COMPARATIVE ANALYSIS OF METHODS FOR DOXORUBICIN DESTRUCTION

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This study presents the results of studying the possibility of using chemical destruction of a highly toxic cytostaticdoxorubicinusing chemical reagents:calcium hypochlorite solution 5.5%, Fenton's reagent (0.02 g FeSO4 / 10 ml

H2O2 30%), H2O2 30%, photodestruction was also carried out with and without hydrogen peroxide. The results were analyzed and the advantageous differences of each of the destruction reagents were identified according to various criteria

Keywords:doxorubicin,destruction,chromatography.

Solutions of doxorubicin were prepared with a dilution of 1:80 and solutions of doxorubicin with destruction agents also at a dilution of 1:80; destruction was monitored using an UltiMate3000 liquid chromatograph with a spectrophotometric detector. The main parameters are the peak areas of doxorubicin and destruction products, as well as their retention time (the shorter the retention time,

especially hydrophilic products). Chromatograms were obtained over a period of 4 months at time intervals of 1 day, 7 days, 14 days, 28 days, 2 months, 4 months. In all cases, the destruction resulted in the formation of less toxic products of a simpler structure compared to doxorubicin. Reduction of toxicity was proven in silico in the Toxicity Estimation Software Tool to increase the semi-lethal dose for rats when administered orally.

Table 1 - Chromatographic and spectral characteristics of doxorubicin and some of its destruction products

Substance name	**Retention time, s**	**Peak area, mAU**	**Absorption maxima, nm**
Doxorubicin	25.9	120.1551	233, 253, 290, 479
Doxorubicin with calcium hypochlorite	26.2	103.7296	195, 233, 253, 294, 485
Doxorubicin with calcium hypochlorite (additional peak)	35.2	4.9855	193, 233, 253, 494
Doxorubicin with calcium hypochlorite	19.0	7.2445	235, 478
Doxorubicin with hypochlorite (destruction products)	3.4	0.0053	268; 310

Complete destruction of doxorubicin and products in the case of using calcium hypochlorite occurred in an interval of 2-4 months, Fenton's reagent - in an interval of 7-14 days, photodestruction method - in an interval of 2-4 months, photodestruction with the addition of hydrogen peroxide - in an interval of 1-2 months . The smallest amount of impurities was formed when using Fenton's reagent and the photodestruction method with hydrogen peroxide; the most hydrophilic products were also formed with these agents. Photodestruction using daylight turned out to be the most convenient method, since it does not require additional reagents or manipulations.

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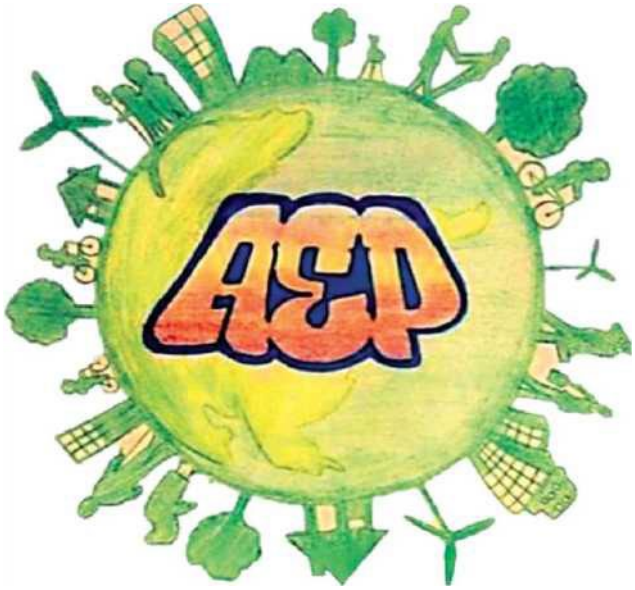

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