MIS(II) IONINING, SULFOMETAKSAZOL BILAN KOMPLEKS BIRIKMASI SINTEZI

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Annotatsiya: *Ushbu ishda sulfometaksazolning Cu(II) tuzlari bilan, kompleks birikmalarini sintez qilish usullari o‘rganilib chiqildi va ularning tuzilishi fizik-kimyoviy tadqiqot usullari yordamida o‘rganildi.*

Kalit so‘zlari: *Sulfometaksazol (SMX), Cu(II)xlorid, koordinatsiya birikmalari, sintez, analiz, element analiz.*

СИНТЕЗ КОМПЛЕКСНОГО СОЕДИНЕНИЯ ИОНА МЕДИ (II) С СУЛЬФАМЕТОКСАЗОЛОМ

Аннотация: *В данной статье исследованы методы синтеза координационных соединений сульфаметоксазола с солями меди (II), а также изучена их структура с использованием физико-химических методов анализа.*

Ключевые слова: *Сульфаметоксазол (SMX), хлорид меди (II), Координационные соединения, синтез, анализ, элементный анализ.*

SYNTHESIS OF THE COORDINATION COMPLEX OF COPPER (II) ION WITH SULFAMETHOXAZOLE

Abstract: *In this study, the synthesis methods of coordination complexes of sulfamethoxazole with Cu(II) salts were investigated, and their structures were examined using physicochemical analysis techniques.*

Key words: *Sulfamethoxazole (SMX), Cu(II) chloride, coordination compounds, synthesis, analysis, elemental analysis.*

In this study, information is provided on the synthesis of coordination compounds of copper, a 3d transition metal, with a bioactive ligand (SMX), which represents one of the new directions in the chemistry of coordination compounds, as well as their analysis using physicochemical methods. Sulfamethoxazole (4-amino-N-(5-methyl-1,2-oxazol-3-yl)benzenesulfonamide) is a broad-spectrum antibacterial agent belonging to the sulfonamide group and exhibits effective activity against a wide range of microorganisms. Sulfonamide derivatives are widely used in modern pharmaceuticals, biochemistry, and medicine.

In recent years, there has been growing interest in studying these organic compounds through the synthesis of their complexes with various 3d metal ions and investigating their novel properties. The main objective of the research is to synthesize complex compounds of sulfamethoxazole with copper(II) salts and to study their structures using physicochemical analytical methods.

Research Methodology. Initially, the necessary reagents and laboratory glassware for the synthesis were prepared. These included $CuCl_2$

●$2H_2O$, $C_{10}H_{11}N_3O_3S$ (sulfamethoxazole), ethanol or dimethylformamide (DMF), NaOH, distilled water, and chemical vessels. The synthesis of the complex compound with the composition $[Cu(SMX)_2]Cl_2$ was carried out as follows [1,2]: To form the complex, 0.002 mol of sulfamethoxazole (as the ligand) was dissolved in 20 mL of ethanol (or DMF) in a separate container. The solution was stirred using a magnetic stirrer until fully dissolved to obtain a saturated solution. In the next step, 0.001 mol of $CuCl_2$

●$2H_2O$ was measured and dissolved in 20 mL of distilled water. The two solutions were then combined dropwise while gently heating at 40–50°C. The pH of the reaction mixture was maintained around 6.5–7. The mixture was stirred continuously for 2–3 hours to allow the reaction to proceed. The resulting precipitate was cooled, filtered, and washed with a water–ethanol mixture. The solid product was dried in a desiccator for 3 days and stored for further analysis [3]. The reaction equation can be represented as follows:

$CuCl_2 \cdot 2H_2O + 2SMX \rightarrow [Cu(SMX)_2]Cl_2 + 2H_2O$

The elemental composition of the synthesized coordination compound $[Cu(SMX)_2]Cl_2$ was analyzed [4].

Table 1

Elemental Analysis Results of the Coordination Compound $[Cu(SMX)_2]Cl_2$

Formula of the coordination compound	Chemical elements	Theoretical (%)	Experimental (%)
$[Cu(SMX)_2]Cl_2$ Brutto formulasi: $C_{20}H_{22}Cl_2CuN_6O_6S_2$ M=641,03 g/mol	C	37,47	37,03
	H	3,46	3,024
	Cl	11,06	10,6
	Cu	9,91	9,46
	N	13,11	12,64
	O	14,98	14,55
	S	10,01	9,63

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