

## **Development of ready-made soup mixes using dehydrated and concentrated sauerkraut juice**

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### **Abstract**

In the process of food by-product reduction innovative solutions are under investigations. In the current study valuable by-product - sauerkraut juice was investigated. Two innovative products of sauerkraut juice- dehydrated juice via spray-drying and concentrated juice via evaporation were tested in ready-made soups. Commercially these soups are provided in different forms - instant or whole, dried or paste form. The aim of this study was to evaluate the use of dehydrated and concentrated sauerkraut juice in dry and paste ready-made soup mixes. In the current experiment four soup recipes with sauerkraut juice products were tested: red beet soup with sauerkraut "Borscht", Ramen with nori, ginger and garlic, country soup mix with potato flakes and traditional sauerkraut soup. All four recipes were developed in two forms - powder and paste. Since in the fermentation process NaCl is vital, no addition of salt was needed. For comparison commercial instant dried and paste form soups were tested. Additionally, sauerkraut juice powder and concentrate solution in hot water was tested to evaluate its properties. For all soups pH, NaCl, colour in CIE L\* a\* b\* system and volatile compounds using solid phase microextraction and GC/MS were tested. Sensory properties are very important quality parameters and intensity of acidity, cabbage taste and aroma, colour were tested using line scale. Results showed that dried and concentrated sauerkraut juice has effect on physicochemical and sensory properties. pH of soup mixes made with concentrate were from 4.3 to 4.5, whereas with dehydrated sauerkraut juice it was 5.5 to 5.7. Commercially available beetroot soup mix has a pH of 3.9. The main volatile compounds in dehydrated juice - water solution was allyl isothiocyanate and caryophyllene. Allyl isothiocyanate is compound naturally occurring in cabbages and has sulfur, pungent, garlic notes, whereas caryophyllene has wood and spicy notes. In concentrated juice main volatiles are limonene with mint and citrus notes and acetic acid with sour aroma. In red beet soup mixes dominated volatiles of other ingredients masking sauerkraut juice products volatiles and as the main compound myristicin was determined with spice, warm and balsamic notes. To conclude, sauerkraut juice powder and concentrate is promising by-product for use in food industry and ready to make soups could be one of perspective application.

**Keywords:** Soup mixes, sauerkraut juice, spray-dry, evaporation

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