

REVIEW

BIOSYNTHESIS AND BIOLOGICAL PROPERTIES OF COMPOUNDS CONTAINING HIGHLY REACTIVE, REDUCED SULFANE SULFUR

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The covalent modifications of sulfhydryl groups (–SH) may occur through oxidation to mixed disulfides (S-thiolation), S-nitrosylation, as well as persulfide and trisulfide formation. The latter possibilities of –SH group modification connected with compounds containing sulfur called sulfane sulfur are described in this paper. Sulfane sulfur compounds contain a labile, highly reactive sulfur atom at a reduced oxidation state with a valence of 0 or –1, covalently bound to another sulfur atom. These compounds include persulfides, polysulfides, polythionates, thiosulfate, elemental sulfur and disulfides, which enable tautomerization to thiosulfoxides. Sulfane sulfur compounds are formed in the anaerobic cysteine sulfur metabolism with the participation of such enzymes as cystathionase (CST), 3-mercaptopyruvate sulfurtransferase (MpST) and rhodanese (thiosulfate: cyanide sulfurtransferase). Compounds containing sulfane sulfur participate in cell regulation processes through activation or inactivation of some enzymes. Other important roles of sulfane sulfur compounds are their antioxidative properties, significance in the processes of carcinogenesis, participation in the tRNA sulfuration as well as an influence on the activity of immune cells. To recognize completely the biological role of compounds with sulfane sulfur it is necessary to have sensitive methods of quantitative determination, so a review of these methods is presented in this paper. Moreover, biosynthetic pathways and biological properties of these compounds have been discussed.

Key words: *sulfane sulfur, persulfides, polysulfides, polythionates, thio-sulfoxides*

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