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Bioactive fiber: Bioactivity of Cereal arabinoxylans in Relation to Their Sources and Structure

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Arabinoxylans are major components of cereal cell walls and they occur at higher content in the by-products of milling, wheat brans, rich brans and rice hulls of dietary fibre than in wheat flour and rice. Arabinoxylans have been reported to have numerous health benefits in recent studies. This presentation will report our recent studies on effects of cereal arabinoxylan extracts with various molecular weights and structures on their human immunity modulation and anticancer activity in in vitro testing.

The extraction yield and structure of AXs varied with sources and extraction technologies. In this study, AXs were extracted from wheat flour pentosan with and without xylanase treatment. In in vitro testing, nitric oxide (NO) secretion and inducible nitric oxide synthase (iNOS) expression of human immune cells of U937 induced by enzyme extracted AXs and water extracted AX were compared. The results show that AXs treatments not only enhanced NO production but also iNOS levels in U937 cells ($P < 0.05$) compared to untreated cells. The enzyme-treated AXs with a higher proportion of low Mw AXs (1-10KDa) and high A/X ratio (0.83) induced significantly higher ($P < 0.05$) iNOS expression (132.2 ± 11.9 μg/ml) than water-extracted AXs iNOS expression (104.3 ± 4.6μg/ml) and the increase in NO secretion corresponds to iNOS concentration in cultured cells, which suggest a pathway by which AXs modulate NO production in human macrophage cells. In addition, It was also found that at a concentration of 500μg/mL, enzyme-treated AXs caused a more significant inhibition of proliferation of Gastric cancer cells ($p<0.05$) and also more significantly reduced the viability of Gastric cancer cells than water extracted AXs following 24 and 48 hours treatment in in vitro ($p<0.05$). Therefore, a potential application of AXs is potentially used as a new method of treating gastric cancers.

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