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ASSESMENT OF GAS COOKING IMPACT ON INDOOR NITROGEN DIOXIDE POLLUTION USING MACHINE LEARNING APPROACH

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Abstract

Recent studies have shown the impact of gas cooking on the occurrence of a significant number of cases of asthma in children in the United States and Europe. This type of cooking was considered as an alternative to be encouraged, especially in developing countries, in the face of cooking with charcoal, the harmfulness of which is proven. It is therefore necessary to evaluate the emissions from gas cooking to estimate their impact on indoor pollution by nitrogen dioxide (NO_2). Thus, we measured every 15 minutes for 7 days the concentration of NO_2 in a kitchen where cooking with gas was regular. We used a micro-sensor dedicated to NO_2 managed by a nanocomputer. This analyzer is part of the models Air Pollution Monitoring System (APOMOS) that we have developed to measure the concentration of air pollutants. Data processing by five Machine Learning models made it possible to identify the most suitable algorithms for predicting NO_2 concentrations based on the number of cooking fires in operation, temperature, and humidity. An analysis of model performance indicates that the K-nearest neighbor regression model is the most suitable for evaluating NO_2 concentrations.

Key words: gas cooking, indoor pollution, micro-sensor, machine learning, NO_2

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