J Nutr Food Sci 2016, 6:4 (Suppl)
http://dx.doi.org/10.4172/2155-9600.C1.024

Changes in blood coenzyme Q_{10} levels by food intervention and intake of CoQ_{10}-fortified rice

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A non-essential nutrient, coenzyme Q10 (CoQ_{10}) is a key element in mitochondrial energy production and antioxidant protection. Daily intake of CoQ_{10} is not considered in nutritional guidance or menu planning. Hospitalized older people have lower blood levels of CoQ_{10} with possible decreased intake of CoQ_{10} compared with healthy older people, suggesting that adequate intake of CoQ_{10} maintains wellness in older people. First we estimated daily intake of CoQ10 from food, designed a food intake guide for ingestion of increased amounts of CoQ_{10} with balanced food choice and evaluated the usability in a diet intervention trial. Average daily intake of CoQ_{10} from food was 1.9 mg/$_{10}$00 kcal/day in both men and women. Ratio of dietary animal to vegetable protein was involved in the amount of CoQ_{10} intake. Our food intervention was effective in increasing CoQ_{10} intake at up to 1 mg/day while maintaining PFC balance. However, choice of food items was sometimes a burden to the participants. Next, we investigated the effect of food choice and efficacy of CoQ_{10}-fortified food on blood CoQ_{10} levels. Two weeks prohibition of meat/poultry consumption decreased blood CoQ_{10} levels by ~0.1 μg/mL. Eating 300 g/day of CoQ_{10}-fortified boiled rice (13 mg CoQ_{10}/$_{10}$0 g rice) could increase both intake and blood levels of CoQ_{10}. Our results indicate that the choice of a CoQ_{10}-fortified food may be more applicative for keeping/raising blood CoQ_{10} levels than food intervention. Further study of the effect of CoQ_{10}-fortified food intake on maintaining/improving the quality of life of the older people should be pursued.

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Anti-inflammatory activity of rice bran protein hydrolysates

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Rice bran contains many health beneficial compounds, for example, protein, phytosterols, oryzanol, tocopherol, tocotrienol and fiber. Protein content in rice bran is 10-16%. In this study, we extracted crude protein from rice bran (CRBP) variety Khao Dawk Mali 105. Four fractions of rice bran protein were fractionated using different solvents; water, NaCl, ethanol and NaOH to obtain albumin (Alb), globulin (Glb), prolamin (Pro) and glutelin (Gln) fractions, respectively. All five samples were subjected to protease hydrolysis; pepsin or protease M. Degree of hydrolysis, total phenolic content, antioxidative activity were investigated throughout the incubation time. The degree of hydrolysis was increased sharply within 0.5 hour of incubation in both enzymes. Similar observation was seen in total phenolic content and antioxidative activity. Because LPS stimulated THP-1 macrophage was used to determine anti-inflammatory activity, it is necessary to assure that there is no LPS contamination in samples. High contamination of LPS was found in all protease M digested samples; therefore, these samples could not be investigated for their anti-inflammatory activity. The results showed that protein hydrolysates from both enzymes exhibited higher antioxidative activity than undigested samples. Among five samples, CRBP and Alb showed the highest antioxidative activity. Pepsin digested CRBP and Alb exhibited anti-inflammatory activity measured by reduction of pro-inflammatory cytokine, IL-1β and TNF-α and induction of anti-inflammatory cytokine, IL-10. Therefore, rice bran protein hydrolysate has a potential to be used as anti-inflammatory food compound.

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