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Antioxidant activity of bran and endosperm derived protein hydrolysates of selected Sri Lankan traditional rice upon simulated gastric and pancreatic treatments

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Currently there is an unprecedented demand for inexpensive plant derived bioactive peptides with antioxidant activity for human consumption. These peptides derived from hydrolysis of plant proteins by commercial proteases can be digested by gastrointestinal physiological proteases. Rice (*Oryza sativa* L.) is one of the most widely consumed staple food worldwide and contains good quality dietary proteins. Studies on the antioxidant activity of rice peptides and protein hydrolysates are very limited. The present study evaluates the antioxidant activity of protein hydrolysates (PH) of selected Sri Lankan traditional rice upon simulated gastric and pancreatic treatments. Masuran, Goda Heeneti, Sudu Heeneti and Beheth Heeneti varieties were used in this study. Rice bran protein hydrolysates (RBPH) and rice endosperm protein hydrolysates (REPH) were prepared using three digestive treatments: hydrolyzed with Alcalase (A: commercial protease), Alcalase and Pepsin (A+P: simulated gastric treatment) and Alcalase, Pepsin and Pancreatin (A+P+PN: simulated gastric and pancreatic treatment). Antioxidant activity of RBPH and REPH were evaluated using 2-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid) (ABTS) radical scavenging, oxygen radical absorbance capacity (ORAC), ferric reducing antioxidant power (FRAP) and ferrous ion chelating capacity assays (n= 3 each). RBPH and REPH (A, A+P and A+P+PN) of all the selected varieties showed significant antioxidant activity for all the antioxidant assays tested. The order of potency of mean ABTS, ORAC, FRAP and chelating capacity were A > A+P > A+P+PN for both RBPH and REPH. RBPH demonstrated highest antioxidant activity for all the antioxidant assays studied compared to REPH. Mean ABTS, ORAC, FRAP and chelating capacity of RBPH derived from A+P+PN treatment was in the range of 8.93 $\pm$ 0.14 - 11.59 $\pm$ 0.38 mg Trolox equivalents (TE)/g PH; 21.55 $\pm$ 4.35 - 36.02 $\pm$ 1.83 mg TE/g PH; 2.29 $\pm$ 0.09 - 2.94 $\pm$ 0.06 mg TE/g PH and 897.26 $\pm$ 15.43 - 1141.81 $\pm$ 11.76 mg EDTA equivalents/g PH respectively. It is concluded that RBPH had high antioxidant activity compared to REPH and antioxidant activity of RBPH and REPH decreases upon simulated gastric and pancreatic treatments. Further, even after simulated gastric and pancreatic treatments RBPH of selected Sri Lankan traditional rice exhibited a moderately high antioxidant activity indicating its potential to be used in the functional foods industry.

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