

Antimutagenic activity of major fractions of *Zataria multiflora* Boiss by Ames method

Fariba Sharififar¹, Gholamreza Dehghan-Noudeh^{1,2}, Mohammad Hassan Moshafi¹, Mandana Ohadi²,
Mohammad Zaman-Basir¹, Emad Yazdanpanah¹, Shirin Yusefian³

¹Herbal and Traditional Medicines Research Center, ²Pharmaceutics Research Center, Faculty of Pharmacy, Kerman University of Medical sciences, Kerman, Iran, ³Department of Agricultural Biotechnology, National Institute of Genetic Engineering and Biotechnology, Tehran, Iran

Zataria multiflora is a medicinal plant that has been interested in antimutagenicity effect because of its high antioxidant activity and richness of flavonoids. Antimutagenicity effect of total extract of the plant has been reported previously. Aerial parts of *Z. multiflora* were extracted by petroleum ether, chloroform and 80% methanol by liquid-liquid extraction method consequently. The fractions were concentrated in vacuum and dried at 40°C in oven. The genotype of two standard strains of *Salmonella typhimurium* (TA98, TA100) was confirmed by the evaluation of two important factors of histidine requirement and the presence of R factor. The minimum inhibition concentration (MIC) of the fractions against these two strains was determined by agar dilution method. From each fraction, various concentrations less than MIC were studied for anti-mutagenic test. The sample along with bacterial strain and mutagen agent were incubated at 37°C for 48 h. The number of revertant colonies was counted and compared with control plates. Our results showed that all fractions especially petroleum ether and chloroform ones maintain the number of colonies in the standard range in control plates and prevent from the growth of many strains of bacteria and increase of revertant colonies enhancement in a concentration-dependent manner. This effect was prominent against TA100 strain. Methanolic fraction exhibited anti-mutagen activity just in the highest used concentration in the presence of TA98.

Key words: Ames test, anti-mutagenicity, fraction, phenylpropanoids, *Salmonella typhimurium*, *Zataria multiflora*

INTRODUCTION

The available anticancer drugs have restricted uses and different side effects, so the need for drugs with different mechanisms and fewer side effects, is felt. Research for newer and especially herbal drugs has always attracted the attention of researchers.^[1] The Ames test is one of the initial tests used in preliminary screening of compounds with antimutagenicity effect because of its simplicity, quickness, and convenience.^[2] This test uses several strains of *Salmonella typhimurium* that carry mutations in genes involved in histidine synthesis (histidine operon), so they cannot synthesis some enzymes needed for histidine biosynthesis. A reversion back of these mutants to a prototrophic state, influenced by different chemical or environmental factors, can be studied in order to achieve mutagen and anti-mutagen

compounds.^[3] Several studies have pointed out that many mutagenic and carcinogenic damages are caused by free radicals.^[4] So it is expected compounds with antioxidant effect would be a good candidate for finding new antimutagenic agents.

Zataria multiflora Boiss known as Avishane-Shirazi belongs to Lamiaceae family that has antiviral, antibacterial and antioxidant effects.^[5] Our recently research has shown that the methanolic extract of *Z. multiflora* has antioxidant and antimutagenicity effects,^[6] and because of a close relationship between antioxidant and antimutagenicity effects, the aim of this study was to evaluate the antimutagenicity effect of major fractions of methanolic extract of *Z. multiflora* by Ames method.

Address for correspondence:
Prof. Gholamreza Dehghan-Noudeh,
Pharmaceutics Research Center, Faculty of Pharmacy, Kerman
University of Medical Sciences, Kermna, Iran.
E-mail: grdehghan@gmail.com; ghr_dehghan@kmu.ac.ir

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