

Lactic Acid Bacteria – Homofermentative and Heterofermentative

Background

Lactic acid bacteria (LAB) are bacteria that are common to the dairy industry; it is assumed that LAB are organisms that produce lactic acid as the principle by-product of sugar fermentations. LAB are generally more tolerant of low pH environments than are other bacteria associated with milk and dairy products. LAB are common in nature and are often associated with plant materials. They can also be found as part of the resident microflora of humans and other mammals (e.g., oral cavity, GI track, etc.). LAB are most known in the dairy industry for their use in “starter” cultures and dairy fermentations. As starter cultures, they are added to milk and allowed to grow under controlled conditions in order to produce acid and/or modify the flavor and texture for the desired characteristics of a cheese or cultured product. LAB can also cause milk to “sour” while some strains may produce gas in cultured products or cheese that will influence package appearance and cause product flavor defects.

Gas Producing Pathways

Homofermentative LAB ferment glucose with lactic acid as the primary by-product. Lab include *Lactococcus* spp. that are used in dairy starter culture applications where the rapid development of lactic acid and reduced pH is desirable.

Heterofermentative LAB ferment glucose with lactic acid, ethanol/acetic acid, and carbon dioxide (CO₂) as by-products. Except for certain fermented milk products, heterofermentative LAB are rarely used as dairy starter cultures, although they are common in milk and dairy products. If allowed to grow significantly, they can cause defects related to their acid and CO₂ production, such as slits in hard cheeses or bloated packaging in other dairy products.



Want more information on [lactic acid bacteria](#) and the MQIP? Contact Nicole Martin (nicole.martin@cornell.edu) in the Milk Quality Improvement Program or visit our website

<https://foodsafety.foodscience.cornell.edu/mqip/>

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