

# Essential Oils of Basil Cultivars Selectively Affect the Activity of Antioxidant Enzymes in Murine Glial Cells

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**Aims:** This work aimed to reveal some mechanisms of influence of three basil EO on the microglial cells, as recently, research data stated that these oils have anti-aging and neuroprotective properties, and they are found to be effective against some forms of neurodegeneration.

**Background:** The microglial cells play a pivotal role as the neuroprotective agents against neuroinflammation. Ocimum subspecies are a rich source of essential oils (EO) and used to be applied since antiquity for different purposes, including the prevention and treatment of various diseases.

**Objective:** In this study, the influence of the essential oils extracted from three basil cultivars (*O. basilicum* var. *purpureum*, *O. basilicum* var. *thyrsoflora*, and *O. x citriodorum*), possessing remarkable antioxidant activity, on the activity of the main antioxidant enzymes in microglial BV-2 wild type (WT) and Acetyl-CoA oxidase deficient cell lines (*Acox1*<sup>-/-</sup>) was evaluated.

**Methods:** All manipulations were carried out using murine microglial BV-2 cell lines (BV-2, Acyl- CoA oxidase type 1 (ACOX1) deficient mutants (*Acox1*<sup>-/-</sup>), and WT cells).

**Results:** Data included in the present article state that plant origin substances can play a role in the regulation of enzymatic antioxidant activity of cells. EOs extracted from the *Ocimum* different cultivars are able to trigger the activity of acetyl-CoA oxidase type 1 (or palmitoyl-CoA oxidase type 1), which can serve as a basis for the regulation of redox deviation in WT cells.

**Conclusion:** Thus, it can be suggested to apply them for the prevention of some processes, which can influence aging, as the process of ageing is commonly associated with mitochondrial dysfunction, oxidative stress caused by the increased level of free radical production, dysfunction of the microglia, high blood pressure, and so on.

**Practical Applications:** The microglial cells play a pivotal role as the neuroprotective agents against neuroinflammation. Different data included in the present article described that plant origin substances can play a role in regulating the enzymatic antioxidant activity of cells. EOs extracted from different cultivars of *Ocimum* are able to trigger the activity of acetyl-CoA oxidase type 1 (palmitoyl-CoA oxidase type 1), which can serve as a basis for the regulation of redox deviation in WT cells. Therefore, it can be proposed to apply them as prevention of some processes, which can influence aging, since the process of aging is commonly associated with mitochondrial dysfunction, oxidative stress caused by the increased level of free radical production, dysfunction of the microglia, high blood pressure and so on.

**Keywords:** *Ocimum*, essential oil, oxygenated monoterpenes, microglia, palmitoyl-CoA oxidase, Brazil.