

**Original Article**

# Antioxidant Activity of Rosmarinic Acid Extracted and Purified from *Mentha piperita*

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## Abstract

Rosmarinic acid was obtained from methanolic extract of *Mentha piperita* L. under a reflux condenser. The current study aimed to evaluate the *in vitro* antioxidant activities and rosmarinic acid levels of the methanol extracts of *M. piperita*. The analysis of the sample by high-performance liquid chromatography technique (HPLC) indicated that rosmarinic acid was present in high concentration 1.9 mg/mL in the extract. Purification was carried out by column chromatography to give 0.020 g from 1 g of crude extract, and then the antioxidant activity of purified rosmarinic acid was determined by the 2,2-diphenyl-1-picrylhydrazyl (DPPH), H<sub>2</sub>O<sub>2</sub> scavenging, and REDOX methods. It was revealed that the anti-oxidant potential of the rosmarinic acid extract was greater than 95% (at 100 µg/mL) for DPPH assay and 87.83% (at 100 µg/ml) for H<sub>2</sub>O<sub>2</sub> scavenging assay. This study was performed by using a reflux methanolic extraction of *M. piperita*. This possible instructional technique proved to be a quick and successful method for retaining the antioxidant properties of rosmarinic acid. The rosmarinic acid content was determined using HPLC.

**Keywords:** Anti-oxidant, DPPH, H<sub>2</sub>O<sub>2</sub>, *M. piperita*, RA, Reflux

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## 1. Introduction

Natural enzymatic and non-enzymatic anti-oxidants regulate the production and content of the reactive oxygen species (ROS) which include free radicals generated by a variety of metabolic reactions in the human body. However, any disruption in this area as a result of the imbalance of equilibrium reaction that increases the amount of ROS and oxidative stress causes harmful repercussions in the body. Many disorders, including cardiovascular illnesses (1, 2), Alzheimer's disease (3), diabetes mellitus (4), inflammatory illnesses (2), carcinogenesis (4), neurodegenerative (5), and pulmonary and hematological disorders (6), are linked to oxidative stress.

Antioxidants are substances that react with and neutralize free radicals. As a result, they prevent or

lessen their harmful effects on the human body. It might come from synthetic or natural sources. Since ancient times, medicinal plants and their phytochemicals have been thought to have pharmacological value. Plants have been used in medicine since 60,000 years ago, long before civilization (7). Plants are responsible for more than 30% of all therapeutic medications (and their derivatives and analogs), and natural goods will continue to have a significant impact on human medicine.

The majority of synthetic bioactive medications are structurally identical to the phytochemicals extracted from plants. The Lamiaceae family is one of the most important medicinal plant families. The presence of phenolic chemicals in this plant, particularly rosmarinic acid (RA), which is renowned as a good antioxidant, is