

Antioxidant Effects of Solusulfonum and α -Tocopherol

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The effects of α -tocopherol and solusulfonum on LPO and plasma antioxidant activity were compared in Wistar rats. The data attest to a pronounced antioxidant effect and synergy of these preparations.

Key Words: *antioxidant activity; LPO, solusulfonum; α -tocopherol*

Stability of total antioxidant activity (AOA) in tissues, its peculiarity in each organ, and the intensity of free radical oxidation (FRO) are the basic indices of homeostasis [3]. Changes of these indices are essential for the pathogenesis of some diseases [4]. Since application of antioxidants as nonspecific therapeutic agents modulates the interaction between the antioxidant mechanisms and FRO processes, the specificity of the action of natural and synthetic antioxidants needs to be studied.

Numerous works of the last decades established the key role of biological antioxidants in protective and adaptive reactions of the organism, which can be explained by their capacity to regulate the state of cell membranes [1-4]. A particular role in this regulation is played by α -tocopherol, which participates in maintaining FRO at a physiological level. According to the antioxidant theory, α -tocopherol acts as a biological antioxidant by inactivating free radicals thereby preventing the development of nonenzymatic free radical peroxidation of unsaturated lipids in tissues with molecular oxygen [7].

Some antibacterial preparations, in particular sulfones, used as antileptic drugs possess antioxidant properties and can affect LPO [6]. They are also used in the treatment of other infectious diseases and are the drugs of choice in the treatment of herpetiform (Duhring's) dermatitis. However, it is not clear whether the therapeutic effect of sulfones depends on their antioxidant properties. Our aim was to compare the

antioxidant effects of solusulfonum and α -tocopherol under the normal physiological conditions.

MATERIALS AND METHODS

The study was carried out on male Wistar rats weighing 200 g. The intensity of AOA and the content of malonic dialdehyde (MDA) were determined in rats treated with α -tocopherol (10% oil solution, 20 mg/kg) and solusulfonum (25 and 125 mg/kg). The rats were divided into five groups (7 rats per group). Group 1 was control. Group 2 rats received α -tocopherol in a dose of 20 mg/kg, groups 3 and 4 rats received solusulfonum in doses of 25 and 125 mg/kg, respectively, and group 5 rats received solusulfonum (125 mg/kg) and α -tocopherol (20 mg/kg). Water solution of solusulfonum was injected intramuscularly 2 times a week, while α -tocopherol was given perorally according to the same scheme. After 3 weeks the rats were decapitated, and the blood was collected. Plasma AOA activity was measured in a model system of yolk lipoprotein oxidation [5] by the concentrations of TBA-active agents using Biokont TBK kits. The data were statistically analyzed using Student's *t* test.

RESULTS

There was a clear-cut inverse dependence between the mean intergroup AOA values and plasma MDA concentrations: AOA increase was accompanied by decrease in MDA concentration (Table 1). Both α -tocopherol and solusulfonum demonstrated antioxidant

effect. α -Tocopherol significantly increased AOA ($p<0.05$) and decreased MDA concentration ($p<0.01$). Solusulfonum produced similar effects on AOA and MDA concentration. It is noteworthy that the effects of both doses of this preparation were virtually identical. Combined administration of solusulfonum and α -tocopherol significantly increased AOA and decreased MDA concentration in comparison with the groups treated with solusulfonum and α -tocopherol separately ($p<0.05$). Therefore, administration of solusulfonum to rats in the given doses according to the described scheme induces a pronounced antioxidant effect: plasma AOA increases and MDA level decreases. This effect is comparable with that produced by α -tocopherol and virtually identical for both solusulfonum doses, which attests to the lack of dose-dependent effect in this concentration range. The combined administration of solusulfonum and α -tocopherol produced a synergic effect, which is characterized by an additional increase in AOA and decrease in MDA concentration in the plasma in comparison with that produced by individual preparations. This mutual potentiation probably attests to different mechanisms of the antioxidant effect of these drugs.

TABLE 1. Effects of Solusulfonum and α -Tocopherol on AOA and MDA ($M\pm m$)

Group	MDA, $\mu\text{mol/liter plasma}$	AOA, %
Group 1 (control)	5.20 ± 0.28	22.30 ± 3.73
Group 2	$4.05\pm 0.20^{**}$	$42.54\pm 6.22^*$
Group 3	$3.94\pm 0.12^{**}$	$39.43\pm 2.74^{**}$
Group 4	$3.97\pm 0.21^{**}$	$39.51\pm 4.27^*$
Group 5	$2.88\pm 0.11^{***}$	$61.30\pm 6.25^{***}$

Note. * $p<0.05$, ** $p<0.01$, and *** $p<0.001$ compared with the control.

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