Study on the Recovery of Useful Components from Byproducts

Wanchai Panthavee
UNU-Kirin Fellow from Thailand
Food Processing Laboratory, National Food Research Institute

Byproduct utilization is most important for food processing plants because it ŝ a path to increase the efficiency in the use of resources as well as in productivity and profitability. Rice (*Oryza*) and citrus (*Citrus*) are main agricultural products in Thailand. In this study, citrus residues from Orange (*Citrus reticulata*), Lemon (*Citrus limon*) and Sikuwasa (*Citrus depressa*) and rice bran (*Oryza japonica*) were used to study on value-added byproducts. All citrus residues were treated with hot acid (0.5 N HCl, pH 1.5) and cellulase enzyme for extracted pectin, while rice bran was treated with hexane and amylase enzyme for separated oil and starch from rice bran residue.

Highest pectin yield from citrus residues obtained by hot acid method and optimal condition for this method was in 2 hr treatment heated at 85℃. Amount of pectin yield, galacturonic acid content and degree of estrerification in pectin products from this method were 20.1, 77.2 and 54.9% for orange, 27.8, 73.8 and 59.0% for lemon and 31.8, 70.9 and 74.1 % for sikuwasa. While, amounts of pectin from all citrus residues by cellulase enzyme method were less than hot acid method, optimal condition for cellulase enzyme extraction was 15U enzyme/ g residue, 16 hr extraction heated at 40 ℃. Amount of pectin yield, galacturonic acid content and degree of estrerification in pectin products by cellulase enzyme method were 17.8, 73.7 and 53.8% for orange, 20.0, 71.0 and 51.0% for lemon and 14.0, 55.5 and 67.0% for sikuwasa, respectively. Pectin recovery from treated residues compared to none-treated residues by hot acid and cellulase enzyme method increased 12.4 and 10.6% by acid and cellulase enzyme method for orange, 8.8 and 6.0% for lemon while 4.2 and 6.0% for sikuwasa, respectively.

For rice bran, original, defatted and defatted- destarched rice bran were used to make rice bran biopolymer. Biopolymer from defatted- destarched rice bran showed the best homogeneous character compared to original and defatted polymer. The same as citrus results, a blend of treated and none-treaded rice bran was prepared to compare the properties of polymer. The pots and sheets molding from treated rice bran gave better characters compared to none-treated rice bran.

Advanced academic research for pectin and rice bran polymer utilization will be continuous study in Thailand. For example, pectin use for formation of edible film as ready-to-eat food package while rice bran polymer to be used for plant pots.