

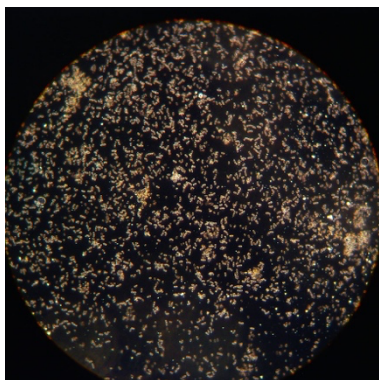
# APPLICATION NOTE

## Lactic Acid Bacteria



### Sometimes desired, but often spoilers

Lactic acid bacteria often cause a considerable pH reduction when they grow. Therefore, such cultures are traditionally used in the production of foods with a prolonged shelf life, such as yoghurt, sauerkraut, pickles or salami. In beverage production, mainly in the production of beer and wine, the identical microorganisms are regarded as the most common spoilage microorganisms, as they are able to grow well in sour environments such as fermented beverages.



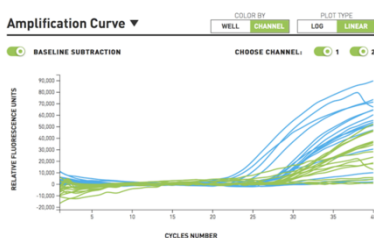
### The Problem

Although the group of lactic acid bacteria which is known today covers 6 families with a total of more than 40 genera, when talking about beer spoilers this term is mainly used only for *lactobacilli* and *pediococci*. Today some 200 species of *lactobacilli* are known, they are common in nature, they are in dairy products and they colonise the human body. Only 10 of those lactobacillus species are regarded as spoilers for traditional beers. During wine production, but also in many beer types – mainly Belgian style and Craft beers – the presence of lactic acid bacteria is even wanted during fermentation. But in the finished product they should not show any further activity. For the assessment of their spoilage potential, the knowledge about spoiling or non-spoiling is essential to avoid false positives.

### The Solution

For the monitoring of diverse lactobacilli including the beer spoiling lactic acid bacteria, FastOrange® B is used. To survey the hygiene status, FastOrange® B Ready-to-use Tubes are the choice. Additionally, all lactic acid bacteria together can be detected in one single PCR analysis without differentiation of their genus. Beer spoiling lactic acid bacteria can be determined with a simple Screening test which gives a clear yes/no answer, or they may be identified by species with the identification PCR.

Although in breweries usually a diversity of lactic acid bacteria exists, only a few specific ones are able to really proliferate in the finished beer and cause spoilage. Today only the species *Lactobacillus backii*, *L. brevis*, *L. casei*, *L. lindneri*, *L. plantarum*, and in low hopped beers as Wheat beer or Kolsch type additionally *L. collinoides*, *L. coryniformis*, *L. parabuchneri* („*frigidus*“), and *L. perolens* were detected and reliably identified. The two species *L. acetotolerans*, an anaerobic bacterium, and *L. paucivorans* have been detected in isolated places, but a proof of their common presence hasn't yet been given.



# APPLICATION NOTE

## Pressure Formation – Burst Risk



This means that the group of beer spoiling lactobacilli indeed is very small – only 10 of some 200 are dangerous for the product beer. For the decision if some detected lactic acid bacteria are really product spoiling, it is essential to determine whether those are belonging to the beer spoiling group of 10 or not.

In other beverages it may be important to detect all lactic acid bacteria – besides the enrichment in FastOrange® B, additionally a PCR Screening test for the general detection of lactobacilli can be used. This Screening test is detecting all *Lactobacillaceae* (all *Lactobacillus* and *Pediococcus* species) together with *Weissella*.

In case of a contamination in the production line, the best start is to identify the species of the spoiler/s and then to back-trace them by species specific PCR analyses. By PCR not only the species but also the concentration of the microorganisms can be determined – you can see at which stage an additional microorganism appears and besides where its quantity is increasing or decreasing.

Of course, this quantification possibility may be used also as a positive measure when monitoring bacteria or yeasts which were added in the beginning of a process as starter cultures but later should be present only in low concentrations or not at all.

When tracking a single microorganism through the production line, PCR analysis is the most helpful tool. The results of a PCR analysis are available some days earlier than those from conventional enrichments, and it delivers comparative results- the spoiler species and their ratio among each other – which is base of a reliable localization of a potential contamination source.

