

Research Study of Nutritional and Healthy Functional Components of Vegetables and Fermented Traditional Foods of Mongolia and Japan

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Research Study of Nutritional and Healthy Functional Components of Vegetables and Fermented Traditional Foods of Mongolia and Japan

Dolgorsuren Bayarsaikhan

UNU-Kirin Fellow from Mongolia

Food Function Laboratory

The functional foods and supplements for human health are studied and developed using traditional food and ancient foods. Sometimes traditional foods are very important as source of function food, because there are many no-identified compounds in the foods. It is possible that Mongolian traditional foods also may have new functions for human health. Traditional Mongolian milk products can be classified as non-fermented and fermented milk products. Fermented milk products can be further sub-divided into products of lactic acid fermentation (Tarag, Khoormog, Byaslag, and Eezgiii) and products of lactic acid fermentation combined with alcoholic fermentation (Airag, Undaa, Arkhi, Aarts and Aaruul). We have focused on the 3 food functions, which were typical health functions and very important for human health. Therefore, angiotensin-converting enzyme (ACE) inhibitory activity, α -glucosidase inhibitory activity, and anti-oxidant activity of traditional daily products in Mongolian country area were assayed in this report. Furthermore these traditional daily products and vegetables were performed overall evaluation of food function for some human health points. Mongolia milk products were crushed and extracted with distilled water. The extracted samples were used for assays of anti-oxidant activity, α -glucosidase inhibitory activity, and ACE inhibitory activity. For identification of compound having ACE inhibitory activity in Mongolian dairy products, ultrafiltration and reverse-phase HPLC fractionation were performed. The relatively high active fraction was used as sample of mass spectrometry analysis. About ACE inhibitory activity of various traditional milk products, 12 Aaruul samples, 3 Eezgii, and 2 Byalag were used for ACE inhibitory activity. Highest group was Aaruul (mare), and Aaruul (cow) was almost same value. It seems that the difference is depend on fermentation process. So we tried to purify the active components in Aaruul (mare). Most active sample was selected from Aaruul (cow and mare) and also Eezgii (cow) group. And ultrafiltration and RP-HPLC were performed. At the HPLC, 8 peaks of inhibitory activity were detected in the chromatography fraction. One of the active fractions was selected and analyzed as active material for mass spectrometry. From result of electrospray ionization fourier transform ion cyclotron resonance mass spectrometry, 2 peaks of the sample were detected. In according to the molecular weight and another data, the 362.05 peak may be almost guanosine 5'-monophosphate (5'GMP), and 346.06 peak may be adenosine 5'-monophosphate (5'AMP). ACE inhibitory activity of 5'-monophosphate of various nucleotides was measured. It became clear that 5'GMP was weak inhibitor of ACE and Mongolian milk products contained the 5'GMP from these results. Generally mare milk is more condensed than other milk, cow, yak and sheep. And when Mongolian milk products were made, it needs to ferment for long time. These are the reason that the mare milk product has more active components than other daily products. This is the first report that 5'GMP is weak inhibitor of ACE. We used 10 kinds of milk products and vegetables for α -glucosidase inhibitory activity. Aaruul (camel and yak) and Camembert had no inhibitory activity of the α -glucosidase. On the other hand, intensity of sea buckhorn, which is a kind of goumi, was 0.343, and value of beetroot was height one 0.823 in used samples. It is known that there are large amount of sugar in beetroot. Therefore glucosidase activity may be interfered by the sugar. Anti-oxidant activity of Mongolian milk products and Mongolian vegetables was measured by lag-time method. Milk products including of Japanese products have almost same values (6.5 – 13.4 μ M Trolox eq.). However the vegetable was more active, especially beetroot had highest activity. It suggested that the high anti-oxidant activity of beetroot is derived from the vitamin C and betaine. We tried to overall estimation for health functions of Mongolian local milk products and local vegetable and fruit. It suppose that the overall estimation of functional food is one useful selection method and first trial in order to select effective foods for human health.