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Development of continuous inspection of indoor aerosol in classroom of Peoples Friendship University of Russia

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Concerning air pollutants, most attention was invariably directed to the outdoor air quality. Indoor aerosol particles cause a health hazard because most people spend most of their time indoors. (Van Grieken *et al*, 2006). The inhalation way of the entering of particles is most dangerous, since even with the small concentrations of aerosol particles in the atmosphere, the large volume of inhaled air regarding the big surface area of the respiratory tract (about 50 M^3/day and 70 M^2), beside the enter transfer activity of aerosol particles (Vasilenko, 1999). Studies indicate that are more than 30 cancerous materials metal (Pb, As, Be, Ni, Cr, etc.), asbestos, polycyclic, aromatic, hydrocarbons and their derivatives, and radioactive materials, which adhere to the indoor aerosol particles (Jiang *et al*, 2004). Particle size is the most important physical parameter, which influences their behavior before entering the organism; the depressiveness of aerosols can be different - from the thousandths of micron to tens of microns. Usually aerosols are polydispersonal. The divisions of respiratory organs noticeably are distinguished as far as such indices as the precipitation of aerosols, mechanisms and the speed of their removal. Therefore, it is very important to identify the sources of the indoor aerosol particles. This fine dust can penetrate deeply in the respiratory system, be taken up in the blood stream and cause local inflammations, and lead to asthma attacks, bronchitis, lung cancer and heart diseases. Indoor pollutant measurements were carried out to assess the relation between the type and amount of factors which affect indoor air pollutants and the comfort and quality of indoor environments.

We have recently measured size spectra and concentration of aerosols inside in classroom of Medical Faculty of Peoples Friendship University of Russia (PFUR). Around-the-clock work of aerosols counter during many days let to obtain typical regime characteristics of in-door aerosols in background state of classrooms (without students) and during lessons. Two-three times increasing of total aerosol concentration or drastic change in size spectrum comparing with regime data let for professors and tutors to make a resolve about short break in studies and aerate class-room. Also we develop our air-control system for automatic control of air quality by university technical service. We use two type of equipment: laser counter FLUKE 983 (control of particulate matter with a diameters 0.3μ, 0.5μ, 1.0μ, 2.0μ, 5.0μ, 10.0μ) and automatic laser counter IDL-1 (Cluster-1) (control of particulate matter with a diameters from 0.5 μ to 120 μ with 450 size groups). IDL-1 combined two regime: aerosols counter and particle sizer (for high concentration of aerosols) with Low Angle Laser Light Scattering (LALLS) method. IDL-1 was developed by our group combined with A.V. Dumansky Institute of Colloidal Chemistry and Chemistry of Water (Kiev).

We have obtained the data about the total regime concentration of in-door aerosols in the different places and condition in the class rooms. The typical background total aerosol concentration is measured with many days continuous measurement. Back ground time-curve of aerosols concentration presents on figure 1. It is very necessary to fast prevent dramatic changing in aerosols concentration because during winter period some students may be latent carrier of respiratory infection diseases. Now we control the presence in in-door aerosols influenza A virus with nested PCR-detecting of the viruses on aerosols (AFA) filters.

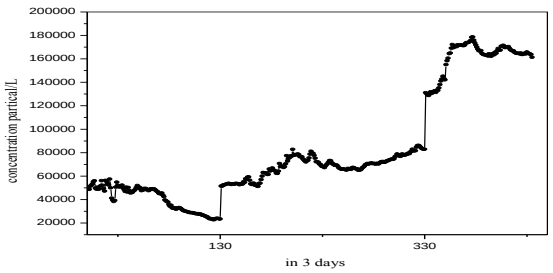

Figure 1. The example of the time-curve of aerosols concentration during three days in classrooms of Medical Faculty of PFUR (December, 2008).

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