

Comparative study of genotoxicity and antimutagenicity of methanolic extracts from *Teucrium chamaedrys* and *Teucrium montanum* in human lymphocytes using micronucleus assay

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Abstract Since *Teucrium chamaedrys* and *Teucrium montanum* are the most popular plants used in the treatment of many diseases, we evaluated genotoxic potential of their methanolic extracts on cultured human peripheral blood lymphocytes (PBLs) using cytokinesis-block micronucleus (MN) assay. Cultures were treated with four concentrations of both plants (125, 250, 500 and 1,000 µg/ml), both separately and in combination with mitomycin C (MMC). The results revealed that extract of *T. chamaedrys* administered at the tested concentrations did not significantly affect the mean MN frequency in comparison to untreated cells. Methanolic extract of *T. montanum* increased the mean MN frequency in PBL at the tested concentrations, but significantly only at the concentration of 1,000 µg/ml. In all tested concentrations, the extract of *T. chamaedrys* significantly reduced the MMC-induced MN frequency, in a dose dependent manner ($r = -0.687$, $p < 0.01$). The extract of *T. montanum* decreased the MMC-induced MN frequency at the tested concentrations, but statistically only at 125 µg/ml. Both extracts administered alone did not

significantly affect the nuclear division index (NDI) at the tested concentrations. In the combined treatments with MMC, the extract obtained from *T. chamaedrys* in the concentrations of 500 and 1,000 µg/ml significantly decreased NDI values in comparison to MMC-treated cells alone, while the extract of *T. montanum* significantly decreased NDI at all tested concentrations. Both extracts nonsignificantly decreased NDI at all tested concentrations in comparison to untreated cells. Our results suggest the important function of *T. chamaedrys* extract in cancer therapy, this methanolic extract may prevent genotoxic effects of chemotherapy in PBLs.

Keywords Micronucleus test · Human lymphocytes · Genotoxicity · Antimutagenicity · *Teucrium chamaedrys* · *Teucrium montanum*

Introduction

The species of genus *Teucrium* have been used as medicinal plants for more than 2,000 years. These species are known for their medicinal and biological properties such as hypoglycemic, hypolipidemic, hepatoprotective, antipyretic, anti-inflammatory, antiulcerogenic, antitumor and antimicrobial activities (Rasekh et al. 2001; Baluchnejadmojarad et al. 2005; Sundaresan et al. 2006; Vuković et al. 2007; Shtukmaster et al. 2010; Sghaier et al. 2011a; Sghaier et al. 2011b). Many species of this genus show antimicrobial, antioxidant and

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