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### Functional and nutritional properties of buckwheat, quinoa and adlay, as pseudo-cereals improve life-style related diseases

Along with worldwide progress in milling and polishing apparatus, and the technology advances allow for most kind of stable foods, such as wheat or rice, to be refined by removing the germ, seed coat and aleurone layers. Consequently, these foods lose important nutrient ingredients and many people who eat these foods suffer from related illness. Especially, many people are suffering from allergenic problems world widely, especially for advanced and developing countries. For the case of Japanese, about 30% of population is allergy and 10% of the patients were food allergy. Germination is the start of life activity for grains, forming various low molecular bioactive and functional materials, and recent focus has been on germination of cereal grains. In the present research, pseudo-cereals such as buckwheat, quinoa and adlay were used for healthy ingredients. Buckwheat grain was fractionated into 17 by graded milling methods: Inner layer contained mostly starch and lower amount of allergenic protein, and outer layer contained large amount of GABA, rutin and large amount of amino acids. Germinated buckwheat also contained various functional materials and these germinated buckwheats were used for Japanese traditional foods: soba natto and soba miso paste processing, and the grains distinctly increased the amounts of GABA; natto (3.3-times) and miso (1.7-times) paste after 60 days' fermentation. Regarding to immunoblotting using human IgE bound albumin and globulin proteins bands, the amount of proteins in soba natto decreased after fermentation for 36h. Also, IgE binding allergenic protein bands in soba miso paste became weak. Quinoa and amaranth were recommended by NASA as a potential 'new' crop for NASA's Controlled Ecological Life Support System. Quinoa and amaranth seeds were germinated by soaking in water around 30°C. Dehulled groats of buckwheat were also germinated, and these grains were tested for the nutritional, functional properties and/or immunological protein fractions. Adlay has been a focus of attention as a gluten-free ingredient from the increase in allergic patient. So, this flour was used for test baking. According to the amount of adlay flour, the loaf volume decreased, while the hardness of bread increased accordingly. Addition of adlay flour significantly increased in lipid content. As a result, an amount of adlay flour could be used to substitute wheat flour to produce a new functional food with economical and health benefits.

### Biography

Naofumi Morita is currently a member of the (Trustee of) Toyo College of Food Technology after his retirement at Osaka Prefecture University. He is a former President of the Japanese Society for Cereal Scientists, and now he is the Vice President of the Bread Society of Japan. His specializations are in Cereal Chemistry and Food Processing. Furthermore, he is the Vice Chief Director of NPO for Patentability-based Practical Application of Wheat & Barley. He is now interested in developing barley flour substituted bread in Japan, because barley flour contains enough amounts of dietary fiber and beta-glucan for our health benefit.

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