

Chemical Composition and Anticholinesterase Activity of the Essential Oil of Leaves of *Lawsonia inermis* Linn from Algerian Sahara.

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Earlier studies have reported that oxidative damages play an important role in development of neurodegenerative diseases like vascular dementia, stroke and Alzheimer's disease (AD). This later is the most neurodegenerative disorder affecting people in the world due to the formation of β -amyloid plaques, which are probably formed by cholinesterase enzymes; acetylcholinesterase (AChE) and butyrylcholinesterase (BChE). AChE is known as specific cholinesterase and it is usually present in the brain, while BChE is known as pseudocholinesterase and it is present in the peripheral. However, inhibitors of AChE and BChE increase the levels of acetylcholine in the brain and are used as therapeutic molecules for AD. This work aimed to study the chemical composition, cholinesterase inhibitory activity of the essential oil from leaves *Lawsonia inermis* Linn commonly known as "henna" recolted from Algerian Sahara. The essential oil (EO) was obtained through steam distillation. The chemical composition of the essential oil was evaluated by gas chromatography, coupled to mass spectrometry (GC-MS) and the inhibition of cholinesterase was evaluated by the capacity of the inhibition of the two enzymes involved the Alzheimer diseases acetylcholinesterase (AChE) and butyrylcholinesterase (BuChE). The analyses led to the identification of essential oil compounds which obtained with a yield of 0.2%. Leaves essential oil showed interesting selective inhibitory activity against both enzymes AChE ($25.2 \pm 0.01 \mu\text{g/mL}$) and BuChE ($29.8 \pm 0.02 \mu\text{g/mL}$). By contrast, the EO of the leaves showed moderate mean inhibitory activity against acetylcholinesterase (AChE) and butyrylcholinesterase (BuChE), with IC50 values of $21.2 \pm 0.15 \mu\text{g/mL}$ and $37.4 \pm 0.11 \mu\text{g/mL}$, respectively. The results of this present study support the uses of *Lawsonia inermis* in traditional medicine and enhance the use of its essential oil in phytomedicines.

Keywords: *Lawsonia inermis*, essential oil, GC-MS, AChE, BuChE.