

low-molecular compounds as zinc dialkyldithiophosphate, calcium and sodium sulfonates, alkylsalicylates can be referred to exogenous cause factors in development of the most frequent skin pathology in workers having contacts with LCF.

The highest degree of the damaging action is established for semi-synthetic compositions where oil is not practically present, but where there is much more various synthetic compounds. The experimental data show that mono-, di- and triethylamines should be, in the first place, referred to components of semi-synthetic LCF that can cause a damaging effect on the skin. In combination with sulfates and sulfonates they can cause reinforcement of the irritation effect. The presence of polyalkylenglycoles in the content of synthetic compositions can decrease the intensity and rates of the damaging effect of the mentioned components on the skin. The highest degree of the damaging effect is specific for semi-synthetic compositions and emulsified LCF where there are no polyalkylenglycols, but where there is a high content of alkanamines and fatty acids that cause the expressiveness of the irritation effect, in the first case, and results in higher rates of the damaging effect, in the second.

Thus, the use of lubrication-cooling fluids needs constant medical examination of workers, aiming to determine skin lesions especially at the stage of introduction of new LCF into industry.

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O30

SCE and MN frequencies in aircraft maintenance personnel exposed to jet propulsion fuel

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Over 2 million military and civilian personnel per year are occupationally exposed, respectively, to jet propulsion fuel-8 (JP-8), JP-8 +100 or JP-5, or to the civil aviation equivalents Jet A or Jet A-1. Approximately 60 billion gallon of these kerosene-based jet fuels are annually consumed worldwide. JP-8 kerosene-based hydrocarbons fuels are complex mixtures of aliphatic and aromatic hydrocarbon compounds; including varying concentration of potential toxicants such as benzene n-hexane, toluene, xylene, trimethylpentane, methoxyethanol, naphthalenes (including polycyclic aromatic hydrocarbons (PAHs)). The potential adverse effects of dermal and inhalation exposure of jet fuels

are important for health hazard evaluation in humans. Few studies have addressed the genotoxic effects of low exposure to JP-8. The aim of this study was to evaluate genotoxic effects in jet fuel maintenance personnel ($n=43$) in comparison with a selected control group ($n=38$). Genotoxic effects were evaluated by cytokinesis-blocked micronucleus (CBMN) and sister chromatid exchange (SCE) techniques on lymphocytes. The mean values of SCE and MN frequencies in peripheral lymphocytes the personnel and controls were 6.44 ± 0.98 , 6.03 ± 0.56 , and 3.72 ± 1.44 , 3.26 ± 1.25 , respectively ($p < 0.05$, $p > 0.05$). Smokers had significantly higher values of SCE and MN at baseline than did nonsmokers. The effect of age and smoking for parameters stated above were also evaluated. In conclusion, our results revealed a significant increase in frequency of SCE in peripheral blood lymphocytes obtained from aircraft maintenance personnel ($p < 0.05$). The frequency of SCE and MN in smokers is higher than nonsmokers. There were interaction between cigarette smoking and JP-8 exposure for SCE and MN frequencies.

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O31

Occupational exposure limits: A comparative study of the levels today and development during the past 10 years

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Occupational exposure limits (OELs) is an important regulatory instrument to protect workers' health from adverse effects of chemical exposures. The OELs mirrors the outcome of the risk assessment and risk management performed by the standard setting actor, and in this study we compared the OELs established by 17 different organisations or national regulatory agencies, including the European Commission (EC), private initiatives (e.g. ACGIH), and EU—as well as non-EU member states. The OELs were compared with respect to: (1) what chemicals have been selected, (2) average level of exposure limits for all chemicals, and (3) similarity between the OELs of different EU member states and the OELs recommended by the European Commission. Our database contains OELs for a total of 1334 substances; of these 26 substances have OELs from all 17 organisations while more than one third of the substances are only regulated by one organisation. The average level

of the exposure limits has declined during the past 10 years for six of eight organisations in our study that have had limits during this period; it has increased for Poland and remained nearly unchanged for Sweden. Still, the average level of OELs differs between organisations; the US OSHA exposure limits are (on average) nearly 40% higher than those of Poland. The scientific or policy-related motivations for these differences remain to be analyzed. For EU member states the similarity measure indicates that the exposure limits are converging towards the European Commission's recommended OELs.

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O32

Effect of nanosized particles on pulmonary surfactant function

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After inhalation, nanoparticles reach the deeper airways and get into contact with the pulmonary surfactant layer, whose main function is to lower surface tension in the alveoli. The aim of our study was to determine if nanosized particles induce a dysfunction of pulmonary surfactant.

TiO₂ (10 nm anatase and 1.3 μm rutile), plain (hydrophobic) and PEGylated (hydrophilic) polystyrene nanoparticles (50 nm) and quartz (2 μm) in increasing concentrations from 50 μg/ml up to 500 μg/ml were incubated with a natural porcine surfactant preparation (Curosurf). Phospholipid concentration was adjusted to 1.5 mg/ml in ringer solution. Surfactant function was measured in a pulsating bubble surfactometer.

TiO₂ nanoparticles and plain polystyrene nanoparticles at concentrations of 200 and 500 μg/ml caused slight but significant increases in adsorption surface tension. For TiO₂ augmentations from 27.9 to 30.8 and 32.5 mN/m, respectively, and for plain polystyrene nanoparticles increases from 28.8 to 32.4 and 33.3 mN/m, respectively, were noted. Surface tension at minimal bubble size was increased at 500 μg/ml from 4.9 to 8.1 mN/m (TiO₂) ($p < 0.05$) and from 3.8 to 6.4 mN/m (plain polystyrene particles) ($p < 0.01$). PEGylated polystyrene nanoparticles in each concentration induced significant decreases of adsorption surface ten-

sion ($p < 0.001$). Both tested microparticles did not affect surface tensions.

Our results demonstrate that nanoparticles induce a slight surfactant dysfunction at high concentrations. We conclude that this effect is at least partly modulated by the hydrophobic/hydrophilic nature and the size of the particles. However, respective concentrations are manifold in excess of what is normally reached in vivo.

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O33

Comparison of polycyclic aromatic hydrocarbon levels in placental tissues of Indian women with full and preterm deliveries

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Background: Polycyclic aromatic hydrocarbons (PAHs) are ubiquitous environmental contaminants formed from incomplete combustion of organic matter. They are reported to alter trophoblast proliferation in placenta, disturbing its endocrine functions and endangered preterm delivery. Taking into consideration present study was planned to assess possible involvement of its exposure to pregnant women with preterm delivery cases of women from India. **Method:** Total 60 mothers ($n = 26$ full term; and $n = 23$ preterm deliveries) were recruited at a local nursing home, for the period of August 2005–February 2006. Subsequent to parturition, placental tissue from each participant was collected, homogenized and extracted for PAHs, to be analyzed on HPLC using fluorescence detector. **Results:** Mean \pm S.D. placental level of benzo(*b*)fluoranthene, a carcinogenic PAH (72.91 ± 12.43 ppb) was found significantly elevated ($p < 0.05$) among women suffer preterm delivery when compared it with the level (31.84 ± 7.01) in women those having full term deliveries. Among non-carcinogenic PAHs, fluoranthene (305.91 ± 45.14 ppb) level was also detected higher in pre-term delivery group than the level (277.6 ± 21.93 ppb) found in full-term delivery group of women. Additionally naphthalene, acenaphthylene, phenanthrene, anthracene, benzo(*a*)pyrene and dibenz(*a,h*)anthracene levels in placental tissue were also found to be higher in preterm delivery group of women but the difference did not reach to statistically significant level. **Conclusion:** This foremost study from India with modest samples size