Cardiovascular and respiratory effects of RME biodiesel exhaust exposure

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Air pollution is a global environmental and health concern, contributing to onset and deterioration of respiratory and cardiovascular diseases. As climate change and dependence on diminishing fossil fuel supplies have taken center stage in political and scientific debates, renewable CO₂-neutral fuels like biodiesel receive increasing attention. The most common biodiesel within the EU, RME (rapeseed oil methyl ester), has been shown to emit fewer exhaust particles compared to standard petro diesel and this perceived “green fuel”, being sustainable and of biological origin, is often predicted to be less harmful to human health. Whilst replacing petro diesel with biodiesel may have advantageous ecological impacts, consequences to public health remained unexplored. In three separate studies, healthy volunteers were exposed to filtered air, petro diesel or biodiesel exhaust for one hour in a controlled chamber. Following exposure in study one and two, cardiovascular endpoints were assessed. In study three, bronchoscopy was performed six hours following completion of exposure. Compared to petro diesel, RME exhaust contained less elemental carbon, fewer poly aromatic hydrocarbons, lower levels of hydrocarbons and higher concentration of nitrogen oxides. RME showed a shift in the particulate matter size distribution towards the ultrafine range and a significantly increased concentration of a range of metals relative to petro diesel. These studies demonstrate that RME exhaust exposure results in comparable adverse respiratory and cardiovascular effects to petro diesel exhaust despite varying composition and particle reactivity. We would recommend that adverse health effects be addressed alongside environmental concerns when new fuel policies are considered due to potential major public health impacts.

Biography

Jenny Bosson completed her Bachelor of Science at Roanoke College, VA, USA and then went on to complete her MD and PhD at Umea University School of Medicine, Sweden. She is currently a physician and senior researcher at the Department of Medicine, Division of Respiratory Medicine and Allergy at University Hospital in Umea, Sweden. She has published over 15 papers in reputed journals and is a supervisor to several PhD and medical students conducting research within health effects of air pollution as well as e-cigarettes and tobacco.

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