Many of anticancer drugs are of natural origin. Plants from the *Solanaceae* family contain various steroidal glycoalkaloids that are toxic to cancer cells. The aim of the first part of this work was to evaluate the potential anticancer effect of α-tomatine – a steroidal glycoalkaloid from *Solanaceae* plant family. The second part of this work was focused on the anticancer research of newly synthetized derivatives of benzo[*c*]fluorene. Benfluron, one of the derivatives, was reported 30 years ago to have anticancer effects *in vitro* and *in vivo* almost.

Tomatine inhibited the proliferation and viability of MCF-7 cells. In this cancer cell line treated with tomatine, no DNA damage, no changes in p53 and $p21^{WAF1/CIP1}$ protein levels, neither the induction of apoptosis was demonstrated. However, the decrease in ATP levels was found.

New synthetized derivatives of benfluron and dimefluron caused higher cytotoxic effect in the different cancer cell lines compared with their original compounds. On the other hand, these derivatives did not caused higher tumour growth inhibition when compared with their original compounds in *in vivo* studies. Benfluron and hydrazone of dimeflurone prolonged the survival of mice with inoculated solid form of Ehrlich tumour.

In this work, we demontrated that tomatine did not induce apoptosis in MCF-7 cells. The cytotoxic effect of this compound could be caused by membrane disruption due to the interaction of tomatine and cholesterol. The derivatives of benfluron and dimefluron were more cytotoxic to cancer cell *in vitro*, but the inhibition of tumour growth were weaker compared with original compounds *in vivo*.