**Title :** Seasonal variations of VOC emissions and secondary aerosol and ozone formation in sugarcane

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# ABSTRACT

Air pollution in Thailand, particularly from volatile organic compounds (VOCs), is a major contributor to air quality issues. This study aims to investigate the seasonal variation of VOC emissions, assess the formation of secondary aerosols, and ozone production in sugarcane fields in Nong Bua Lamphu Province using the TDU-GC-MS technique. Samples were collected throughout 2023, covering three seasons: summer, rainy, and winter. The analysis revealed that Alkanes accounted for 41%, Alkenes for 34%, Aromatics for 12%, Haloalkanes for 5%, and OVOCs for 8%. Based on the OFP and SOAP calculations, Phenol showed the highest values in both indices during the summer, while Isoprene and Phenol were predominant in the rainy and winter seasons, respectively. The variation in VOC emissions across seasons is attributed to factors such as plants releasing Isoprene to protect themselves from heat and sunlight stress. Thus, meteorological factors like temperature and humidity play a crucial role. This study provides foundational knowledge for further research on air pollution.