

Genotoxic effects of 2-methoxy and 2-methyl benzofuran phenylmethyl imidazole on MCF-7 cell line

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Background and Aims: Increased exposure to estrogen has been associated with the risk of breast cancer. Substituted benzofuran derivatives with inhibitory effects on estrogen synthesis could be considered as a potential approach to reduce the risk of breast cancer. The study of cytotoxic effects of these compounds has suggested involvement of other mechanisms such as DNA damage. In the current study we have investigated genotoxic effects of two benzofuran derivatives, 2-methoxy and 2-methyl, on MCF-7 cell line.

Methods: The MCF-7 cell line was exposed to different concentrations of 2-methoxy (100, 150, 200 nM) and 2-methyl (200, 250, 300 nM) benzofuran phenylmethyl imidazole for 2 h. The Comet assay was used to examine DNA damage due to this exposure. We also studied the DNA repair capacity after 2 h exposure to genotoxic concentrations of these compounds and their recovery were evaluated after 17 and 24 h, using the comet assay.

Results: The results indicated that genotoxic effects of 2-methoxy and 2-methyl benzofuran phenylmethyl imidazole appeared in concentrations of at 200 nM and 300 nM respectively. The 2-methyl derivative was recovered after 24 h while 2-methoxy derivative was recovered after 17 h.

Conclusions: The results showed that these compounds are genotoxic and the concentration of tested benzofuran derivatives with genotoxic effects are not close to their enzyme inhibitory concentration. Moreover, our study shows that the DNA damages are repairable. Therefore, it seems that the investigated compounds have the potentials as therapeutic agents.

Keywords: Benzofuran-phenylmethyl imidazoles; DNA damage; Comet assay