

Radioprotective–Antimutagenic Effects of Rosemary Phenolics against Chromosomal Damage Induced in Human Lymphocytes by γ -rays

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The radioprotective effects of carnosic acid (CA), carnosol (COL), and rosmarinic acid (RO) against chromosomal damage induced by γ -rays, compared with those of L-ascorbic acid (AA) and the S-containing compound dimethyl sulfoxide (DMSO), were determined by use of the micronucleus test for antimutagenic activity, evaluating the reduction in the frequency of micronuclei (MN) in cytokinesis-blocked cells of human lymphocytes before and after γ -ray irradiation. With treatment before γ -irradiation, the most effective compounds were, in order, CA > RO \geq COL > AA > DMSO. The radioprotective effects (antimutagenic) with treatment after γ -irradiation were lower, and the most effective compounds were CA and COL. RO and AA presented small radioprotective activity, and the sulfur-containing compound DMSO lacked γ -ray radioprotection capacity. Therefore, CA and COL are the only compounds that showed a significant antimutagenic activity both before and after γ -irradiation treatments. These results are closely related to those reported by other authors on the antioxidant activity of the same compounds, and the degree of effectiveness depends on their structure. Furthermore, the results for treatments before and after γ -ray irradiation suggest the existence of different radioprotective mechanisms in each case.

KEYWORDS: Rosemary; polyphenols; antioxidant; radical scavenger; micronuclei; antimutagenic; radioprotection; radiation effects; carnosic acid; carnosol; rosmarinic acid