Background

In vitro models simulating the digestive tract are commonly used to investigate degradation of nutrients or development of gut flora. Aim of this work was to modify an established model (Aura, 1999, J Cer Sci) to allow further studying mechanisms of carcinogenesis and chemoprevention using human carcinoma cells in vitro. Therefore the modified model, characterised by changing ox gall concentration to a physiological level, should be compared to the established model.

Methods

Fermentation supernatant (fs) of inulin was obtained by in vitro fermentation (Fig. 1). Bile acids, cholic (CA) and deoxycholic acid (DCA), were determined in fs by HPLC-MS/MS. Cell growth of HT29 cells treated with different concentrations of fs and corresponding synthetic mixtures of CA and DCA were determined by quantifying DAPI-labelled DNA.

Results

Established Model (high ox gall)

Using 41.6 g/l ox gall both fs inhibited cell growth whereas fs blank was more cytotoxic (Fig. 2).

Use of 41.6 g/l ox gall resulted in unphysiological high amounts of CA and DCA in fs. Inulin decreased bile acid concentrations (Fig. 4).

Cytotoxicity of fs blank is partly due to high amounts of CA and DCA (Fig. 6).

Modified Model (low ox gall)

Using 0.6 g/l ox gall fs blank was less cytotoxic whereas fs inulin was more effective in reducing cell growth (Fig. 3).

Use of 0.6 g/l ox gall resulted in considerable lower amounts of CA and DCA in fs. Inulin decreased bile acid concentrations (Fig. 5).

Conclusion

By decreasing ox bile concentration secondary cytotoxic side effects of fs are reduced. Moreover fermentation products of inulin suppress growth of HT29 cells. Fs obtained from the modified model (using 0.6 g/l ox gall in intestinal extract) can be used for in vitro investigations on chemopreventive properties of complex food ingredients.

Acknowledgements:

For funding we would like to thank the Ministry of Education and Research, Germany (0313829A).