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THE SYNTHESIS OF (N-METYLOL-(1-CARBOXIFERROTSENIL) CARBOXAMIDE)

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ABSTRACT

The present article deals with the importance and use of ferrocene and some of its derivatives, the possibility of urea derivatives as a fertilizer and biostimulator in agriculture, and informs that the synthesis (N-methylol- (1`-carboxyferrocenyl) carboxamide), its physicochemical analyses, the structure of these derivatives have been studied using IQ-spectrometry, mass spectrometry methods.

KEYWORDS: *Ferrocene, Ferrocencarboxylic Acid, Monomethylo-Mochevina, Ferrocerone, IQ-Spectrometry, Mass Spectrometry.*

INTRODUCTION

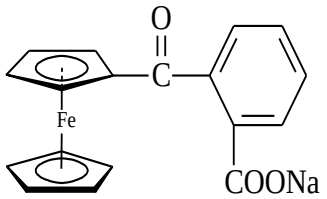
THE ANALYSIS OF THE REFERENCES

Ferrocene can be called a catalyst for organic compounds and biomolecules. Since the discovery of ferrocene in 1951, many compounds with biological activity based on ferrocene have been synthesized.

A large number of ferrocene derivatives containing ferrocenylbenzoic acids and ferrocenylphenols were synthesized. Some of these compounds have been shown to be used in medicine. The main reason why ferrocene derivatives exhibit such positive properties can be explained by the fact that its structural structure is close to that of the gem, which is the most active compound in the cell of living organisms. Today, new opportunities are opening up for the application of ferrocene products in various fields. New substances with specific molecular and crystal structure are being synthesized on the basis of ferrocene derivatives.

Scientists of the Department of Chemistry of Andijan State University have synthesized many biostimulants based on ferrocene and its derivatives in the Scientific Laboratory of Commodity Chemistry and are working on their practical application. improvement of methods for obtaining acetylferrocene and ferrocencarboxylic acids, derivatives of ferrocene, synthesis of ferrocencarbonic acid based on the synthesis of some biologically active derivatives and their chemical composition, as well as ferrocene methylolocic urea, dimethyl urea ,including the synthesis of methylened urea, thiourea, methylolthiourea and the study of their stimulatory properties and their implementation in practice.

For example, the sodium salt of p-ferrocenylphenol has been shown to be useful in the treatment of anemia, while the sodium salt of o-carboxybenzoilferrocene has been introduced into the treatment of anemia under the name Ferrocerone. Water-soluble derivatives of p-ferrocenylphenol, o-carboxyferrocene, and 1- (p-oxyphenylferrocencarboxylic acids have now been synthesized and their biological activity studied.

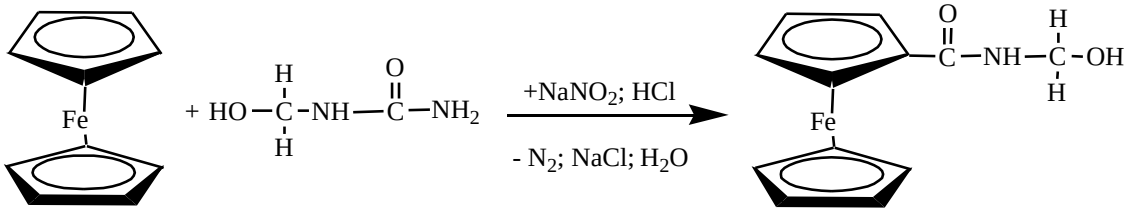


sodium salt of p-ferrocenylphenol	o-carboxy-benzoylferrocenene sodium salt	Salts of 1`- (p-oxyphenyl) ferrocencarboxylic acid

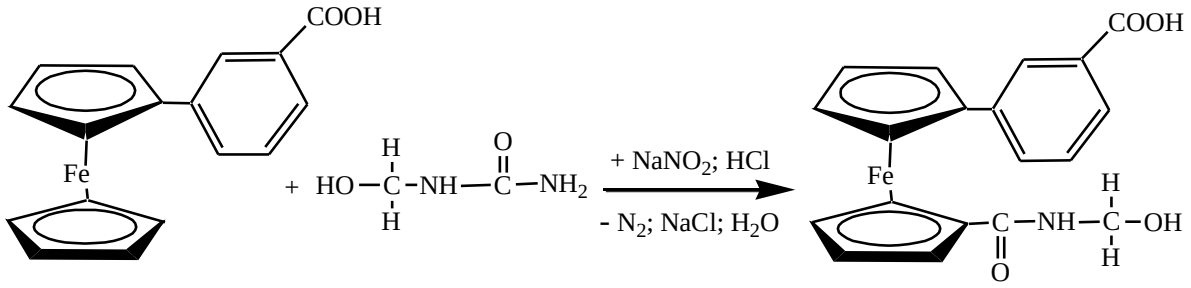
Interest in ferrocencarboxylic acids has grown significantly since the discovery of important properties. In the treatment of various diseases, diseases that can be caused by metabolic disorders, its water-soluble derivatives have been shown to be effective in increasing the yield of agricultural crops.

Under the guidance of Professor I.R.

Interaction of ferrocene with monomethylol urea results in the synthesis of N-methyloxy-ferrocenylamide.



1 '- (3-carboxyphenyl) 1-N-methyloxyferrocenolamide was synthesized as a result of the reaction of m-ferrocenyl benzoic acid with monomethylol urea.



The biostimulatory properties of these substances were determined based on the results of laboratory and field tests, and positive results were obtained.

Based on the above considerations, we continued our research on the production of new biologically active compounds of ferrocene and carried out the reaction of ferrocencarboxylic acid with monomethyl urea. The reaction was performed by diazotization.

The individuality of the reaction product was checked by thin-layer chromatography. The structure of the synthesized (N-methylol- (1`-carboxyferrocenyl) carboxamide) was studied using IR spectra. Absorption lines in the 1158 and 1029 cm-1 regions of the IR spectrum belong to the heteroannular dialmashed ferrocenyl group, while absorption lines in the 914 cm-1 region belong to the ferrocene the presence of an exchange pentadiene ring in the residue, the absorption line at 935 cm-1 indicates the presence of deformation oscillating OH-, and 1281 cm-1 in the area of valence oscillating -NH- groups [8].The biostimulatory properties of these substances were determined based on the results of laboratory and field tests, and positive results were obtained.

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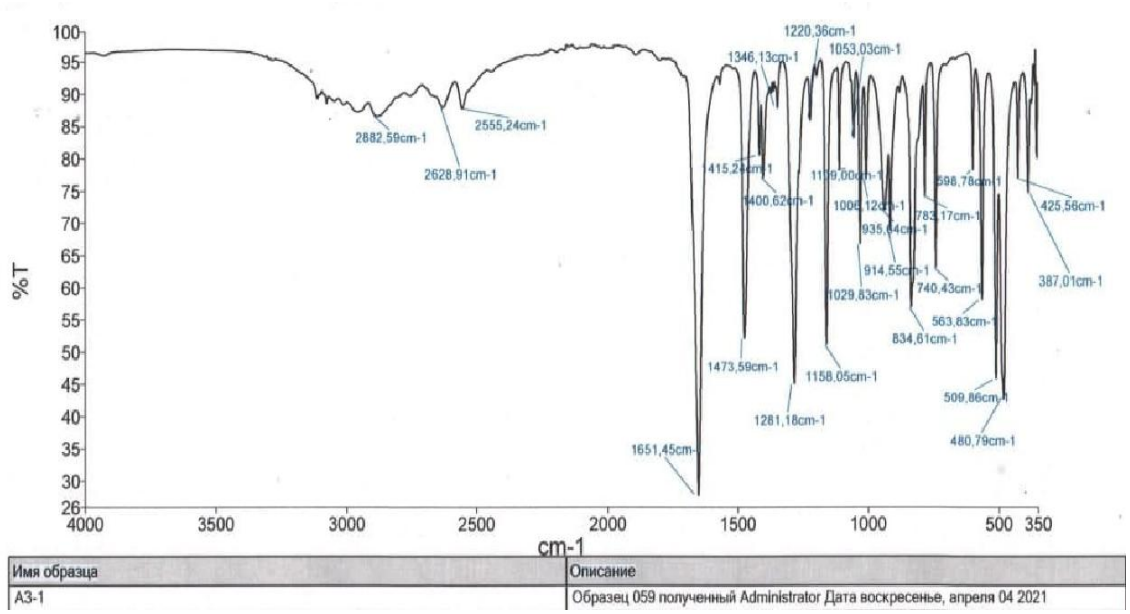
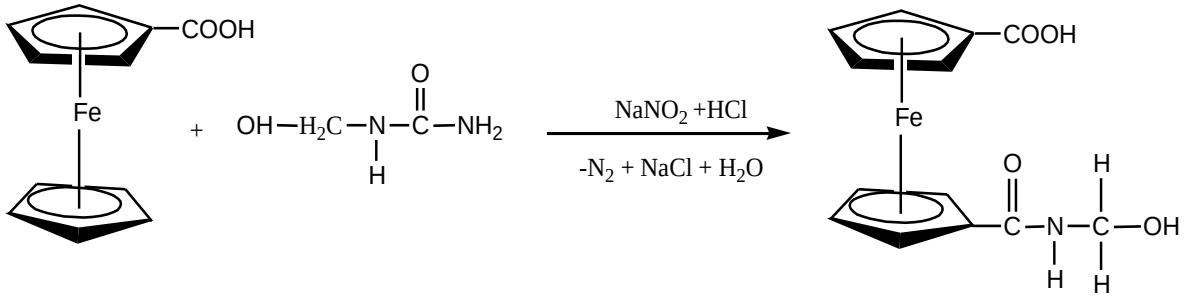


Figure 1. IR spectrum of (N-methylol - (1`-carboxyferrocenyl) carboxamide).

According to the results, the reaction follows the following scheme:



The obtained IR-spectral data are confirmed by the results of mass spectrometry analysis. The structure of the ions formed in the mass spectrum (Figure 2) and their m / z values are given in Table 1 below.

TABLE 1 MASS SPECTROMETRIC VALUES OF (N-METHYLOL - (1`-CARBOXYFERROCENYL) CARBOXAMIDE)

№	Formula	m/z	Relative intensity%
1	$(C_5H_4)_2FcCO + H^+$	213	100%
2	$2(C_5H_4)_2FcCONH+ H^+$	453	47%
3	$(C_5H_5)_2Fc^+OH +H^+$	204	42%
4	$2(C_5H_4)_2FcCONHCH_2OHCOOH+H^+$	601	30%
5	$(C_5H_5)_2Fc+ H^+$	185	25%

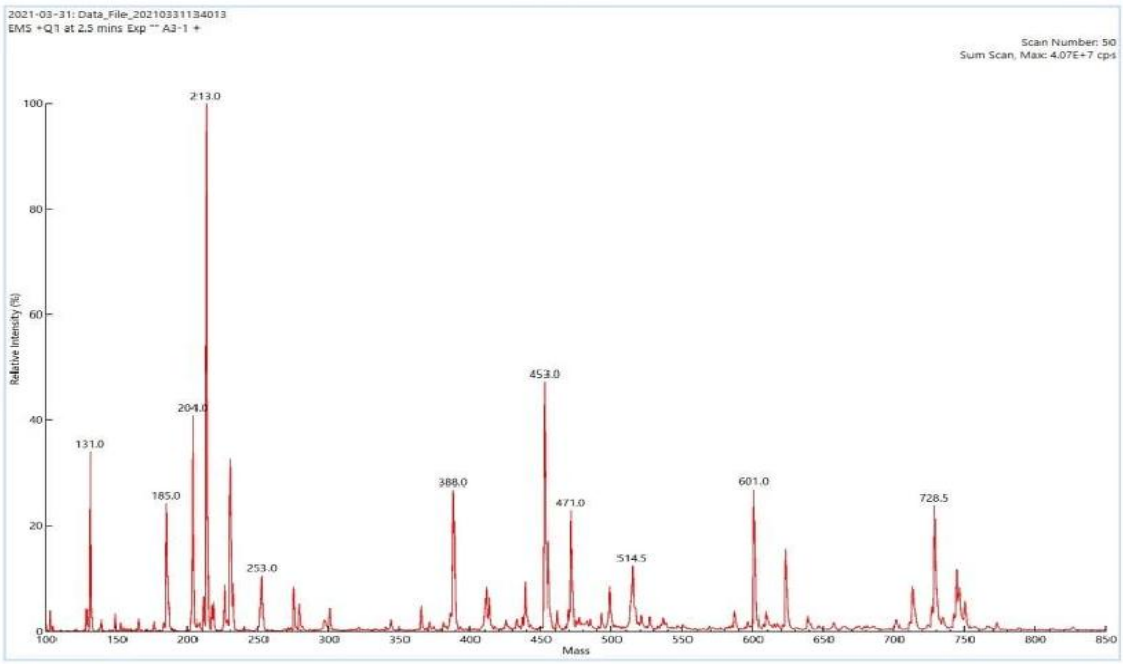


Figure 2. Mass spectrum of (N-methylol - (1`-carboxyferrocenyl) carboxamide).

EXPERIMENTAL SECTION

In a three-mouthed round-bottomed flask with a volume of 500 ml cooled to -50C, equipped with an autocomplete, dropper funnel and thermometer, 0.09 g of monomethylol urea 15 ml of distilled water, 15 g of ice, 1 ml of concentrated hydrochloric acid. A 10 ml aqueous solution of 0.05 g of sodium nitrite was added dropwise for 20 min, stirring to form a solution. At the end of diazotization, 0.02 g of urea dissolved in 2 ml of water and 0.04 g of sodium acetate dissolved in 4 ml of water were added to the reaction mixture to decompose the excess HNO2. Temperature and pH constant were observed during diazotization. The diazotization process was performed at -50S at pH = 1. The ice bath was then replaced with a water bath and a drip funnel with a return cooler. 0.23 g of ferrosencarbonic acid dissolved in 50 ml of diethyl ether was added to the reaction mixture.

The reaction mixture was heated in a water bath while stirring at 34-350C for 3-4 hours. When the reaction was complete, the mixture was poured into a separation funnel and the aqueous part was separated from the ether part. The aqueous portion was washed 3 times with diethyl ether. The ethereal part was separated and washed 3 times with water. Ether layers were added and treated with 3% sodium hydroxide solution. The alkaline part was neutralized with a 5% hydrochloric acid solution. The precipitated yellow substance was filtered and dried at room temperature.

The yield of the reaction is 60% of the theory. The resulting yellow substance is well soluble in organic solvents, sparingly in water. T.s. = 197oC. Empirical formula C13H14O4NFe.

Thus, a new (N-methylol - (1`-carboxyferrocenyl) carboxamide) containing ferrocencarboxylic acid was synthesized.

We believe that the water-soluble products of this substance can be used as a biostimulator that can have a positive impact on the growth and development of agricultural crops and serve to increase productivity.

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