

A setup to test toxicity of alcohol inhalation from consumer products

Dr. Monique Manche, Laboratoires Anios, 59260 Lille-Hellemmes, France

Dr. Fabrice Nesslany, Laboratoire de toxicologie génétique, Institut Pasteur de Lille, 59000 Lille, France

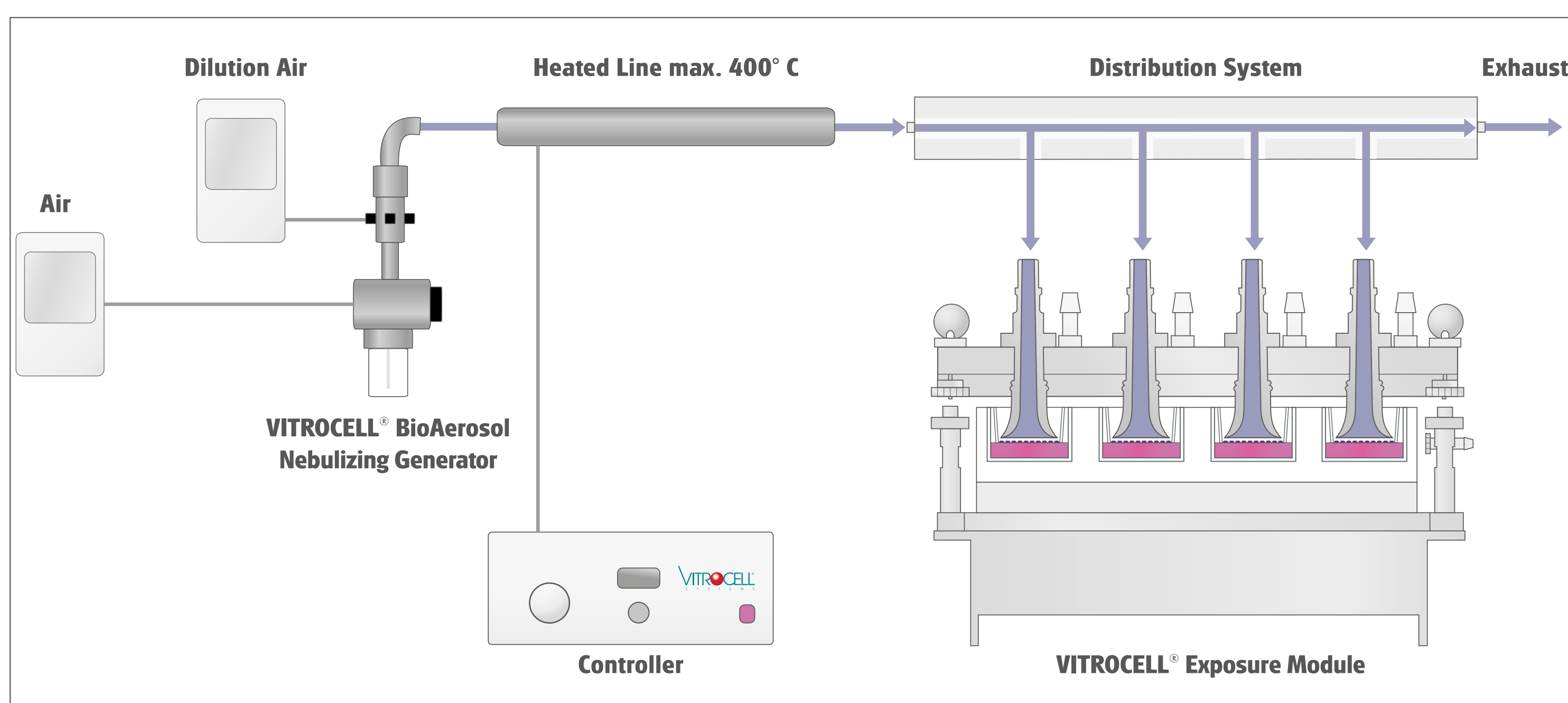
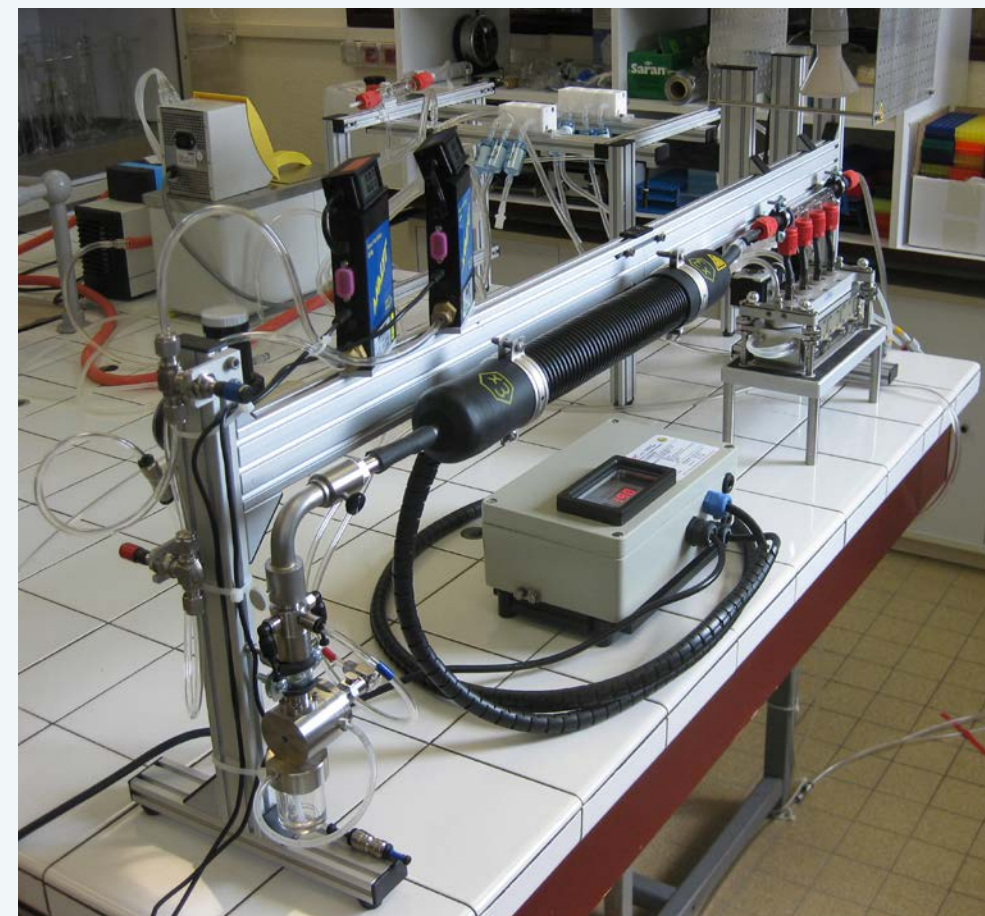
Tobias Krebs, VITROCELL Systems GmbH, 79183 Waldkirch, Germany

Background

Alcohol-based hand rubs (AbHR) contribute significantly to the prevention of nosocomial infections. The alcohol content in these products is high so as to provide rapid antimicrobial efficacy, with amounts that can exceed 80 % w/w. Mostly used alcohols are ethanol, propan-2-ol and propan-1-ol. The objective of the research was to perform a comparative evaluation of these 3 alcohols in terms of respiratory toxicity, highlighting, where appropriate, the impact of increasing concentrations. Genotoxicity tests (*in vitro* micronucleus test and comet assay) have been conducted on p53 competent pulmonary cells, with alcohol administration as vapours to obtain data under conditions more representative of actual exposure conditions via the pulmonary route.

Setup

Air-liquid interface (ALI) cultured NCI H292 cells were exposed to alcohol vapours on their apical side. VITROCELL® equipment with an aerosol generator connected to a heating system was used. The system allows for a controlled flow rate of the test product for direct contact between the cells and the test atmosphere. Two different treatments were used: 30-minute continuous exposure and 2-minute exposure, repeated every 5 minutes, over a total of 60 minutes.



Summary

Both genotoxicity tests results (*in vitro* MN test and Comet assay on ALI NCI H292 cultures without exogenous metabolic activation system) were negative following alcohol vapours exposure, whatever the alcohol and the treatment scheme. Vapours exposure levels were significant, with mean doses of

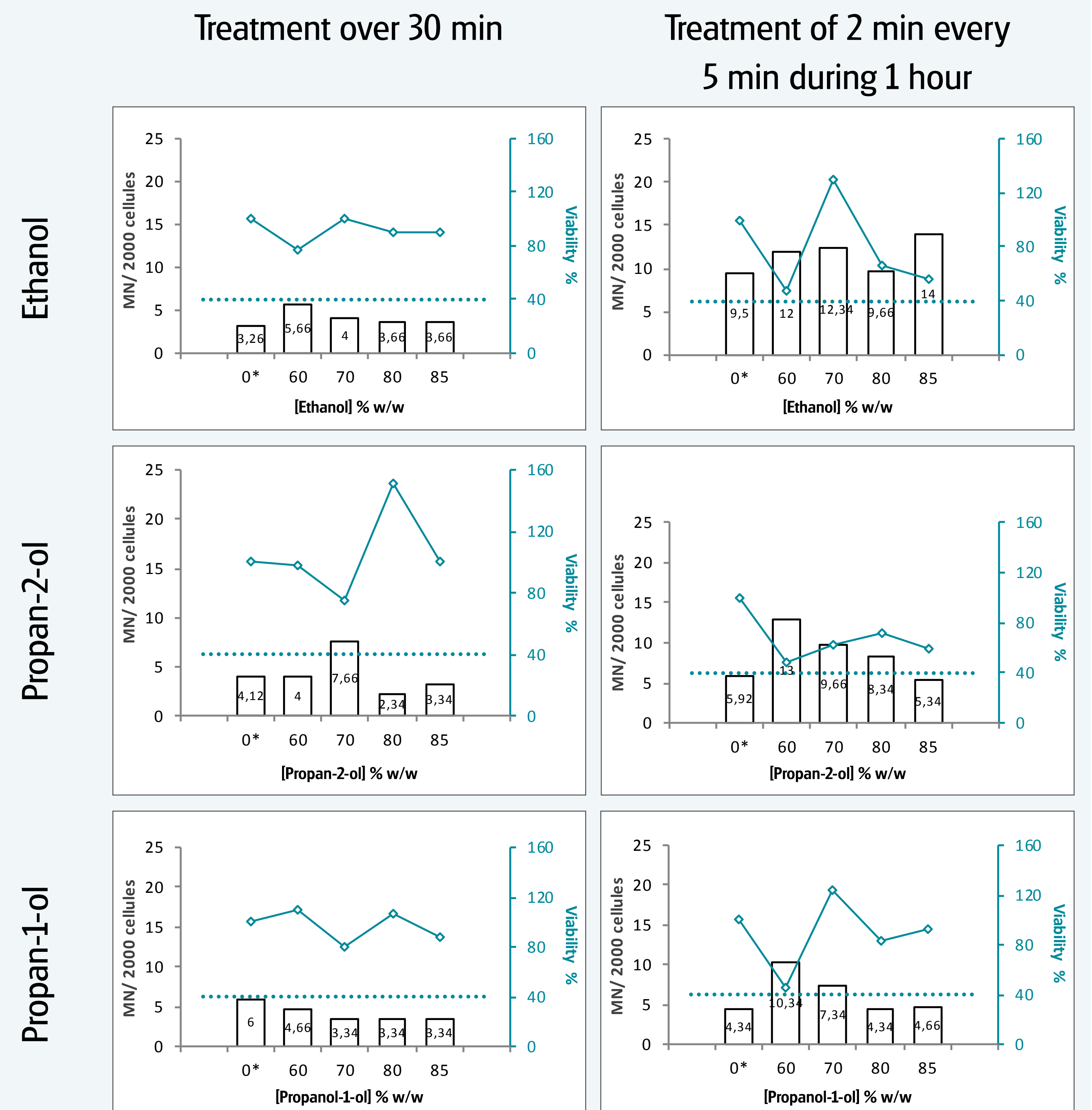
37400 mg/m³ (± 19600 ppm) for ethanol,

32.700 mg/m³ (± 13.100 ppm) for propan-2-ol and

17300 mg/m³ (± 7000 ppm) for propan-1-ol.

These data provide valuable information for the evaluation of genotoxic risk associated with respiratory tract exposure when using alcohol based products with one of these 3 alcohols: either ethanol, propan-2-ol or propan-1-ol.

In vitro micronucleus test



In vitro Comet assay

