

## Investigation of the Function of Chemotaxonomy of White Tea on the Regulatory Function of Genes in Pathway of Colon Cancer

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**Abstract :** Today, many nutritionists recommend the consumption of plants, fruits, and vegetables to provide the antioxidants needed by the body because the use of plant antioxidants usually causes fewer side effects and better treatment. Natural antioxidants increase the power of plasma antioxidants and reduce the incidence of some diseases, such as cancer. Bad lifestyles and environmental factors play an important role in increasing the incidence of cancer. In this study, different extracts of white teas taken from two types of tea available in Iran (clone 100 and Chinese hybrid) due to the presence of a hydroxyl functional group in their structure to inhibit free radicals and anticancer properties, using 3 aqueous, methanolic and aqueous-methanolic methods were used. The total polyphenolic content was calculated using the Folin-Ciocalcu method, and the percentage of inhibition and trapping of free radicals in each of the extracts was calculated using the DPPH method. With the help of high-performance liquid chromatography, a small amount of each catechin in the tea samples was obtained. Clone 100 white tea was found to be the best sample of tea in terms of all the examined attributes (total polyphenol content, antioxidant properties, and individual amount of each catechin). The results showed that aqueous and aqueous-methanolic extracts of Clone 100 white tea have the highest total polyphenol content with  $27.59 \pm 0.08$  and  $36.67 \pm 0.54$  (equivalent gallic acid per gram dry weight of leaves), respectively. Due to having the highest level of different groups of catechin compounds, these extracts have the highest property of inhibiting and trapping free radicals with  $66.61 \pm 0.27$  and  $71.74 \pm 0.27\%$  (mg/l) of the extracted sample against ascorbic acid). Using the MTT test, the inhibitory effect of clone 100 white tea extract in inhibiting the growth of HCT-116 colon cancer cells was investigated and the best time and concentration treatments were 500, 150 and 1000 micrograms in 8, 16 and 24 hours, respectively. To investigate gene expression changes, selected genes, including tumorigenic genes, proto-oncogenes, tumor suppressors, and genes involved in apoptosis, were selected and analyzed using the real-time PCR method and in the presence of concentrations obtained for white tea. White tea extract at a concentration of 1000  $\mu\text{g/ml}$  3 times 16, 8, and 24 hours showed the highest growth inhibition in cancer cells with 53.27, 55.8, and 86.06%. The concentration of 1000  $\mu\text{g/ml}$  aqueous extract of white tea under 24-hour treatment increased the expression of tumor suppressor genes compared to the normal sample.

**Keywords :** catechin, gene expression, suppressor genes, colon cell line

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