacteria of Leuconostoc spp. are isolated from human clinical samples, considering themselves opportunistic pathogens. The plants are the natural habitat of the genus Leuconostoc, and are often isolated from its surface. Its concentration depends on the weather conditions of humidity, ultraviolet light, temperature and nutritional conditions, and increases during the ripening of fruits, since the nutrients are in greater availability. Leuconostoc spp. ferment glucose via the pentoses producing ethanol and CO2 and, in addition, produce acetate by oxidation of coenzyme NADH, which is why it is of technological interest in the beverage and wine industries. In addition, the bacteria of the genus Leuconostoc are heterofermentative lactic acid bacteria, used mainly in the dairy industry. Lactic acid bacteria or LAB are lactic acid producing fermenting bacteria, used in the industry to give certain qualities to foods and protect them against the action of other harmful organisms. Some species of Leuconostoc are very important for fermented dairy products, as they contribute to the formation of openings in blue cheeses and the organoleptic characteristics of butter and cream. The most important species of this genus is Leuconostoc citreum (formerly known as L. amelibiosum), considered one of the most predominant lactic acid bacteria that helps in the production of kimchi, the best-known Korean traditional dish, based on Korean cabbages fermented. Leuconostoc citreum is found in several fermented foods of vegetable and dairy origin, such as cheese, pozol (a Mexican drink of fermented corn), cassava starch, and sourdough, and is used in the direct fermentation of semolina. In addition, as with most LAB, bacteria of the genus Leuconostoc may have a role in the prevention of growth and decomposition activity and of pathogenic microorganisms. This characteristic has been attributed to various metabolic end products including bacteriocins (lactic and citric acid), organic acids, hydrogen peroxide, diacetyl and ethanol. The antifungal activity of L. citreum has been tested in bakery products, while in lactic products it has been reported that L. citreum MB1 strain is capable of retarding the growth of L. monocytogenes at refrigeration temperatures. Although LAB are generally beneficial for food and are used for the fermentation of a variety of foods and raw materials, where they contribute to flavor, texture and shelf life, some species may play an important role in the deterioration of food. The undesirable changes caused by the LAB include the greening of the meat and the formation of gas in the cheeses, the pickles and the canned and packaged meats and vegetables. In addition, in wines, meats, milk or juices damaged by these bacteria can be detected strange flavors described as cheesy, malted, acid, buttery or similar to the liver. LAB can also produce large amounts of an exopolysaccharide that causes mucus in the meat and deterioration in some beverages. Exopolysaccharides are polymers of long-chain carbohydrates widely used in the food industry, particularly in fermented dairy foods, thanks to their positive effects on the texture and sensory attributes in the final product. However, in meat products, cider, wine and in the sugarcane industry, the production of exopolysaccharides can cause serious problems. Leuconostoc bacteria are involved in the deterioration of food, especially in refrigerated meats packaged in modified atmosphere, causing for example greening in salchicas. Leuconostoc citreum causes spoilage of cooked meat products vacuum packed due to the production of exopolysaccharides, a polymer that contains glucose-galactose. Also, species of the genus Leuconostoc, mainly Leuconostoc mesenteroides, can produce dextran from sucrose, which reduces the gain of sucrose in the sugar industry. While Leuconostoc gasicomitatum and Leuconostoc gelidum, they cause viscosity and gas formation in fish stocks with acetic acid. Although the genus Leuconostoc is found in human feces, vagina and breast milk, it is not part of the human microbiota. A limited number of Leuconostoc spp., including Leuconostoc citreum, have been associated with human infections, causing bacteremia. However, the associated strains are considered opportunistic pathogens of susceptible immunocompromised individuals and the genus is generally recognized as nonpathogenic. The classification and characterization of LAB include phenotyping and genotyping. Bacteria of the genus Leuconostoc spp. develope in aerobic media, although they are facultative anaerobes. In addition, they need a complex medium for their development given the multiple demands of amino acids, peptides, carbohydrates, vitamins and metal ions. In particular, L. citreum differs from other species because it does not ferment raffinose or melibiose; In addition, as its name indicates, it produces a yellow pigment that can be appreciated when grown in MRS broth (Mann, Rogosa and Sharpe). Compared to phenotypic methods, genotypic methods offer advantages such as general applicability and good discriminatory power. Molecular diagnosis, using PCR is one of the most solid techniques with high discriminatory power to identify species and provide unequivocal results. Tests carried out in IVAMI: Molecular detection of Leuconostoc citreum by PCR. Isolation in culture of Leuconostoc spp. using selective media. Identification at species level of isolated colonies compatible with the genus Leuconostoc by molecular methods (PCR and sequencing). Recommended sample: Any food where you want to test or rule out the presence of bacteria of the genus Leuconostoc. Isolated colonies in culture compatible with the genus Leuconostoc. Conservation and shipment of the sample: Refrigerated (preferred) for less than 2 days. Frozen: more than 2 days. Plates with isolated colonies can be sent at room temperature or in refrigeration. Delivery of results: Molecular detection of Leuconostoc citreum by PCR: 24-72 h. Isolation in culture of Leuconostoc spp. in selective media: 3 days. Identification at the level of species of isolated colonies compatible with the genus Leuconostoc by molecular methods (PCR and sequencing): 48-72 h. Cost of the test: Molecular detection of Leuconostoc citreum by PCR: Consult to ivami@ivami.com. Isolation in culture of Leuconostoc spp. in selective media: Consult to ivami@ivami.com. Identification at the species level of isolated colonies compatible with the genus Leuconostoc (PCR and sequencing): Consult to ivami@ivami.com. A selective medium (LUSM medium) for the isolation of Leuconostoc spp. was developed. This medium contained 1.0% glucose, 1.0% Bacto Peptone (Difco), 0.5% yeast extract (BBL), 0.5% meat extract (Difco), 0.25% gelatin (Difco), 0.5% calcium lactate, 0.05% sorbic acid, 75 ppm of sodium azide (Sigma), 0.25% sodium acetate, 0.1% (vol/vol) Tween 80, 15% tomato juice, 30 micrograms of vancomycin (Sigma) per ml, 0.20 microgram of tetracycline (Serva) per ml, 0.5 mg of cysteine hydrochloride per ml, and 1.5% agar (Difco). LUSM medium was used successfully for isolation and enumeration of Leuconostoc spp. in dairy products and vegetables. Of 116 colony isolates obtained from fresh raw milk, curdled milk, or various vegetables, 115 were identified as members of the genus Leuconostoc. A total of 89 of these isolates were identified to species; 13.5% of the isolates were Leuconostoc cremoris, 7.9% were Leuconostoc mesenteroides subsp. mesenteroides, 11.2% were Leuconostoc mesenteroides subsp. dextranicum, 16.9% were Leuconostoc mesenteroides subsp. paramesenteroides, 10.1% were leuconostoc lactis, and 40.4% were Leuconostoc oenos. When we compared the counts obtained for two Leuconostoc strains, Leuconostoc dextranicum 181 and L. cremoris JLL8, on MRS agar and LUSM medium, we found no significant difference between the values obtained on the two media.Full text is available as a scanned copy of the original print version. Get a printable copy (PDF file) of the complete article (613K), or click on a page image below to browse page by page. Links to PubMed are also available for Selected References.These references are in PubMed. This may not be the complete list of references from this article. Anderson DG, McKay LL. 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