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学位論文題目	Antioxidant and antimicrobial activities of extracts prepared from fruit and vegetable wastes and by-products (農産廃棄物及び農産加工副産物由来抽出物の抗酸化性と抗菌性)
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### 論文内容の要旨

The functional food constituent of human diet mainly comes from fruits and vegetables and these are the major dietary source of nutraceuticals. The aim of the present study was to evaluate the functionality of extracts prepared from fruit and vegetable wastes and by-products. In the present study, under-utilized fruit and vegetable wastes and by-products extracts were tested for their antioxidant as well as antimicrobial properties. Hot-water and ethanol were used for extraction processes. Antioxidant activities were evaluated based on the DPPH (2,2-diphenyl-1-picrylhydrazyl) radical-scavenging assay and the AAPH [2,2'-azobis-(2-amidinopropane) dihydrochloride]-induced linoleic acid (LA) peroxidation test, whereas antimicrobial effects were determined using agar plate count and spectrophotometric assays. Most extracts prepared from fruit and vegetable wastes and by-products exhibited a potent antioxidant activity in DPPH free radical and AAPH peroxy radical. The highest level of antioxidant activities were detected in grape seed, in addition immature prune and buckwheat hull exhibited efficient antioxidant activities with DPPH free radical. A positive correlation was

observed between antioxidant activities and phenolic contents of extracts. Thus, fruit and vegetable wastes and by-products are the potential source of natural antioxidants.

In antimicrobial assay, the extracts from fruit and vegetable wastes and by-products showed bacteriostatic as well as bactericidal effects, whereas Gram-positive bacteria were more susceptible than the -negative. A moderate growth inhibition was observed in immature prune and peach, whereas strong effects were detected in grape bunch stem followed by grape wine pomace, and Chinese quince sake pomace. The highest level of antimicrobial effect was exhibited by the grape bunch stem extract. The results showed that the bioactive components of agricultural wastes and by-products having antioxidant as well as antimicrobial potency. In addition, the mode of action of antimicrobial activities depends on the type of microorganisms and their cell wall structures. In contrast, it was demonstrated that CGA and related compounds exhibited a potent antimicrobial activities with the synergistic effects. Crude extracts from fruit wastes and by-products could be a potential source of antimicrobial candidacy. Thus, Fruit and vegetable wastes and by-products are the potential sources of natural bioactive compounds. The exploitation of these abundant and low-cost renewable resources could be anticipated for the food industries during packaging and/or storage.

As a conclusion, it could be said that utilization of functional food components from these extracts will improve agricultural sustainability by maximizing the use of agricultural wastes and by-products.