Effect of Heat Stress on Yield, Monoterpene Content and Antibacterial Activity of Essential Oils of *Mentha x piperita* var. Mitcham and *Mentha arvensis* var. *piperascens*

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Abstract: Heat stress affects the yield of medicinal plants and can reduce biomass and/or metabolite production. In order to evaluate the effect of heat induced stress on the essential oil production in *Mentha x piperita* L. var. Mitcham (Mitcham mint) and *Mentha arvensis* var. *piperascens* Malini, cv. L. H. Bailey (Japanese mint), we studied the chemical composition of the oils of the two mint species under different heat shock stresses in growth chambers. The antibacterial activity of the essential oils was also evaluated; microscopic observation (fluorescence and electron transmission) was used to assess the effect of the tested samples on bacterial growth. The results obtained shed light on the mint essential oils composition and biological activity in relation to heat stress.

Keywords: *Mentha x piperita*; *Mentha arvensis*; essential oils; heat stress; antibacterial activity; monoterpenes

1. Introduction

*Mentha x piperita* L. and *Mentha arvensis* L. are perennial plants belonging to Lamiaceae family, originating from Europe but spread around the world and cultivated in many different climates. *M. piperita* (2n = 72) is a hexaploidy medicinal plant considered to be a sterile plant hybrid of *M. aquatica* L. (Native Spearment, 2n = 48 or 56) and *M. aquatica* L. (Water Mint, 2n = 96) [1]. *M. arvensis*, popularly known as wild mint or corn mint, has its unique importance among mint family due to its high content of menthol [1]. These *Mentha* species are two important medicinal plants due to high consumption in the world and for the size of the area cultivated for essential oil production [1]. They are reported in literature to be useful for the treatment of intestinal colic, spasms of the bile duct, dyspepsia, biliary, gallbladder and gastrointestinal (GI) tract disorders, gastritis, flatulence and enteritis [1].