EVALUATION OF OXALATE CHELATING PROPERTIES OF SELECTED EGG WHITE PROTEINS AND THEIR HYDROLYSATES

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ABSTRACT

Ovalbumin, ovotransferrin, ovomucin are considered as the major egg white proteins which highly available in the egg white with remarkable functional properties such as anti-bacterial, anti-viral, metal chelating etc. Oxalate also a negative ion and anti-nutritive agent which provides precursor ions to form calcium oxalate kidney stones. According to the present studies, restriction of oxalate rich food is the main prevention factor. Very few studies have been investigated to scavenge the oxalate in the diet. Incorporating egg white proteins to scavenge oxalate will be beneficial, because egg white proteins are well known as natural proteins with many functional properties. Aim of the study was to evaluate the oxalate chelating properties of major egg white proteins: ovalbumin, ovotransferrin (Apo & Halo) and ovomucin. Oxalate (200 mg) were dissolved in 10 ml of distilled water and 0.4 g of native form of proteins were added using triplicates separately as well as 0.2 mg of proteins were used to prepare the hydrolysates. The samples were incubated at 4 °C for 24 hours. After centrifuging, supernatants were measured and directed to the HPLC analysis which has been carried out on RP18 column using the mobile phase of methanol: water (50: 50 v v^{-1}) with the flow rate of 1 ml min^{-1} and detection wavelength was 237 nm at 1.35 ± 0.5 min retention time. Among the four native form of proteins ($P < 0.05$), ovalbumin was reported the highest chelating of oxalate (321.07±6.58 mg) and lowest value was shown in apo-ovotransferrin (126.43±4.2 mg). Ovomucin also showed the high chelation of oxalate (236.69±10.59 mg) which less than to ovalbumin. There was a significant difference among the ovalbumin and ovomucin. Whereas the holo-ovotransferrin was shown the oxalate releasing activity. Ovalbumin and ovomucin were shown very good oxalate chelating activity, compare to the apo-ovotransferrin. When considering hydrolyzed form of the proteins ovomucin showed good oxalate chelation (286.02±17.8 mg) than its' native form (236.69±10.59

mg) but did not show any significant different between treatments. And there were no significant different between hydrolyzed form of apo ovotransferrin (154.92±64 mg), hydrolyzed form of ovalbumin which treated with 1% pepsin treatment (151.1±3.25 mg) and the hydrolyzed form of ovomucin (286.02±17.8 mg). Lowest chelation of oxalate (91.98±11.8 mg) reported in hydrolyzed form of ovalbumin which has treated with 1% protease and 1% trypsin. There were utmost significant different between the hydrolyzed form of the ovomucin and the ovalbumin which has treated with 1% protease and 1% trypsin. Ovalbumin and ovomucin consist of good oxalate chelating activity than rest of the proteins (native and hydrolysates). Therefore, there is a potential to develop nutraceuticals to scavenge oxalate with oxalate chelating properties of these proteins.