

## Antimicrobial, Mutagenic and Antimutagenic Properties of *Anethum graveolens* Essential Oil

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**Background & Objectives:** Medicinal plants have many compounds with lots of biological activities. Microbial development of resistance has resulted in using these compounds instead of antibiotics and preservatives. Considering the growing interest in the use of essential oils, assessment of their effect on heritable material is necessary. The free radicals induce lipid peroxidation, inactivation of enzymes and ion channels through protein oxidation and nitration, and DNA damages. *Anethum graveolens* is well known aromatic and medicinal natural plant in Iran, which is widely used as tea or additive in commercial spice mixtures for many foods to offer aroma and flavor. Investigations on the biological activities of *Anethum graveolens* are scarce. In this study mutagenic and antimutagenic properties of Iran native *Anethum graveolens* was investigated.

**Methods:** Antimicrobial effects of essential oil were accomplished by disk diffusion methods. Minimal inhibitory concentration was studied using macro-well dilution. Then minimum bactericidal concentration was determined mutagenic and antimutagenic activities evaluated by Ames test with nitrofluorene and 2-aminoanthracene mutagens (for *S. typhimurium* TA98) and sodium azide and 2-aminoanthracene (for *S. typhimurium* TA100) with or without metabolic activation (S9 mix).

**Results:** Sensitivity profile of examined microorganisms from sensitive to resistance was as follows *Candida albicans* < *Escherichia coli* < *Pseudomonas aeruginosa* < *Staphylococcus aureus*. Amounts of mutagenicity for TA100 and TA98 with S9 were 12.9% and 18.5% respectively; Without S9, they were 4.46% and 21.6%. Inhibition of mutagenicity was around % 49% and 9.3% for TA98 with or without S9, respectively; For TA100 these percentages were 26% and 85.95%.

**Conclusion:** The results showed strong antimicrobial activity of essential oil. It had no mutagenic effect. Difference in the results of mutagenicity with or without S9 in the strains, were probably because of different kinds of created mutations. Essential oil had suitable antimutagenic activity with or without S9 in TA98. The mentioned properties of *Saturja sahandica* essential oil could make it a promising candidate for future applications.

**Keywords:** *Anethum graveolens*; Mutagenicity; Antimutagenicity; Ames Test; S9