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Supramolecular Based on Paracetamol Study of Complexes

[1]Ergasheva Robiya Uktamovna and [2]Choriev Azimjon Uralovich

[1]Lecturer at the Faculty of Chemistry, Karshi State University.
[2]Associate Professor of the Department of Chemistry, Karshi State University.

Annotation: *In recent years, along with the search for and introduction of drugs, the development of new forms of existing drugs, further enhancement of their effectiveness is an urgent problem from a scientific and economic point of view. The results of research in the field of chemistry and pharmaceutical sciences have led to the creation of drugs and dosage forms that are not found in nature, based on new substances.*

Keywords: paracetamol, cyclophosphamide, fluorouracil, chromatography, spectroscopy.

I. INTRODUCTION

However, synthetic drugs have been found to have many side effects. Thus, there is a growing interest in pharmaceuticals for humans [1]. Obtained using water-insoluble preparations based on partetamol and one of its compounds. Complex compounds differ from many drugs in water solubility, broad spectrum of action, low therapeutic dose and low toxicity. One of the main reasons for this is that paracetamol has unique physicochemical properties [3].

II. METHODOLOGY

In medicine there are diseases that are very rarely treatable, and very high therapeutic doses of the drugs used can be observed. One of these diseases is cancer. The main drugs used to treat it are cyclophosphamide and fluorouracil, which must be taken in large quantities during the course of treatment. This, in turn, leads to adverse effects on the kidneys and other internal organs [4].

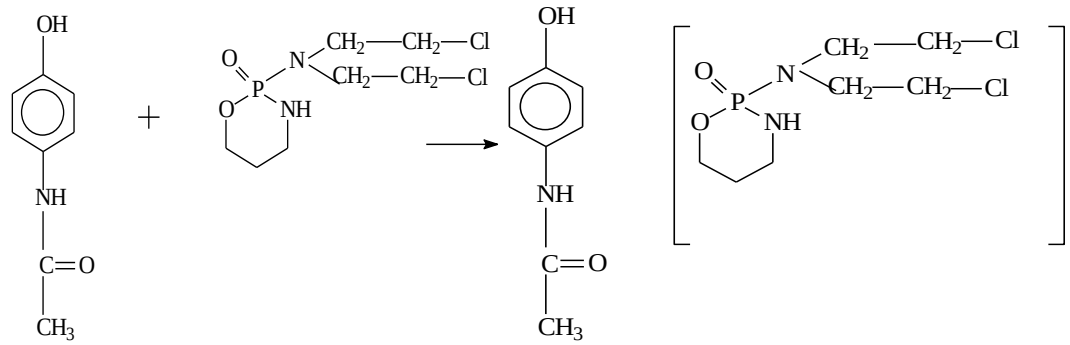
Cyclophasefamide is an alkylating cytostatic drug, chemically close to the nitrogen analogues of mustard gas. The mechanism of action is believed to be cross-linking between DNA and RNA, and inhibition of protein synthesis. The immunosuppressive effect is manifested in the suppression of the proliferation of clones of lymphocytes (mainly V-lymphocytes) involved in the immune response, with prolonged use, the development of secondary malignant tumors is possible [5-6].

III. ANALYSIS AND RESULTS

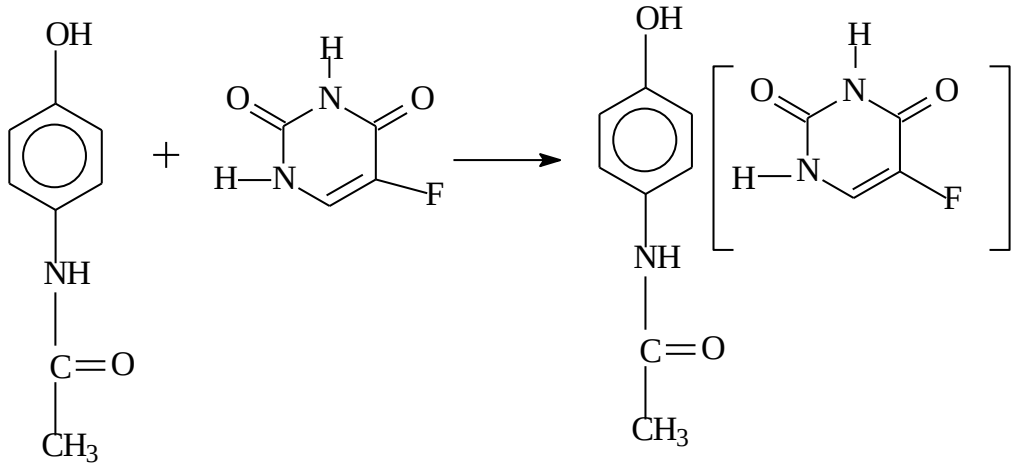
Fluorouracil is an analogue of uracil, which is part of ribonucleic acid. The drug acts as an antimetabolite. After transformation into active dioxynucleotide inside the cell, it undergoes DNA synthesis and blocks the conversion of dioxyuridylic acid to thymidylic acid by the cellular enzyme thymidylate synthetase. There is evidence that fluorouracil blocks the methylation reaction of dioxyuridylic acid to thymidylic acid during anabolic metabolism. In the same way, fluorouracil enters into the synthesis of deoxyribonucleic acid (DNA), suppressing the formation of rebonucleic acid (RNA). Since DNA and RNA are important for cell division and growth, fluorouracil acts to induce thymine deficiency, which in turn causes uneven growth and cell death. Effects on DNA and RNA have been found mainly in fast-growing cells that receive large amounts of fluorouracil. A decrease in its therapeutic dose, an increase in solubility, a decrease in toxicity and an extension of the exposure time through chemical modification of the above drug is of great practical importance for people with cancer in general [7-8].

In connection with the above, the purpose of this work is to synthesize supramolecular complex compounds of paracetamol with cyclophosphamide and fluorouracil in several different ratios and to study some of their physicochemical properties.

The reaction for the synthesis of supramolecular complex compounds was carried out according to the following scheme:



Paracetamol Cyclophosphamide



Paracetamol Fluorouracil

In this case, paracetamol has a proton-donor NH-group, a proton-acceptor

With the C = O-OH group, the group can act as a proton-donor and a proton-acceptor simultaneously. Paracetamol molecules bind in hydrogen chains with NH ... O and OH ... O.

Part of the experiment Reaction of paracetamol with cyclophosphamide In the synthesis of supramolecular complexes of paracetamol with cyclophosphamide 0.002 mol [0.522 g] cyclophosphamide and 0.002 mol [0.302 g] acetophene (paracetamol) were taken in a 1: 1 ratio in 50 ml of 50% ethyl alcohol 30-40 S0 for 8 hours in a magnetic burner. YK (thin layer) chromatography is performed every hour for observation. Silifol-UV-254 plates (KAVALER, Germany) were used for YuQX.

IV. **DISCUSSIONS**

Upon completion of the reaction, the resulting residue was lyophilized to constant weight. The resulting substance was dried in a place inaccessible to direct sunlight. A brown substance was formed in 87% yield. The liquefaction temperature of the obtained substance is 130 S0.

The reaction of paracetamol with fluorouracil

Fluorouracil was taken from 0.004 mol (0.52 g) and 0.004 mol (0.604 g) of acetophien (paracetamol) and mixed with 50 ml of 50% ethyl alcohol in a magnetic flask at 30-40S0 for 8 hours. Silifol-UV plates were used for YuQX -254 (KAVALER, Germany). The alcohol was pumped out in a rotary evaporator. The reaction yield was 90%.

When the physicochemical properties of all synthesized substances were studied, it turned out that all the resulting substances have a color from yellow to brown. Some physicochemical constants of the newly synthesized compounds are shown in the table below.

Some physicochemical constants of newly synthesized compounds:

№	**Substances**	**Mol ratio**	**Solubility**	**Liquid, 0S**	**R_f**	**color**	Reaction yield %
1	Paracetamol: cyclophosphamide	1:1	Chloroform: Methanol	130	0,9	Dark brown	87
2	Paracetamol: cyclophosphamide	2:1	Chloroform: Methanol	142	0,86	Reddish brown	75
3	Paracetamol: cyclophosphamide	4:1	Chloroform: Methanol	134-135	0,83	Brown	78
4	Paracetamol: fluorouracil	1:1	Chloroform: Methanol		0,54	Brown	90
5	Paracetamol: fluorouracil	2:1	Chloroform: Methanol		0,32	Yellow	82
6	Paracetamol: fluorouracil	4:1	Chloroform: Methanol		0,56	Red	86

System: chloroform: methanol (20: 1).

V. CONCLUSION

Thus, supramolecular complexes of paracetamol were obtained in various ratios. A 1: 1 ratio of 87% and 90% of the resulting products resulted in high yields. The structure of the synthesized substances was confirmed by UV and IR spectroscopy.

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