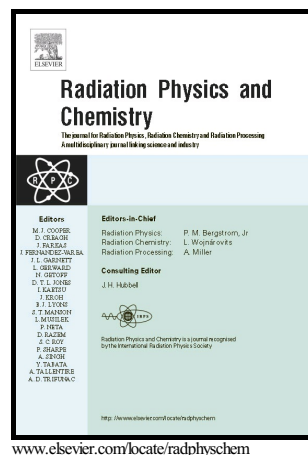


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Luteolin as reactive oxygen generator by X-ray and UV irradiation

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Title

Luteolin as reactive oxygen generator by X-ray and UV irradiation

ACCEPTED MANUSCRIPT

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Abstract

Non-toxic X-ray-responsive substances can be used in the radiosensitization of cancer, like porphyrin mediated radiotherapy. However, most X-ray-responsive substances are toxic. To find novel non-toxic X-ray-responsive substances, we studied the X-ray and UV reactivity of 40 non-toxic compounds extracted from plants. Dihydroethidium was used as an indicator to detect reactive oxygen species (ROS) generated by the compounds under X-ray or UV irradiation. We found that 13 of the investigated compounds generated ROS under X-ray irradiation and 17 generated ROS under UV irradiation. Only 4 substances generated ROS under both X-ray and UV. In particular, luteolin exhibited the highest activity among the investigated compounds; therefore, the ROS generated by luteolin were thoroughly characterized. To identify the ROS, we employed a combination of ROS detection reagents and their quenchers. $O_2^{\cdot -}$ generation by luteolin was monitored using dihydroethidium and superoxide dismutase (as an $O_2^{\cdot -}$ quencher). OH^{\cdot} and 1O_2 generation was determined using aminophenyl fluorescein with ethanol (OH^{\cdot} quencher) and Singlet Oxygen Sensor Green[®] with NaN_3 (1O_2 quencher), respectively. Generation of $O_2^{\cdot -}$ under X-ray and UV irradiation was observed; however, no OH^{\cdot} or 1O_2 was detected. The production of ROS from luteolin is surprising, because luteolin is a well-known antioxidant.

Keywords

X-ray, radiosensitizer, reactive oxygen species (ROS), luteolin

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