

Depletion of Cytotoxicity of Arsenic on Human Colon Cells After Modification of Ion Exchange Resins with Lysine

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Aim of the study: Arsenic (As), one of the trace metals, presents in soils and groundwaters. Depending on the geographical location, its abundance may vary, which must be declined to definite limits in order to prevent carcinogenic effects of it. Ion exchange resins are simple tools for removing trace metals from water but they must be strengthened to increase their efficacy as well as decreasing the cost of removal. As is mainly absorbed by intestine and therefore colon is the first target of its toxicity. The aim of this study is to decrease cytotoxic effects of arsenic on the human colon cells via modification with ion exchange resins that also be modified with lysine.

Material and Methods: 100 ppb As solution was treated with Monoplus MP64 and Purolite A400 resins. Besides, these resins were also modified with positively charged amino acid, lysine. Resins and their amino acid modified correspondences were also applied to human colon cell line DLD-1. DLD-1 cells were grown in RPMI-1640 medium supplemented with 10% fetal bovine serum and 2 mM glutamine. Cytotoxicity of As on DLD-1 cell lines was determined with Alamar blue and IC₅₀ value was calculated by using sigmoidal graph of data.

Results: In this study, we found that As dose dependently inhibited proliferation of DLD-1 cells. IC₅₀ value was calculated as 75±3 ppb. However, ion exchange resins Monoplus MP64 and Purolite A400 prevent cells against As. Moreover, resins modified with lysine showed strong protective effects against As toxicity. As removal is one of the main concerns for drinking water and depletion of the exposure to acceptable limits must be taken into account. Hence, using these kind of modifications might be important strategies against As toxicity

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