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QUANTITATIVE DETERMINATION OF THE PREPARATION COBALT-30 AND ITS COMPARISON OF LEUKOPOESSTIMULATING EFFECTIVENESS

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Abstract:
Under the influence a drug increase the content of Cobalt-30 stick core leukocetes. The effect of the drug was compared with lacto flora. Both drugs have the same effect, but the performance is better. Cobalt-30 is easily tolerated and has no side effects. The drug can be used in the clinic for the treatment of leukopenia state. The developed methods of mass-spectrometric determination of Cobalt-30 tablets

Keywords: Cobalt-30, mass-spectrometry, leukocetes, quantitative determination, drug

1.INTRODUCTION.

Now the pharmaceutical market of Uzbekistan is one of dynamically developing sectors of national economy, and the range of antianemic preparations are widely presented. However the analysis of price and assortment policy in the market the antianemic preparations of medicines showed the importance of taking measures to development and deployment into production of domestic substances and dosage forms, and also diversification of a domestic production, by developing assortment versions and introducing import-substituting production is necessary. It is known at the Tashkent pharmaceutical institute there has been conducted purposeful synthesis of medicinal preparations based of coordination compounds of biometals [1-9].

Actual problem of standardization and quality control of medicines based on coordination compounds is developing and introducing those methods that would most fully reflect chemical essence of a complex, namely its chemical structure, valent coordination condition of metal and identity of preparation. Cobalt-30 coordination compound of cobalt with methionine represents fine-crystalline pink color powder with a slight specific smell. The purpose of this research is developing of a technique of quantitative definition of cobalt-30 in tablets by a mass spectrometry method with inductively connected plasma. Unique opportunities of mass spectrometry allow using it for research of fundamental bases of chemistry, pharmacy and creating scientific bases of forecasting, searches and complex using new medicines for applied medicine. Detection limits for the majority of elements make less than 1·10-9 grams, and dynamic range allows defining at the same time concentration of impurity elements and main components of tests. Mass and spectrometer definition is executed by "A technique of performance of measurement of mass fractions in breeds and soils by a nuclear and absorbing method" (No. 290 MVI: 2006) with using ISP - a mass spectrometer of ELAN-6000 of Perkin Elmer firm (USA).

2.EXPERIMENTAL PART.

The quantitative determination of Cobalt-30 is carried out by a complexometric method with an indicator xylenol orange (TU 6-09-1509-78) in an acetate buffer medium according to the following procedure: 4-5 ml of 2 mol / l hydrochloric acid solution, slightly heated until dissolved, add 50 ml of water and heat to boiling. To the resulting solution, add 40-50 ml of acetate buffer mixture (pH 4-6.5), 4-5 drops of xylenol orange indicator and titrate with 0.05 mol/l Trilon B solution from a semi-micro burette until the crimson color turns yellow. 1 ml of 0.05 mol/ l Trilon B solution corresponds to 0.01777 g of Cobalt-30.

Statistical processing of the results obtained was carried out in accordance with the requirements of the State Fund XI, no. 1, p. 199 and document Uz T 51-153-2007 (Table 1).

Definition method of cobalt-30 in tablets: about 0,3 g (an exact hinge plate) pounded tablets powder of Cobalt-30 incinerated in a platinum crucible in the muffle furnace at 450-500^{0}C. The rest was processed by 10 ml of the concentrated hydrochloric acid, dry evaporated, flowed 10 ml 2 M HCl, filtered in a measured flask on 25 ml, a crucible washed out water, washing waters united with a filtrate and brought volume to a tag water. Amount of cobalt found 240,7 nanometers on the resonant line. Characteristic concentration of Cx = 0,15 mkg/ml; detection limit C = 0,01 mkg/ml

Table 1. Results of quantitative determination of Cobalt-30 in tablets

№	Weight, g	Titrant volume, ml	Found Co-30 in the sample taken, g	Average weight of 1 tablet, g	Content. Co-30 in 1 tablet, x, g	$\bar{x}$, r	$S^2 10^8$	$S_{\bar{x}} \cdot 10^4$	$\Delta_{\bar{x}} \cdot 10^3$	$\bar{E}$, %
1	2	3	4	5	6	7	8	9	10	11
0.015g tablets										
010505	1,0018 1,0000 1,0044	2,75 2,69 2,70	0,04875 0,04776 0,04797	0,3036	0,0148 0,0145 0,0144	0,0146	3,0	1,0	4,30	2,94
020505	1,0012 1,0020 1,0006	2,84 2,82 2,85	0,05046 0,05003 0,05063	0,2984	0,0153 0,0149 0,0151	0,0151	4,0	1,155	4,97	3,29
030505	1,0034 1,0027 1,0016	2,67 2,71 2,63	0,04747 0,04809 0,04673	0,3065	0,0145 0,0147 0,0143	0,0145	4,0	1,155	4,97	3,43
040505	1,0042 1,0056 1,0038	2,84 2,78 2,80	0,05043 0,04915 0,04974	0,2987	0,0150 0,0146 0,0148	0,0148	4,0	1,155	4,97	3,36
050505	1,0025 1,0007 1,0013	2,93 2,87 2,88	0,05213 0,05106 0,05109	0,3077	0,0160 0,0157 0,0156	0,0158	3,0	1,0	4,30	2,72
0.020g tablets										
060505	1,0040 1,0028 1,0034	3,44 3,48 3,49	0,06114 0,06192 0,06196	0,3498	0,0213 0,0216 0,0215	0,0215	3,0	1,0	4,30	2,0
070505	1,0025 1,0035 1,0015	3,13 3,14 3,11	0,05555 0,05584 0,05521	0,3501	0,0194 0,0195 0,0193	0,0194	1,0	0,577	2,481	1,28
080505	1,0052 1,0060 1,0048	3,20 3,14 3,17	0,05689 0,05579 0,05630	0,3534	0,0200 0,0196 0,0198	0,0198	4,0	1,154	4,962	2,51
090505	1,0022 1,0018 1,0010	3,31 3,23 3,24	0,05880 0,05733 0,05757	0,3460	0,0203 0,0198 0,0199	0,0200	7,0	1,528	6,570	3,28
100505	1,0017 1,0026 1,0009	3,38 3,35 3,31	0,06004 0,05954 0,05888	0,3570	0,0214 0,0212 0,0210	0,0212	4,0	1,154	4,962	2,34

Statistical processing results of quantitative definition of Cobalt-30 in tablets showed that the calculated values of control criterion for identification of gross blunders of Qi don't exceed tabular Q(0,95 value; 3) =0,94 therefore selection of small volume (n <10) it is uniform, it isn't burdened by a gross blunder and values of X, S2 and S are reliable. The relative standard error of a mass and spectrometer method doesn't exceed 2,5% for the analysis of Cobalt-30tablets.

Developed in Tashkent pharmaceutical institute preparation Cobalt-30 is the haemo stimulating substance which is especially effectively operating on granulocytopoiesis at secondary leukopenia. Prolonged use Cobalt-30 has no negative effect on a gistomorfology of the vital internals. Clinical tests of Cobalt-30 were carried out under the leadership of the prof. Memetov F.B., assistant-professor H.H. Tuydzhanova (RONTS), prof. M .A. Isamukhamedova and candidate of medical sciences of Ya.S. Mamadaliyeva (The institute of improving qualification of physicians) and prof. A.A. Buglanov (SRI of Hematology) in patients with hemopoiesis disturbances which are especially followed by a leucopenia state arising at action of the ionizing radiation and for preventing and treating patients with malignant

tumors. There has been evaluated the efficiency and shipping Cobalt-30 tablets in patients suffering from the secondary leucopenia which arose owing to chemotherapy of malignant new growths.

Cobalt-30 was appointed with 1 tablet 3 times a day before food within 3-4 weeks. Patients in the comparison group were received by Lacto Flore within 30 days. The clinical assessment was carried out on extent by improving of peripheral blood picture (leukocytes quantities) and the general condition of the patient. There have been conducted researches of cardiovascular system and breath conditions (an electrocardiogram, arterial pressure, etc.) and also a number of biochemical analyses. Received results are processed by variation statistics method.

Results of clinical tests showed that from 90 patients the positive haemo stimulating effect is noted at 69 patients (81,2%) and weak effect – at 11 patients (12,9%). Efficiency of Cobalt-30 is studied in comparative aspect with LAKTOFLOR which also renders the haemo stimulating effect at the leykopenia. It is established that effect of cobalt-30 is equivalent to Lacto Flore`s action. However Cobalt-30 has more specific effect on leukopoiesis. It is necessary to emphasize that Cobalt-30 generally renders the haemo stimulating effect on granular leukocytes whereas on non granule lymphocyte cells of patients with lymph - proliferative diseases the haemo stimulating effect isn't shown.

3.CONCLUSIONS:

1. Developed methods of mass - spectrometer definition of cobalt-30 in tablets possess quite high sensitivity and accuracy and can be used for an assessment of preparations on indicators: "Dissolution", "Uniformity of dispensing" and "Quantitative definition".
2. Conducted researches showed that tablets effectively stimulate cobalt-30 leukopoes are well tolerated by patients; have no essential impact on cardiovascular, respiratory, nervous and secretory systems of an organism.

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