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LIST OF ABBREVIATIONS

CalEPA	The Office of Environmental Health Hazard Assessment (OEHHA) of California Environmental Protection Agency
DCM	Dichloromethane
c-PAHs	Carcinogenic PAHs
EFs	Emission factors
GC-MS	Gas Chromatography-Mass Spectrometry
hrs.	hours
ICR	The inhalation cancer risk
LOD	Limit of detection
LOQ	Limit of Quantification
MEF	Mutagenic equivalent factor
MEF	Mutagenic equivalent factor
mg/L	milligram per liter
NAAQS/EPA	The National Ambient Air Quality Standard-U.S.-Environmental Protection Agency
nc-PAHs	Non-carcinogenic PAHs
ng/m ³	nano-gram per cubic meters
PAHs	Polycyclic aromatic hydrocarbons
PCD	Pollution Control Department, Thailand
PM _{2.5}	Fine particulate
PM ₁₀	Coarse particulate
ppbv	part per billion by volume
ppm	part per million
TEF	Toxic equivalent factor
TEQ	Toxicity equivalent concentration
t-PAHs	Total PAHs
TSP	Total suspended particle

$\mu\text{g}/\text{m}^3$

microgram per cubic meters

WHO

World Health Organization



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ข้อความแห่งการริเริ่ม

วิทยานิพนธ์นี้ได้นำเสนอความรู้ใหม่สรุปได้ดังนี้

- 1) การปล่อยมลพิษจากการจุดธูป ได้แก่ฝุ่นละอองขนาดเล็กกว่า 2.5 ไมครอน(PM_{2.5}) และก๊าซต่าง ๆ ซึ่งอาจมีผลกระทบต่อสุขภาพมนุษย์ การวิจัยครั้งนี้สามารถนำไปเป็นข้อมูลพื้นฐานให้หน่วยงานของรัฐและผู้ที่เกี่ยวข้องนำไปจัดการเรื่องจัดการคุณภาพอากาศภายในอาคารจากการใช้ธูป ประชาชนได้ทราบข้อมูลและตระหนักถึงความเสี่ยงจากการสัมผัสควันธูป
- 2) การปล่อยมลพิษจากการเผาวัตถุดิบที่ใช้ในการผลิตธูป และการเลือกใช้ธูป โดยพบว่าธูปหอมไว้ควันลดการปล่อยฝุ่นละอองขนาดเล็กกว่า 2.5 ไมครอน และ ก๊าซมลพิษได้ ธูปที่มีส่วนผสมจากเปลือกกล้วย (ซึ่งเป็นกากของเสียจากการผลิตกล้วยอบแห้ง) มีการปล่อยสารพอลิไซคลิกอะโรมาติกไฮโดรคาร์บอนในปริมาณน้อย ซึ่งสามารถนำไปต่อขอจัดการจัดการของเสีย และเพิ่มมูลค่าของสินค้า

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STATEMENTS OF ORIGINALITY

This work has contributed some new knowledge as listed.

- 1) Emission of pollutants from incense burning such as particulate matter with diameter less than $2.5\text{ }\mu\text{m}$ ($\text{PM}_{2.5}$) and toxic gases, which adversely affect human health. Data obtained from this research will be useful for governmental organizations and some related users for indoor air quality management due to incense use. The data provided in this research is expected to rest people awareness on the risk of incense burning exposure.
- 2) Pollutant emission from ingredient of incenses and selection of environmental-friendly incenses. It has been confirmed that smoke-free incense reduce emissions of $\text{PM}_{2.5}$ and toxic gases. Moreover, this research revealed that incense stick produced from longan peels (waste for dried longan production) emit low concentration of PAHs. This finding could be useful in terms of waste management and value added to products.

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