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Abstract

The aim of this research is to evaluate the antioxidant, cytotoxic, and antimicrobial effects, identify the constituent compounds, calculate the extraction rate, and conduct phytochemical analysis of rosemary. Rosemary, also known as *Rosmarinus officinalis*, is native to the Mediterranean region. It belongs to the mint family and is an evergreen shrub related to basil and marjoram. Some rosemary plants can reach a height of one meter or more. Its small, grayish-green leaves resemble pine needles and have a sweet, slightly bitter aroma similar to lemon. Its flowers range in color from white to light and dark blue and bloom in the spring. The use of rosemary dates back to 500 BC when the ancient Greeks and Romans used it as a culinary and medicinal herb to treat many ailments. In 1987, researchers at Rutgers University in New Jersey obtained a patent for a preservative. A sample of rosemary was taken, dried, ground, weighed, and placed in a Soxhlet extraction apparatus. After exiting the apparatus, it was weighed, the extraction rate was calculated, and the components present in the rosemary were identified and collected by conducting phytochemical analysis using potassium hydroxide, ferric chloride, copper acetate, acetic anhydride, and concentrated sulfuric acid. Chemical laboratory experiments were carried out, revealing some substances such as flavonoids (yellow), tannins (dark green), terpenes (blue-green), and saponins. Foam was observed, but anthraquinone glycosides were not detected. Furthermore, its toxicity to stromal cells was tested using shrimp. Three samples of the extract were taken at different concentrations, and the shrimp were monitored for a full day. It was

found that the lower the concentration, the greater the number of stromal cells killed. I

recommend using rosemary to treat certain diseases such as Alzheimer's, depression,

diabetes, and cancer. It has antimicrobial and anti-inflammatory properties, and it also

possesses cosmetic properties that improve hair growth. Furthermore, it has 11

nutritional benefits as an antioxidant. I will explore how to use it as a healthy food or

dietary supplement, and I will study the genetic variations in the rosemary plant and

their impact on its biological properties and chemical composition.