

# IN VITRO ANTIOXIDANT AND ANTIMICROBIAL ACTIVITIES OF THE FIVE DIFFERENT SOLVENT EXTRACTS OF *CENTAUREA PULCHERRIMA* VAR. *FREYNII* FROM TURKEY

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## ABSTRACT

Various extracts of *Centaurea pulcherrima* var. *freyonii* were investigated for total phenolic, flavonoid, antioxidant and antimicrobial activities. The antioxidant properties of plant extracts were evaluated by free radical scavenging assays (DPPH and ABTS). Antimicrobial activities were examined using disc diffusion methods. According to the results of antioxidant capacity assays, the plant showed moderately antioxidant activity in test methods. It was found that ethyl acetate extract showed the most effective activity including total phenolic, flavonoid, antioxidant and antimicrobial activities.

## KEYWORDS:

Antimicrobial activity, antioxidant activity, folk medicine, plant extracts, total flavonoid, total phenolic.

## INTRODUCTION

Plants are the natural resource of many chemical compounds which are used to fight against several diseases or care healthy. Most of the people use the plants as herbal medicine or foods [1]. According to [2], nearly 60-80% of the world population firstly apply plants for treating diseases. Because of their components that have exhibited biological activities, in particular, antimicrobial [3, 4] and antioxidant [5, 6] properties, plants are widely researching in recent years.

Turkey flora consists of nearly 11000 species of which 34.5% are endemic. And, it is believed that the flora is containing over 3000 aromatic plants [7]. But, there isn't enough information about the most of aromatic plants biological activity. For instance, *Centaurea* genus is one of the important aromatic plants which belong to Asteraceae. This genus consists of approximately 700 species [8, 9, 10] and most of them naturally growing in Turkey [11, 12]. According to [11] more than 100 *Centaurea* species are endemic which growing in Turkey.

There are some local names giving by people

such as "peygamber çiçeği", "zerdali diken", "coban kaldiran", "Timur diken" and "boga diken" in Anatolia [13, 14, 15]. Most of *Centaurea* species are so valuable due to the using traditional medicine. For example, it can be used as a remedy for haemorrhoids; abscess and the common cold were reported [14, 15, 16, 17]. The goal of this study was to determine the biological activity of endemic plant *Centaurea pulcherrima* var. *freyonii*. Thus, in this study total flavonoid compounds, total phenolic compounds, antioxidant properties (DPPH, ABTS), and the in vitro antimicrobial activities of various extracts of aerial parts of the plant against strains of some pathogen bacteria and yeasts were investigated.

## MATERIALS AND METHODS

**Plant materials.** Plant samples were collected in August 2016 from Gümüşhane around (44°69'40.5"N 50°70'83"E). Voucher specimens were deposited in the Genetic and Bioengineering Department, Gümüşhane University, Gümüşhane - Turkey. The plant aerial parts were chopped, dried and powdered.

**Extraction.** The plant materials (20 g) were extracted with 400 ml each solvent at 37 °C 125 rpm during 24 h. The extracts were filtered using Whatman filter paper (No: 1) and then concentrated under vacuum at 40 °C using a Rotary evaporator. The residues obtained were stored in a freezer at -20 °C until further tests.

**Total phenolic content.** The amount of total phenolic content in the extract was determined according to Folin-Ciocalteu method with minor modifications [18]. 31.25 µl of sample solution (1 mg/ml) were introduced into well containing 125 µl of Folin-Ciocalteu's reagent and 93.75 µl of 7.5% Na<sub>2</sub>CO<sub>3</sub>. After 2 h incubation at room temperature, the absorbance was measured at 750 nm with micro plate absorbance reader (iMark™ 1681135, Bio-Rad). The total phenolic content was calculated as