

Effect of Salt on Color Stability of Pickled Ume

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Summary

Umeboshi, a salty pickled plum colored by purple perilla leaves, is a traditional Japanese preserved food. Anthocyanins in perilla leaves were extracted into exude juice, shira-umezu, then adsorbed to the salted plant tissue. The color of anthocyanins is generally very unstable in weakly acidic or neutral aqueous solutions, however, the red color of "umeboshi" is very stable for a long time. It has been a question why umeboshi keeps such a beautiful red color after several years. We studied on the red color and stability of umeboshi by changing the procedure of salt pickling and coloring.

We pickled ume using various conditions (addition of $MgCl_2$ and ethanol) as well as traditional method of 20% NaCl. The coloring was also done not only by the routine procedure but also using the frozen and crushed leaves. The change of pH and NaCl concentration in white and red ume-vinegar was measured. The change of red color and the amounts of each component in red ume-vinegar by aging were analyzed by spectrophotometry and HPLC. The color of pickled plum, umeboshi, was measured by the color-difference meter.

The amount of exude white ume-vinegar was increased when pickled with $MgCl_2$ and decreased with ethanol. The pH was lowered by $MgCl_2$ and changed to high value by ethanol. The absorbance of red color of ume-vinegar became maximum value after one week of starting coloring, and it slowly decreased afterwards. $MgCl_2$ had a hyperchromic effect on red color of ume-vinegar and the color of which obtained by pickling with ethanol was thin and yellowish. At the first stage (c. a. 30 days) the major pigment was malonylshisonin, although, it was hydrolyzed to shisonin by aging.

Traditional procedure: using 20% NaCl for pickling and colored with salt crumpled and squeezed perilla leaves, gave the most beautiful red colored umeboshi. The high concentration of salt and the low pH must effect the red color development of umeboshi. The study on coloring mechanism of anthocyanins to the plum tissue is under progress.