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メタデータ	言語: English 出版者: 公開日: 2019-12-20 キーワード (Ja): キーワード (En): 作成者: MANAOIS, Rosaly Vallejo メールアドレス: 所属:
URL	https://doi.org/10.24514/00002977

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Plants are known rich sources of biologically active compounds that provide physiological benefits, including antioxidative and anti-inflammatory effects, and reduction of risks of degenerative conditions. In this work, the different bioactive constituents in some plant foods, particularly pigmented rice (*Oryza sativa* L.) and some commonly consumed vegetables in Japan, were investigated.

Unpolished forms of three varieties of Philippine *indica* rice differing in pericarp color and a nonpigmented *japonica* cultivar (Koshihikari) were evaluated for their antioxidant potential using *in vitro* and *in vivo* techniques. Black rice (var. Ittum) contained the highest level of monomeric anthocyanins, 27.0 mg/100 g fresh weight (FW), but red rice (var. Saluyaw) had the highest antioxidant capacity among the samples, as measured by hydrophilic-oxygen radical absorbance capacity (H-ORAC) assay, 7,284 μmol Trolox equivalent/100 g FW. This indicated the presence of other antioxidants in red rice. Feeding of Balb/c mice with diets containing 65.95% rice for 30 d did not induce changes in the antioxidant status in serum and liver, nor in the anti-inflammatory markers in adipose tissues.

In order to explore naturally occurring antioxidants in various foodstuffs, antioxidant capacities of spinach (*Spinacia oleracea*), komatsuna (*Brassica rapa*), and Japanese parsley or seri (*Oenanthe javanica*) were assessed. Seri exerted the strongest antioxidant capacity, 4,085 μmol TE/100 g FW. Further study on the effect of location and seasonal variations in seri indicated that the mean total ORAC value of 22 seri samples cultivated in three regions (Kyushu, Kanto, Tohoku) was 3,287 μmol TE/100 g FW, with 82% attributed to hydrophilic antioxidants. The major hydrophilic antioxidants in seri were chlorogenic acid (CGA) and quercetin derivatives, namely, isoquercitrin (quercitin-3-*O*-glucoside), rutin (quercetin-3-*O*-rutinoside), hyperoside (quercetin-3-*O*-galactoside), and quercetin- 3-*O*-rhamnosyl-galactoside. CGA was the primary contributor to antioxidant capacity of seri. Seri samples cultivated in Kanto area contained higher levels of CGA, corresponding to higher H-ORAC values. Lipophilic ORAC values tended to increase in December to January, but this did not affect the total antioxidant capacity of seri. These results provided information on seri bioactive compounds and the conditions favorable for cultivation of seri possessing higher antioxidant capacity.

The potential effect of unpolished rice cultivars in modulating the intestinal bacterial population in mice was examined. Bacterial community in cecal contents analyzed by Polymerase Chain Reaction (PCR) amplification of DNA followed by Denaturing Gradient Gel Electrophoresis (DGGE) showed distinct DGGE profiles between the control (AIN-93G diet) and rice-fed groups. Banding patterns of samples from rice groups were similar, although intensities of the bands varied. Cluster analysis showed two separate major clusters for AIN and rice-fed groups. Results of quantitiative PCR and DGGE showing various microbial populations further confirmed differences in microbial diversity between AIN and rice-fed groups. This work showed that diets containing rice resulted in shifts in the composition of intestinal microbiota of Balb/c mice.