Research Title: Prebiotic activity study of Thai fruits and vegetables

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ABSTRACT

In this study, crude ethanolic extracts of 34 fruits and vegetables were tested for their phytochemical properties, such as, antioxidant activities, total phenolics and flavonoids. The plant extracts with highest antioxidant activity were the extracts of mangosteen (*Garcinia mangostana*) fruit peels and Indian gooseberry (*Phyllanthus emblica*) fruit extracts with the EC_{50} of 440.73 and 453.50 µg extract/mg DPPH (2,2-diphenyl-1-picryl hydrazyl), respectively, by DPPH radical scavenging activity method and reducing capacity of 2.99 and 3.51 mmol Fe(II) /g extract respectively by ferric reducing antioxidant power (FRAP) method, while the plant extracts with relatively high antioxidant activity were the extracts of lotus seeds (*Nelumbo nucifera*), kamchat ton seeds (*Zanthoxylum limonella*), lopea tree whole plants (*Acanthopanax trifoliatum*), karunda fruits (*Carissa carandas*), star apple fruits (*Chrysophyllum cainito*), sugar apple fruit pulps (*Annona squamosa*), black rice grains (*Oryza sativa*), asiatic pennywort whole plants (*Centella asiatica*), maidenhair tree leaves (*Ginkgo biloba*), bamboo grass leaves (*Tiliacora triandra*), cultivated banana fruit pulps (*Musa sapientum*) and pisang mas fruit pulps (*Musa acuminata*) with the EC_{50} of 1,340.86 - 7,690.25 µg extract/mg DPPH and reducing capacity of 1.19-0.19 mmol Fe(II)/g extract. The crude extracts of Indian gooseberry fruit had highest total phenolic contents (416.07 mg GAE/g extract), followed by the extracts of mangosteen fruit peels, kamchat ton seeds and lopea tree whole plants with relatively high phenolics (397.36, 190.52 and 149.86 mg GAE/g extract respectively). The mangosteen fruit peels extract had highest total flavonoids (351.60 mg CE/g extract), followed by the extracts of kamchat ton seeds and lopea tree whole plants with quite high total flavonoids (135.36 and 113.25 mg CE/g extract respectively). In addition, indigestible polysaccharide contents of all plant extracts were also analyzed. The extracts with highest indigestible polysaccharide contents were the extracts of mangosteen fruit peels (188.62 mg/g extract) followed by the extract of shallot bulbs (*Allium oschaninii*), elaeagnus latifolia fruits (*Elaeagnus latifolia*), pineapple fruit pulps (*Ananas comosus*), lotus seed, purple sweet potato bulbs (*Ipomoea batatas*), black rice grains, jerusalem artichoke bulbs (*Helianthus tuberosus* Linn.), pisang mas fruit pulps, salak plum fruit pulps (*Salacca zalacca*), sweet potato bulbs (*Ipomoea batatas* (Linn.) Lamk.) and cultivated banana fruit pulps with relatively high indigestible polysaccharide contents (168.69,

155.51, 155.23, 147.49, 137.13, 136.91, 130.13, 129.22, 127.76, 125.91 and 124.85 mg/g extract respectively). Thus, the extract of lotus seed, black rice grains, pisang mas fruit pulps, cultivated banana fruit pulps and pineapple fruit pulps with relatively high amounts of indigestible polysaccharide and strong antioxidant activities were selected for study their effect on growth and fermentation of probiotic bacteria (*Lactobacillus acidophilus* TISTR 1034, *L. bulgaricus* TISTR 451 and *Streptococcus thermophilus* BCC 5366). The addition of lotus seed extract in yogurt resulted in highest proliferation of probiotic bacteria with 2.24 logCFU/g increase of total lactic acid bacterial (LAB) counts, while the addition of black rice grain, pisang mas fruit pulp and pineapple fruit pulp extracts caused good growth of total LAB in yogurt (2.12-2.19 logCFU /g increase). However, yogurt with cultivated banana fruit pulps extract added had less increase of total LAB counts with 2.02 log unit increase at 24 hour fermentation.

Keywords : Antioxidant activity, Phytochemical, Prebiotic