

## SEPARATED AND COMBINED EFFECTS OF MICROWAVE AND ELECTRON BEAM ON HUMAN BLOOD PROTEINS

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The effects of separated and combined microwave (MW) of 2.45GHz and accelerated electron beam (EB) of 6.23 MeV irradiation on proteins in samples of human serum, human plasma and human whole blood are presented. Also, it was studied the effect of separate and combined EB and MW irradiation on proteins irradiated in samples of human whole blood, without and in the presence of a synthetic compound (S.C.) which is expected to exhibit various biological actions, such as to diminish or to increase the irradiation effects. S.C. addition to whole blood diminishes or increases for certain EB dose ranges the EB effects on different blood components. The biggest differences between the protein fraction values for irradiated blood without S.C. and irradiated blood with S.C. were observed for alpha 2 (19.7% increasing on average in the range of 1-40 Gy), beta 2 (13% decreasing on average in the range of 20-40 Gy) and gamma-globulin (19.3% decreasing on average in the range of 30-40 Gy). Also, S.C. presence in the irradiated integral blood samples increases or decreases the enzymatic activity of certain proteins such as AST (aspartate aminotransferase) and GGT (gamma-glutamyl transferase). AST increases by 32.5% and GGT decreases by 25% on average in the range of 1-40 Gy. One of the most affected proteins is LDH (lactate dehydrogenase) by both, EB and MW. The simultaneous EB and MW irradiation with low doses (1-4 Gy for EB and several watts during 1-2 s for MW) produced the biggest effect on LHD which increase, for example, by a factor of 1.65 for a health donor (Fig. 1) and by a factor of 1.41 for a donor with cancerous skin tumour (Fig. 2).

