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AIR QUALITY IN PASSENGER CABINS OF DC-9 AND MD-80 AIRCRAFT

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ABSTRACT

The air quality in the passenger cabins of DC-9 and MD-80 aircraft has been studied on 48 representative flights. A portable air sampling case was used. No observations of health effects were made. The average levels of the components related to environmental tobacco smoke, were for respirable suspended particles 60, 250, 160 and 220 μg/m^3; for nicotine 5, 41, 21 and 32 μg/m^3; and for carbon monoxide 0.6, 1.1, 0.8 and 1.1 ppm in Business Non-Smoking, Business Smoking, Tourist Non-Smoking and Tourist Smoking sections respectively. The levels of carbon dioxide and relative humidity were about 1300 ppm and 25 percent in all sections respectively.

INTRODUCTION

Very few studies of air quality in aircraft passenger cabins have been performed due to the technical problems involved. The development of portable air sampling units has made it possible to do studies under normal operating conditions. Previous studies have dealt mainly with the impact of environmental tobacco smoke (ETS), with only limited attention to humidity, temperature, ozone and chemicals not directly related to ETS, such as carbon dioxide and nitrogen oxides. They were reviewed and summarized by Holcomb 1988 (1). He concludes that measurements of the constituents of ETS fail to support claims that exposure levels in aircraft affect adversely the health of non-smoking passengers or crew and that the available scientific evidence does not support the prohibition of smoking on commercial aircraft. Other factors of importance for cabin air quality have also been studied (2,3, 4, 5). The results of those studies show that aircraft cabin air quality is generally similar to indoor air quality, except for particularly low relative humidity, low air pressure and low oxygen partial pressure.

The present study sought to obtain reliable data on air quality on one series of aircraft by analyzing air samples from a large number of Scandinavian Airline System (SAS) flights under various conditions. Besides concentrations of respirable suspended particles (RSP), nicotine and carbon monoxide, which are used as markers of ETS, carbon dioxide concentrations and relative humidity and temperature were used to evaluate cabin air quality. No observations of health effects were made.