Food-contact materials, including paper, have to comply with a basic set of criteria concerning safety. This means that paper for food contact should not give rise to migration of components, which can endanger human health. The objectives of this pilot study were, first, to compare paper of different qualities as food-contact materials and to perform a preliminary evaluation of their suitability from a safety point of view, and, second, to evaluate the use of different in vitro toxicity tests for screening of paper and board. Paper produced from three different categories of recycled fibres (B-D) and a raw material produced from virgin fibres (A) were obtained from industry, and extracts were examined by chemical analyses and diverse in vitro toxicity test systems. The products tested were either based on different raw materials or different treatments were applied. Paper category B was made from 40% virgin fibres, 40% unprinted cuttings from newspapers, and 20% de-inked newspapers and magazines. Paper categories C and D were based on newspapers and magazines. However, paper D was de-inked, whereas C was not. To identify constituents of the papers with a potential to migrate into foodstuff, samples of the paper products were extracted with either 99% ethanol or water. Potential migrants in the extracts were identified and semiquantified by GC-1R-MS or GC-HRMS. In parallel to the chemical analyses, a battery of four different in vitro toxicity tests with different endpoints were applied to the same extracts: (1) a cytotoxicity test using normal human skin fibroblasts. The test was based on measurements of the reduction of resazurin to resorufin by cellular redox processes and used as a screening test for acute or general toxicity; (2) a Salmonella/microsome assay (Ames test) as a screening test for mutagenic and potentially carcinogenic compounds; (3) a recombinant yeast cell bioassay as a screening test for compounds with oestrogenic activity; (4) an aryl hydrocarbon (Ah)-receptor assay (CALUX assay) as a screening test for compounds with dioxin-like activity. In addition, the papers were tested for microbial content and, in general, the microbiological load was quite low. The following microorganisms were counted and identified on both surface and homogenized pulp samples: the total number of aerobic bacteria, the number of aerobic and anaerobic spore formers, the number of Bacillus cereus/thuringiensis, and the number of yeast and moulds. The chemical analyses showed a significantly higher amount and different composition pattern of chemicals extracted with ethanol compared with water. Analyses of the ethanol extracts showed a distinctly smaller number and lower concentrations of chemicals in extracts prepared from sample A compared with extracts of samples B-D. The compounds identified in B-D were similar, but the amounts were lower in B compared with C and D. In accordance with the chemical analyses, the water extracts were less cytotoxic than the ethanol extracts. The extract prepared from virgin fibres was less cytotoxic than the extracts prepared from paper made from recycled fibres, and extracts prepared from C was the most cytotoxic. None of the extracts showed mutagenic activity. No conclusion about the oestrogenic activity could be made, because all extracts were cytotoxic to the test organism (yeast cells). Ethanol extracts of A and B showed a negligible positive response in the Ah-receptor assay at the highest nontoxic concentration, whereas C and D showed a more pronounced effect with C being the most potent. A comparable weak effect of water extracts of samples B-D was.