Nitrogen Oxide: Implications of Urate on a Vehicle Air

Authors: Kenneth Lawrence Geoffrey Johnson Dustin Castro Donald Moore James Greene

Published Date: 03-19-2019

University of California-Berkeley

School of Biology

Despite the fact that even though the current fuel mandates only call for about 5 to 6% of gasoline to be used for ethanol, in just five years ethanol consumption has grown from a low of 5% to the present point where itâ€™s been estimated at 10% of all gasoline consumption in the U.S. Japanâ€™s consumption of ethanol does not exceed 0.1%. Currently in Japan we use five ethanol sugar molasses as a blending fuel. However, at this moment and most of the time the E-5 specification for motor fuel is being implemented. Under the E-5 standards in general, the oxygenated gasoline will be used, however for a final fuel that has E-5 gasoline and NMRI 100 ppm included, a special pressure gauge control for the oxygenate concentration needs to be used for that particular motor fuel. As the automobile industry starts doing this, which would be implemented in the next coming years, it is highly likely that researchers will come up with more and more studies on this matter.

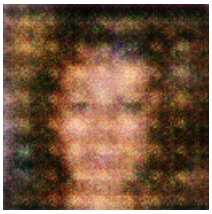
This study, published last August in the journal Environmental Health Perspectives is led by Prof. Ikuo Tsuchida from Tokyo Institute of Technology and involves Yayoi Yamamoto and Tipako Yamamoto from the National Institute of Advanced Industrial Science and Technology and Taku Inokuchi of Tokyo Institute of Technology.

They conducted a study on the effects of the toxicity of Monosodium urate (MUR), a common sugar-based detergent, that is produced by an enzyme found in rotted biomass plant. As a matter of fact, more than half of the urate produced is when plant material decomposes and this urate gets into the air. When a person breathes in this urate, they are exposed to the chemical nitrogen oxide. As a matter of fact, if the plant source and the charcoal burning for cooking emit nitrogen oxide, they can degrade our gut contents causing other complications. We need to have a balance between the nitrogen oxide and potassium dioxide for a safe life. People with well-balanced gut contents, however, they do not produce the auto-mucus acid that converts potassium to urate. This acid is what the urate comes from.

Just to understand the symptoms of this urate acid is generated after exhaust process which occurs during the emission stage, the researchers looked to see how the urine might be affected by these nitrogen oxide and potassium dioxide as follows. This could identify people that have a deficiency of urate acid. Researchers at the National Institute of Advanced Industrial Science and Technology measured the urine of 344 random participants without any intervention at the start of the experiment. At the end of the experiment, they collected urine from 116 participants who had a continuous period of starchy processing and 60 participants who had never been exposed to starchy processing.

In order to better understand the adverse effects of the urine on the air, the researchers showed that subjects with low level of urate acid in their urine resulted in the secretion of blue dye which had nitrogen oxide content. By conducting air pollution analysis, they confirmed that the urine does not mix with the surrounding air. If the urine is acidic in its composition, it reacts with air gases and vapors causing an alteration in the air pollutant. If the urine is low in urate acid, that organo-chemical effect does not occur. The researchers could establish that the nitrogen oxide is thought to lead to the emission of sulfur dioxide which leads to the formation of ozone. Also the oxide has an effect on the balance of nitrogen dioxide, potassium dioxide and sulfur dioxide that is released from the exhaust processes. It is very likely that the nitrogen dioxide is not from the meat as it would need to be from the gases that are included in the exhaust process. On the other hand, the carbon dioxide has a uniform acidity level so any increase in the balance of nitrogen dioxide, potassium dioxide and sulfur dioxide that is released in the exhaust process only results in this slight increase in the nitrogen dioxide levels.

The explanations on the added content of nitrogen dioxide, besides the emissions from animal and cooking sources.



A Fire Hydrant In The Middle Of A Forest