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IN VITRO ANTIOXIDANT EFFECT OF SESAME OIL SEED ON THE PROTECTION OF PROTEINS FROM CARBONYLATION AND DESIALYLATION IN HUMAN BLOOD SERUM

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Abstract

Free radicals generated as a result of oxidative stress can cause protein oxidation. Protein damage can be assessed by determining the amount of carbonylation and desialylation of proteins. Meanwhile sesame oil has a good antioxidant effect in protecting proteins. Thus in this preliminary *in vit*ro study, the influence of hydrogen peroxide (H_2O_2) and hydroxyl (OH) radicals on the sialic acid bound to proteins and protein carbonylation was investigated. Also antioxidant effect of sesame oil in preventing protein oxidation and protein desialylation was investigated.

Initially, H_2O_2 was added to the human serum, respectively OH (Experiment 1 and 3) as well as sesame oil (Experiment 2 and 4) and then the serum was incubated on 4 ^{0}C for four hours, in which case the serum proteins reacted with these radicals but also with sesame oil. After incubation, oxidative damage was measured before and after the addition of sesame oil to the medium respectively, the amount of sialic acid (SA) bound to proteins as well as the amount of protein carbonylation as a marker of oxidative damage to proteins was determined. SA levels were determined by combined modification of the tiobarbituricacid method by Skozo-Mohos and dimethyl sulfoxide method by Aminoff, namely Tram method. Protein carbonyl group was determined by 2,4-dinitrophenyl hydrazine (DNPH) method by Levine. The statistical processing of the results was done with ANOVA Tuckey Test.

The addition of H_2O_2 respectively OH in serum, has caused a desialylation of proteins and also an increase in the amount of carbonylated proteins. Sesame seed oil has shown its antioxidant activity related to the sialic acid level (Experiment 2 and 4), and its amount in experimental groups is approximately as the untreated human serum with H_2O_2 and hydroxyl radical that served as a control group. In contrast, this is not the case with protein carbonylation, as sesame seed oil has failed to protect proteins from oxidation caused by hydrogen peroxide and hydroxyl radicals.

Consequently, it can be concluded that oxidative stress has caused a decrease in the amount of sialic acid bounded to proteins, as well as increase in carbonylation of proteins, while sesame oil with its antioxidant properties has affected the maintenance of sialic acid values, but has not achieved also in protecting proteins from carbonylation.

***Key words**: Sesame oil, Radical, Sialic acid, Antioxidant, Protein oxidation.*