

## Focus on IFA's work

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# Exposure to environmental tobacco smoke in German hospitality venues

### Problem

Before the introduction of statutory protection for non-smokers, employees in the catering sector in Germany were exposed to tobacco smoke. The new legislation also provides for exemptions from a complete smoking ban.

Since little in the way of published data is available on the exposure of employees in German hospitality venues, a study conducted jointly by the IPA and IFA was to present the scale of this exposure.

### Activities

Tobacco smoke comprises over 4,000 different substances, approximately 70 of which are carcinogenic. Owing to the smoke's complex composition, nicotine was selected as a tobacco-specific substance, and acrylonitrile for evaluation of the exposure to environmental tobacco smoke.

At the IFA, methods were developed and validated for measuring nicotine and acrylonitrile in environmental tobacco smoke. The internal exposure of the test subjects was determined by the IPA, by measurement of nicotine and its metabolic products in the urine and saliva and of a haemoglobin adduct of acrylonitrile in the blood.

In the summer of 2008, a total of 134 stationary (at the bar/counter) and personal samples were taken for 37 non-smoking employees in eleven hospitality venues in Bochum and Cologne (café/bistro: 44; pub/bar: 68; discotheque: 22).



Tobacco smoke

Sampling was conducted in most cases from the evening through to the early morning hours, and also during the morning in cafés/bistros. The stationary measurements were repeated in eight smoking hospitality venues in the winter of 2008/2009.

### Results and Application

Nicotine and acrylonitrile were detected in all air samples. In the summer, the concentrations for nicotine lay between 1.2 and 152  $\mu\text{g}/\text{m}^3$ , and for acrylonitrile between 0.1 and 8.2  $\mu\text{g}/\text{m}^3$ , with a close correlation between the two.

The highest exposures were found in discotheques (nicotine: 19.5 to 152  $\mu\text{g}/\text{m}^3$ ; acrylonitrile: 1.9 to 8.2  $\mu\text{g}/\text{m}^3$ ), the lowest in cafés/bistros

(nicotine: 1.2 to 43.2 µg/m<sup>3</sup>; acrylonitrile: 0.1 to 2.5 µg/m<sup>3</sup>). The values measured in pubs/bars lay between these extremes.

The values in all hospitality venues were higher in the winter, even reaching those of discotheques where the number of customers was high.

Among the catering staff, the bar/counter staff were subject to exposure that was higher, in some cases substantially so, than that experienced by the waiting staff, depending upon the precise nature of their tasks. Besides the trend over the course of the day (maximum values late in the evening), higher nicotine and acrylonitrile concentrations were observed at the weekends.

The results of the study clearly show the breadth of the catering staff's exposure to environmental tobacco smoke. A typical workplace with characteristic exposure to environmental tobacco smoke does not exist. Besides the number of smoking customers, the time of day and the characteristics of the premises are influencing factors.

If the values obtained by the IPA by biomonitoring are considered in addition to the air measurements, the maximum values measured for discotheque personnel reveal an exposure level equivalent to that for people who smoke a few cigarettes each day.

## Area of Application

Operators of hospitality venues; all employees in the catering sector who are exposed to environmental tobacco smoke.

## Additional Information

- Nikotin (Code 8108) und Acrylnitril (Code 6041). In: BGIA-Arbeitsmappe Messung von Gefahrstoffen. Vol. 41 X/2008. Published by: Institut für Arbeitsschutz der Deutschen Gesetzlichen Unfallversicherung (IFA), Sankt Augustin. Erich Schmidt, Berlin 1989 – loose-leaf (in German)  
[www.bgia-arbeitsmappedigital.de/8108](http://www.bgia-arbeitsmappedigital.de/8108) and  
[www.bgia-arbeitsmappedigital.de/6041](http://www.bgia-arbeitsmappedigital.de/6041)

## Expert Assistance

IFA, Division 2: Chemical and biological hazards  
Institut für Prävention und Arbeitsmedizin der DGUV (IPA), Institut der Ruhr-Universität Bochum

## Literature Requests

IFA, Central Division