A STUDY ON THE ANTIBACTERIAL ACTIVITY OF ETHANOLIC AND METHANOLIC EXTRACTS OF *SATUREJA HORTENSIS* L.

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Aromatic plants are known as one of important sources of antimicrobial agent. The genus *Satureja* L. (savory, saturei) includes more than ۳۰ species belonging to the family Lamiaceae. *Satureja hortensis* L. produce antimicrobial secondary metabolites and essential oils as a part of their normal program of growth or in response to pathogens attack or stress condition. The aim of this study was evaluation and comparing the antibacterial activity of methanolic and ethanolic extracts of *S. hortensis* L. Against some bacterial pathogens [۱, ۲]. Plants were collected from farmland in Ahvaz, Khouzestan. Then ethanolic and methanolic extracts were prepared using ۱g of dried plant powder and ۱۰mL of ۸۰% ethanol or methanol. Sterile blank discs were saturated with (۱۰۰, ۲۰۰, ۴۰۰ and ۶۰۰ mg/ml) concentrations of these extracts and Antibacterial activity of extracts was assessed using standard disc diffusion method against some pathogenic bacteria. A lawn culture of test bacteria with ۰.۵ McFarland turbidity prepared on Muller-Hinton agar and discs were placed on lawn cultures and incubated at ۳۷°C for ۲۴h. Simultaneously discs containing standard antibiotics were placed on cultures. After incubation the inhibition zone diameter around each disc was measured in millimeter [۳, ۴]. Different concentrations of both ethanolic and methanolic extracts of this plant showed considerable antibacterial activity against some gram positive bacteria *Staphylococcus aureus* (۱۸mm), *Bacillus cereus* (۱۶mm) and also gram negative bacteria *Proteus mirabilis* (۱۴mm) and *Pseudomonas aeruginosa* (۱۱mm). Based on these results it can be suggested that *S. hortensis* L. is an medicinal plant that have this potential to be used as a new source for antibiotic discovery against bacterial pathogens especially pathogens such as S*taphylococcus*, *Bacillus* and also for treatment of *Proteus mirabilis* infection.

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ZINC AND IRON NANO OXIDE INDUCED PRODUCTION OF HYPERICIN AND HYPERFORIN IN CELL SUSPENSION CULTURE OF *HYPERICUM PERFORATUM* (L.)

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Hypericum perforatum L. (St. John's wort) is an herbal remedy widely used in treatment of mild to moderate depression [۱]. Hypericin and hyperforin, a photosensitive napthodianthrone, are believed to be the compounds responsible for reversing the depression symptoms [۲]. Hypericin and hyperforin production have been induced using elicitors in cell cultures of *H. perforatum* [۳]. In the present study the effect of zinc and iron nano oxides at different concentrations (۰, ۵۰, ۱۰۰, ۱۵۰ ppb/۳۰ ml culture) were investigated for hypericin and hyperforin production in *H. perfuratum* cell suspension culture. Detection and identification of hypericin and hyperforin was carried out by high performance liquid chromatograph method. The highest hypericin and hyperforin production were observed in media supplemented with ۱۰۰ppb zinc and iron nano oxide. Zinc and iron nano oxide enhanced hypericin production (11.18 and 7.87 $\mu g\ g^{-1}$ DW, respectively) ۳ and ۱۳-fold, respectively, higher than that of the control. A dramatic increase in hyperforin production was achieved after exposure to zinc and iron nano oxide (195.62 and 217.45 $\mu g\ g^{-1}$ DW, respectively) ۵ and ۱۲-fold, respectively, higher than that of the control. These observations suggested that nanoparticles could be introduced as an appropriate candidate for elicitation studies of *in vitro* secondary metabolites production.

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