

# **Prevention of cadmium induced toxicity in liver-derived cells by the combination preparation Hepeel<sup>®</sup>**

**Rolf Gebhardt**

Institute of Biochemistry, Medical Faculty, University of Leipzig, Johannisallee 30, 04103  
Leipzig, Germany

## **Abstract**

Cadmium is a heavy metal of considerable environmental concern that causes liver damage. This study examined the possible prevention of cadmium toxicity in human HepG2 cells and primary rat hepatocytes by Hepeel<sup>®</sup>, a combined preparation of tinctures from seven different plants. Hepeel<sup>®</sup> prevented cadmium chloride (CdCl<sub>2</sub>)-induced cell death in both HepG2 cells and hepatocytes, and also reduced the loss of glutathione, lipid peroxidation, nuclear fragmentation, caspase activation and release of mitochondrial cytochrome C. To compare their relative efficacy, the seven constituent plant tinctures of Hepeel<sup>®</sup> were also separately tested. The tinctures China and Nux mochata which exert solely anti-oxidative effects failed to reduce cytotoxicity, and only protected against loss of glutathione and lipid peroxidation. In contrast, the tinctures Carduus marianus and Chelidonium exerted anti-apoptotic effects which protected HepG2 cells and primary hepatocytes against CdCl<sub>2</sub>-induced cell death. These results demonstrate how the effectiveness of Hepeel<sup>®</sup> is determined by the synergistic features of its constituent tinctures. Furthermore, we conclude that cadmium toxicity in the liver is mainly due to stimulation of the intrinsic apoptotic pathway, but may be intensified by increased oxidative stress.

**Keywords:** Antioxidants; Apoptosis; Cadmium; Cytochrome C; Hepatoprotection; Plant tinctures