

Malolactic conversion of lingonberry juice – impact on sensory properties and microbial stability

Umea Berry Symposia – Abstract

Authors: Jun Niimi, Martina Bergentall, Petter Melin (RISE Research Institutes of Sweden)

Lingonberry is a popular fruit in the Nordic countries, where many variations of lingonberry products are available. The berry naturally contains high amounts of antioxidants and antimicrobial substances which make it an ideal natural preservative. The juice of lingonberry is also naturally low in pH which is often perceived as too sour in taste. To better utilise lingonberry juices as themselves or in combination with other ingredients, transformation of the juices is required to improve the palatability. The current study explored the possibility of converting malic to lactic acid using lactic acid bacteria, determine the changes in sensory characteristics of the fermented juices as well as blends thereof with blackcurrant juice, and investigate the microbial stability of the juices when challenge tested. Lingonberries were pressed and the juices were fermented with *L. plantarum*. In order for the fermentation to be unimpeded due to active benzoic acid and successfully complete the conversion from malic acid to lactic acid, the pH of lingonberry juice was increased from 3.0 to 5.2. The resulting pH after fermentation had stabilised to 4.9 after 7 days.

To prepare the fermented lingonberry juices in a context of a mixture of juices, fermented juices were pasteurised and prepared in blends with diluted blackcurrant juice (25%)

in five different proportions of lingonberry/blackcurrant juice; 0/100, 25/75, 50/50, 75/25, and 100/0. These five juices were evaluated with a sensory panel using descriptive analysis, along with a non-fermented lingonberry juice. The juices evaluated showed that fermentation significantly ($p < 0.001$) reduced the perceived sourness and astringency, seen from the difference between fermented and non-fermented lingonberry juices. The fermentation had also significantly ($p < 0.001$) increased the perceived sweetness of the juices.

The five blends were also subjected to challenge tests using three microbial species commonly found in juices. In none of the samples the bacterium *Listeria monocytogenes* were able to grow likely due to the low pH (3.07 – 4.98) possibly in combination with benzoic acid. The yeast, *Candida albicans* were only able to grow in 0/100 lingonberry/blackcurrant juice, which did not contain any benzoic acid. When testing *Aspergillus brasiliensis*, full growth could only be observed in 0/100 lingonberry/blackcurrant juice. In the blends, mould growths were delayed in a concentration-dependent manner where no growth was observed in the 100 % fermented lingonberry juice even after six weeks. The challenge test overall indicated that blends containing lingonberry juice prevent fungal growth although a high concentration might be required to prevent mold growth.