

***In vitro* Anti-proliferative Effect of Some *Asparagus* Taxa on Colon Cancer Cell Lines**

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Introduction

Asparagus genus, which belongs to the Asparagaceae family, is represented by 10 species, 3 of which are endemic in Turkey, and it is distributed in Europe, North Africa, and Asia. *Asparagus* spears (especially *Asparagus officinalis* L.) which are widely consumed all over the world either as nutrient or with medicinal purposes, has been cultivated for hundreds of years.

Asparagus taxa are highly valued for their abundance of bioactive compounds such as saponins, flavonoids, hydroxycinnamic acids, sterols, fructans, carotenoids, and amino acids (Lee et al., 2010; Chitrakar et al., 2019). According to the literature data, *Asparagus* taxa are traditionally used for the treatment of hemorrhoids and infertility problems as well as stomach, urinary system, liver, kidney, and heart diseases (Zhang et al., 2018; Mashele, 2019).

The effects of the extracts prepared from *Asparagus* taxa, were previously evaluated on the experimental animal model of carbon tetrachloride-induced hepatotoxicity and the life span of *Caenorhabditis elegans*, by us.

In our previous studies, *in vitro* antioxidant capacity of all extracts was also determined.

Therefore, the aim of this study is to evaluate the *in vitro* anti-proliferative activity of some *Asparagus* taxa (*Asparagus officinalis*, *Asparagus acutifolius*, *Asparagus verticillatus*, *Asparagus aphyllus* subsp. *orientalis*) in colon carcinoma cell line as a model.

Materials and methods

Materials

The dried radix parts of *Asparagus officinalis*, *Asparagus acutifolius*, *Asparagus verticillatus*, *Asparagus aphyllus* subsp. *orientalis* were extracted with 70% ethanolic solution in water. The extracts prepared of these four plants were used as samples for the MTT test.

Within the scope of this study aqueous-ethanolic extracts of radix of 4 different *Asparagus* taxa (*Asparagus officinalis* (AOR), *Asparagus acutifolius* (AAR), *Asparagus verticillatus* (AVR), *Asparagus aphyllus* subsp. *orientalis* (AAOR)) were evaluated with MTT assay for determination of the anti-proliferative effect of CaCO₂ on colon cancer. The MTT assay has been widely applied in the assessment of anti-proliferative activity. The extract groups were compared with the control group consisting of cells without any substance applied.

Method

In this study, the cytotoxic effect of hydroalcoholic extract of *Asparagus* taxa on the CaCO₂ cancer cell line was determined using MTT assay at doses of 0.1 mg, 0.25 mg, 0.5 mg, 0.75 mg, 1 mg, 1.5 mg and 2 mg for each sample after 24 h and 48 h of treatment.

Results and discussion

The analyzed samples in this study, did not show an anti-proliferative effect after 24 h. It has been determined that 1 and 2 mg samples of AAOR have an anti-proliferative effect of 63.41% and 78.6% on colon cancer in 48 h, respectively.

In addition, the AAR sample showed an inhibitory effect on cancer cells in 48 h as much as AAOR sample. A 2 mg sample of AOR has been found to have an anti-cancer effect of 58.7% in approximately 48 h.

However, AVR did not show an anti-proliferative effect on colon cancer cells neither at 24 nor at 48 h. Finally, AAOR, AAR and AOR can be used as candidate material in the treatment of colon cancer and used for performing further studies.

Conclusion

The investigated aqueous ethanolic extract of AAOR, AAR and AOR exhibited effective anti-proliferative properties. This is the first study presenting the anti-

proliferative effect of CaCO₂ on colon cancer potential of these taxa from Turkey.

References

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