

## News &amp; Comments

## Anticancer Agents from *Xanthium strumarium* Fruits

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Glioma is a term used to describe tumours that develop around glial cells and are mostly found in the brain and spinal cord. The most frequent type of brain tumour is glioma, which can be observed both supratentorial and infratentorial. Glioblastomas account for roughly 57 percent of all neuroepithelial tumours and 48% of all malignant brain and central nervous system tumours yearly. Furthermore, most malignant glioma patients do not live for more than a year. Plant-derived anticancer medicines account for roughly 67% of all anticancer medications. Some natural items are employed as starting materials in the manufacture of some complicated drugs, in addition to being utilized as medicines. *Xanthium strumarium* L. (Syn. *X. brasiliicum* Vell.) (Asteraceae), also known as cocklebur, is a one-year plant that grows on riverbanks, roadside ditches, and other rocky sedimentareas.

Sesquiterpenes, a type of plant secondary metabolite, have been investigated extensively for their antitumor effects in cancer cells. In vitro cytotoxic activity of several extracts of *Xanthium* species and their xanthanolides on certain cancer cells have been reported. The researchers used lipid peroxidation levels, apoptotic DNA fragmentation, cell cycle analysis, in vitro invasion assay, in vitro kinase activity, immunocytochemical staining, and micronucleus counting to assess the cytotoxic activities of xanthanolides isolated from the prickly fruits of *X. strumarium* on C6 glioma and HUVEC cells.

CDCl was used to record NMR spectra using a Varian Mercury 400 MHz spectrometer, which ran at 400 MHz and 100 MHz for H-NMR and C-NMR, respectively. Plant samples were obtained in the Kilis-Sogutludere area of Turkey's South-eastern Anatolia region. Under reduced pressure, the acetone was evaporated, yielding a dark brownish extract (63.66 g, 2.65% yield). Due to the limited accumulation of active agents in the tumour and low drug permeability from vessels to the brain tumour cell, C6 glioma and HUVEC cells were chosen as representative cells to evaluate angiogenesis of various formulations. MDA levels of the C6 glioma and HUVEC cells were determined using the methods described previously.

CC, TLC, and crystallization techniques were used to isolate 5 recognized chemicals from the acetone extract of common cocklebur fruits, including four xanthanolides and a triterpene. Due to their antitumor actions, sesquiterpenes, one of the plant's secondary metabolite classes, have been intensively researched against various cancer cells. The constant production of Reactive Oxygen Species (ROS) as a result of aerobic respiration and the oxidation of different substrates in live cells cause lipid peroxidation in tissues by attacking unsaturated fatty acids. IC50 values of metabolites (cytotoxic dose



and one more high dose alternately) and extracts of *X. strumarium* fruits were used to determine DNA fragmentation. Protein quantity and kinase activities of C6 glioma and HUVEC cells were calculated using BSA and ADP standard curves.

Immunocytochemical labelling was used to determine the degree of COX-2 expression in cells treated with cocklebur compounds.

Two distinct investigators assessed the COX-2 expression intensity in the cells, and the cells were scored according to their colouring intensity as specified in the experimental section. 1000 binuclear cells from each test group were counted and the number of micronuclei was measured to determine genotoxicity in C6 glioma and HUVEC cells treated with the chemicals. To see if the antiproliferative effects of pure metabolites were related to alterations in the cell cycle, C6 glioma and HUVEC cells were labelled with PI and examined using flow cytometry.

The current findings revealed that the cytotoxicity patterns and methods of action of acetone and dichloromethane extracts, as well as pure metabolites isolated from acetone extracts of *X. strumarium* fruits, were highly different.

These findings revealed that plant extracts and pure plant metabolites may have diverse biological characteristics. As a result, while study into the biological activity of plant extracts can yield valuable results, the isolation and biological activities of pure plant metabolites are more relevant to science.

#### **JOURNAL REFERENCE**

Karagoz, I.D., A. Cakir, M. Ozaslan, I.H. Kilic, B. Tepe, E. Akdogan and C. Kazaz, 2022. Anticancer agents from *Xanthium strumarium* fruits against C6 glioma cells. *Int. J. Pharmacol.*, 18: 437-454.

#### **KEYWORDS**

*Xanthium strumarium*, cocklebur, xanthanolides

