

DETERMINATION OF DOXORUBICIN FROM THE EFLUATE OF CELLS USING THE DRUGLOG® SYSTEM (Nr. 6ER-019)

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Background and importance

We have previously shown that we're able to quantify the content of doxorubicin both as a pharmaceutical and laboratory substance dissolved in complemented fluorobrite (chromophorous food media). In the present study we tried to measure the same preparations in the effluate of cultured cell lines using the DrugLog® system (Pharmacolog AB Sweden) as part of our quality assurance process.

Aim and objectives

Demonstration of the suitability of the DrugLog® system to determine the concentration of doxorubicin in the above-specified preparation in a qualitative and quantitative manner.

Material and methods

Triple negative breast cancer cell lines MDA-MB-231 were cultured with a density of 1×10^5 cells/ml in Dulbecco's Modified Eagle Medium with 10% fetal bovine serum. Doxorubicin-complemented fluorobrite was used as culture media. After quantitative determination of the fluorobrite concentration with the Druglog®, doxorubicin was added. For this purpose either Adrimedac® (liquid formulation of doxorubicin, Doxorubicin Aurobindo® (powder form) or Doxorubicin Sigma Aldrich (laboratory substance in powder form) in complemented fluorobrite was used. After calibration concentration of the respective solutions was measured.

Results

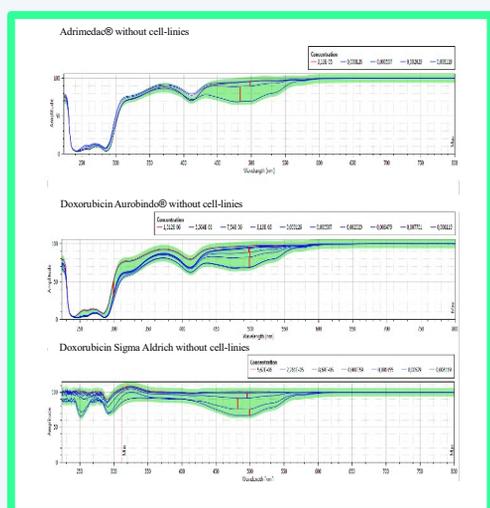


Fig. 1: UV Vis Fingerprints of the cell cultures treated with Doxorubicin within 24 hours prepared in complemented DMEM from a concentrate in the pharmacy lab (Manufacturer Medac, Aurobindo and Sigma Aldrich)

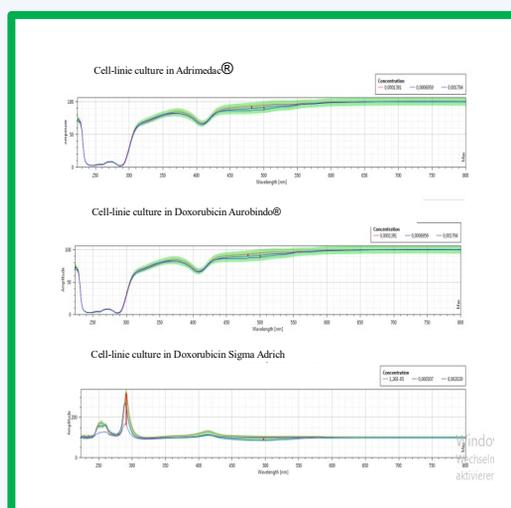


Fig. 2: UV Vis Fingerprints of the cell cultures treated with Doxorubicin within 24 hours prepared in complemented DMEM from a concentrate in the pharmacy lab (Manufacturer Medac, Aurobindo and Sigma Aldrich)

The three different preparations have shown the following results:

Adrimedac®: relative deviation after day 1: 3.3% (n=18), day 2: 16.46% (n=18);

Doxorubicin Aurobindo®: day 1: 1.84% (n=18); day 2: 8.89% (n=18);

Doxorubicin Sigma Aldrich: day 1: 22.4% (n=18); day 2: 32.6% (n=18). According to our observation, the deviations were surprisingly large and the drug concentrations in all solutions were lower than expected, compared to the concentrations of doxorubicin in the preparations without cells. The preparations with the laboratory substance was the most rapidly degraded.

Conclusion and relevance

From our results it can be concluded that the Druglog® is suitable to provide reproducible quantitative measurements of doxorubicin concentrations from the effluate of cell preparations without further filtration of the solutions. In future experiments we will compare these results using a standard HPLC method, in order to explain the difference in the deviations of doxorubicin in the solutions between the pharmaceutical and the laboratory grade of doxorubicin. This method can be used for further research of cytotoxic preparations in hospital pharmacies.