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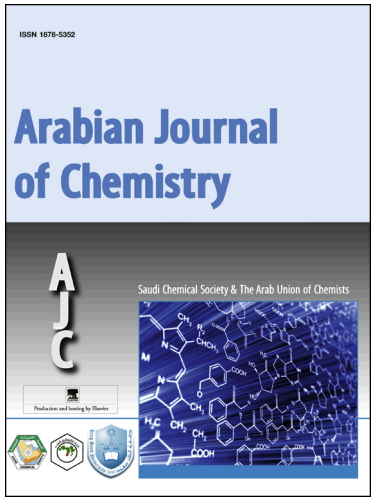

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In vitro cytotoxic and antioxidant activities of phenolic components of Algerian *Achillea odorata* leaves

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Abstract
In this study, methanol extract from *Achillea odorata* was evaluated for its phenols content using Folin-Ciocalteu reagent, and antioxidant activity using: 1,1- diphenyl 2- picryl-hidrazyl (DPPH) radical scavenging activity, reducing activity of H_2O_2 and ferric reducing power assay. Total phenolic content was determined as gallic acid (GAE) equivalent. Flavonoids and flavonols contents were determined as quercetin (QE) equivalents. The cytotoxicity of plant extract was tested against three tumor cell lines: MCF-7, Hep2 and WEHI using 3-(4,5-dimethyl thiazol-2-yl)-2,5-diphynyl tetrazolium bromide (MTT) assay. Preliminary screening concluded in the presence of substances with large therapeutic values. The total phenolic content confirmed the presence of total phenolics in the extract and showed strong association with antioxidant activity. An important content of flavonoids and flavonols was also detected. The results of the antioxidant activities obtained indicate that *Achillea odorata* recorded a good capacity. For the cytotoxic activity, the results showed the plant extract significantly inhibited tumor cell growth and colony formation at various concentrations.

***Keywords*:** Cytotoxic activity; Antioxidant effect; *Achillea odorata*; Methanol extract; Polyphenols

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1. Introduction

Herbal preparations have long been used as remedies for infectious and other diseases and they are used in primary health care in several countries (Sokmen et *a*l., 1999). Since the prehistoric era, herbs have been the basis for nearly all medicinal therapy until synthetic drugs were developed in the nineteenth century (Exarchou et *al.,* 2002). The preservative effect of many plant spices and herbs suggests the presence of antioxidative and constituents in their tissues (Hirasa and Takemasa, 1998). Recently, interest has increased considerably in finding naturally occurring antioxidants to replace synthetic antioxidants, which are being restricted due to their carcinogenicity (Sasaki et *al.,* 2002). The antioxidative phytochemicals especially phenolic compounds found in vegetables, fruits and medicinal plants have received increasing attention for their potential role in prevention of human diseases. Phenolic compounds can play an important role in adsorbing and neutralizing free radicals, quenching singlet and triplet oxygen, or decomposing peroxides. Many of these phytochemicals possess significant antioxidant capacities that are associated with lower occurrence and lower mortality rates of several human diseases (Anderson et *al.,* 2001).

Yarrow (*Achillea L.*) is one of the youngest evolutionary genera of the Asteraceae family, which is present throughout the world. More than 100 species have been recognised in this genus (Goli et *al.,* 2008; Rahimmalek et *al.,* 2009). The use of yarrow for various medicinal