

CORRELATION_OF_PARTICULATE_MATTER_TO_CORONARY_HEART_DISEASE

RT.pdf

by Totong Kamaluddin3

Submission date: 01-Jul-2021 09:59AM (UTC+0700)

Submission ID: 1614408802

File name: CORRELATION_OF_PARTICULATE_MATTER_TO_CORONARY_HEART.pdf (1.81M)

Word count: 3707

Character count: 20131

**A^{JM}
BES** Vol. 20, No. 2, 2018

(ISSN 0972-3005)

Asian Journal of Microbiology, Biotechnology & Environmental Sciences

MICROBIOLOGY

BIOTECHNOLOGY

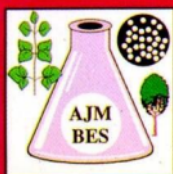
ENVIRONMENTAL SCIENCES

Editors

P.K. Wong

R.K. Trivedy

Sadhana Sharma



Global Science Publications, India

ASIAN JOURNAL OF MICROBIOLOGY, BIOTECHNOLOGY AND ENVIRONMENTAL SCIENCES

(VOL. 20 NO. 2, 2018)

CONTENTS

- 1-7 ANALYSIS OF FACTORS AFFECTING THE SELF-CARE BEHAVIORS OF DIABETES MELLITUS TYPE 2 PATIENTS IN BINJAI, NORTH SUMATERA-INDONESIA
—RINA AMELIA, AZNAN LELO, DHARMA LINDARTO AND ERNA MUTIARA
- 8-11 FUNGAL TRANSFORMATION OF OFLOXACIN AND ENROFLOXACIN
—I.A. PARSHIKOV AND EM. KHASAEVA
- 12-15 ARTHROPOD DIVERSITY DURING VEGETATIVE PHASE OF RICE FIELD AT KEDAH, MALAYSIA
—F.H. SAHARI AND L.A. MANAF
- 16-19 ANTIBACTERIAL PROPERTIES OF HONEY AND PROPOLIS PRODUCED BY BOTH *HETEROTRIGONA ITAMA* AND *GENIOTRIGONA THORACICA* STINGLESS BEE
—NURHIDAYAH AB RAHIM, MOHD HAFIZ MAIL, ESHAIFOL AZAM OMAR, ROZ AZINUR CHE LAMIN^C, SITI NURSHAHIDA NAZLI, NURHIDAYAH SABRI AND NOORZAFZA ZAKARIA
- 20-26 THE CONCEPTUAL DESIGN OF DECISION SUPPORT SYSTEM TO PRESERVE *Neolissochilus hexagonolepis* (McClelland, 1839) IN PELUS RIVER, PERAK
—NUR SYAFIQAH CHE HUSSIN, LATIFAH ABDUL MANAF AND NOR ROHAZAH JAMIL
- 27-43 VARIATION IN THE STOMATAL TYPES AND ANTICLINAL WALL PATTERNS IN MALAYSIAN SAPINDACEAE SPECIES
—MOHD. NORFAIZAL, G., NORAINI, T., A. LATIFF, MASROM, H., SALMANIZA, S. AND NURSHAHIDAH, M.R.
- 44-48 BREEDING HABITATS OF MOSQUITO LARVAE IN A PADDY GROWING AREA IN KUALA PILAH, NEGERI SEMBILAN, MALAYSIA
—O. WAN-NORAFIKAH, C.D. CHEN, M.H. MOHD-AMIR, A.H. AZAHARI, A.H. ZAINAL-ABIDIN, W.A. NAZNI, M. MARIAM, J. MOHD-SHAHIZAN AND M. SOFIAN-AZIRUN
- 49-52 EVALUATION OF DIAGNOSTIC VALUE OF C REACTIVE PROTEIN IN NEONATAL SEPSIS
—RONNIMOL JOJI, APARNA Y. TAKPERE AND SHILPI GUPTA
- 53-59 ISOLATION, ANTIBIOTIC PROFILE AND GLYPHOSATE UTILIZATION OF *PSEUDOMONAS AERUGINOSA* FROM RICE PADDY SOILS IN EBONYI STATE, NIGERIA
—GODWIN NKWUDA NWONUMARA, CHIBUIKE IROGBU, BONIFACE NWOFUKE UKWAH, MOSES IKECHUKWU BENJAMIN, JOHN IDENYI NWOKPURU, OGONNA CHRISTIANA ANI, AMOS NWORIE, AUGUSTINE OKOH OKPANI, OBI IHUOMA A., EGWUOM GODSWILL BLESSING C., VICTOR UDOH USANG AND NSE OKON UMONG
- 60-71 THE EXISTING VALUES OF SMALL ISLAND'S VULNERABILITY INDEX BASED ON EXPOSURE DIMENSION: A CASE STUDY OF KAWE REGIONAL MARINE PROTECTED AREA IN RAJA AMPAT, INDONESIA
—FERAWATI RUNTUBOI, RICARDO F TAPILATU, MARTIN MATULESSY, FRIDA A LOINENAK AND ALIANTO
- 72-80 CHARACTERIZATION OF THERMOPHILIC, ALKALITOLERANT *HYDROGENOPHILUS HIRSCHII* STRAIN MCM B-883 ISOLATED FROM OIL WELL
—MAHESH CHITRAKOTI AND BHARAT SHINDE
- 81-86 ISOLATION AND CHARACTERIZATION OF BACTERIOPHAGE IN CONTROLLING *ESCHERICHIA COLI* IN JEMBER AREA, INDONESIA
—ERLIA NARULITA, IFA SULISTYORINI, GERDA PERMATA AJI, MOHAMMAD IQBAL AND SITI MURDIYAH
- 87-92 MOLECULAR SCREENING OF ROBO2 GENE IN PRIMARY VESICoureTERAL REFLUX PATIENTS IN TAIF REGION, KSA
—A.A. ALHARTHI, E.I. EL-HALLOUS, M.W. ABUKHATWAH, A.M. ALMALKI, A. GABER AND M.M. HASSAN
- 93-99 A SUSTAINABLE APPROACH OF NITRATE ADSORPTION FROM WATER USING PALM OIL AGRICULTURAL WASTE
—M.T. BASHIR, S. ALI, I. AZNI AND R. HARUN
- 100-105 VERY HIGH GRAVITY FERMENTATION WITH ERGOSTEROL AND TWEEN80 SUPPLEMENTATION: A NOVEL APPROACH IN BIOETHANOL PRODUCTION FROM *NYPAFRUTICAN* SAP
—FAJAR RESTUHADI AND EYV ROSSI
- 106-114 MODEL OF GENDER MAINSTREAMING SUCCESSION IN GREEN-BUDGETING APPLICATION IN CENTRAL JAVA PROVINCE INDONESIA
—ABDUL FIKRI FAQIH, SUDHARTO P. HADI AND HARTUTI PURNAWENI
- 115-123 ISOLATION OF A SALT- AND METAL-RESISTANT METHYLOTROPHIC BACTERIA STRAIN ASSOCIATED WITH *RETAMA MONOSPERMA* (L.) BOISS
—N. SELAMI, K. HACHEM, C. AIBECHÉ AND M. KAID-HARCHE

- 124–129 IMMOBILIZATION OF A-AMYLASE FROM *BACILLUS SUBTILIS* ITBCCB148 USING BENTONIT
—YANDRI, T. SUHARTATI, S. D. YUWONO, H.I. QUDUS, E.R. TIARSA AND S. HADI
- 130–137 MULTIPLEX PCR BASED DETECTION OF *SALMONELLA ENTERICA* SEROVARS TYPHI, PARATYPHI A, B AND C IN FOOD
—PARICHAT PHUMKHACHORN AND PONGSAK RATTANACHAIKUNSOPON
- 138–142 IMPACT OF DIFFERENT PLOIDY LEVELS CHANGE ON DIANTHALEXIN CONTENT IN *DIANTHUS CARYOPHYLLUS* L.
—BUSHRA M.J. ALWASH, SATTAR A. SHLAHI AND SUMAYA F. HAMAD
- 143–149 POTENTIAL UTILIZATION OF *MICROCYSTIS* SP. FOR BIODIESEL PRODUCTION: GREEN SOLUTION FOR FUTURE ENERGY CRISIS
—MADUSANKA D.A. T AND PATHMALAL M. MANAGE
- 150–154 BIOCONTROL AND GROWTH PROMOTION ACTIVITY OF ENDOPHYTIC *ASPERGILLUS* SPP. FROM MANGO (*MANGIFERA INDICA* L.)
—R. SANJAY, E. ESAKKIRAJA AND A. DURAI PANDI
- 155–165 EFFECT OF DIFFERENT PHYTOHORMONES ON PLANT REGENERATION OF *GLADIOLUS (GLADIOLUS HYBRIDUS* HORT.) FROM CULTURED CORMEL
—RAM KANYA MALVIYA, M.K. TRIPATHI, VIDHYASHANKAR M.², R.P. PATEL AND A. AHUJA
- 166–172 COMMUNITY EMPOWERMENT THROUGH AGENT OF CHANGE INTO THE EARLY DETERMINATION OF HUMAN TUBERCULOSIS SUSPECTS: A CASE STUDY IN NORTH ACEH REGENCY, INDONESIA
—IBRAHIM, HARRY AGUSNAR, WIRSAL HASAN AND HERU SENTOSA
- 173–176 AEROMYCOFLORA OF DISTRICT CENTRAL LIBRARY OF WARANGAL (TELANGANA)
—A. NARESH, NAGARAJU MULKA, M. SUREKHA, S. RAM REDDY AND S.M. REDDY
- 177–183 INDUSTRIAL EFFLUENT TREATMENT BY MORINGA OLEIFERA AS NATURAL COAGULANT OF DIFFERENT PARTICLE SIZE.
—V. BALAJI, S. ANAND KUMAR VARMA AND R. ASHWIN
- 184–188 STUDY OF SIDEROPHORE PRODUCTION AS A MECHANISM OF ANTIFUNGAL ACTIVITY OF FLUORESCENT *PSEUDOMONAS* SPECIES AS BIOCONTROL ORGANISMS AGAINST *FUSARIUM* AND *PYTHIUM* SPECIES
—B. M. SANDIKAR
- 189–191 IDENTIFYING EFFICIENT CLUSTERING TECHNIQUES FOR CLASSIFYING RAINFALL DATA
—S. SWAMINATHAN AND S. MEGANATHAN
- 192–196 CLASSIFICATION OF MITOGEN ACTIVATED PROTEIN KINASE USING DISCRETE WAVELET TRANSFORMS AND GABOR WAVELET TRANSFORMS
—SHRUTI JAIN
- 197–203 A STRESS TOLERANT *SPHINGOMONAS* FROM TRANS-HIMALAYAN RHIZOSPHERIC SOIL IMPROVES GROWTH OF TOMATO
—D. DOLKAR, P. DOLKAR, O.P. CHAURASIA AND T. STOB DAN
- 204–209 HOST DEPENDENT EXPRESSION OF LACTOSE (*LAC*) PROMOTER IN *AZOTOBACTER VINELANDII* AND *STREPTOMYCIN (STR)* PROMOTER IN *AZORHIZOBIUM CAULINODANS*
—ANIL BALI
- 210–215 *THELOHANELLUS THOUBALENSIS* SP.NOV. (CNIDARIA: MYXOSPORA: MYXOZOA) INFECTING A FRESH WATER FISH *PUNTIUS CHOLA* HAMILTON, 1822 OF THOUBAL, MANIPUR
—T. SONI, N. MOHILAL AND TH. HEMANANDA
- 216–217 QUANTIFICATION OF PROTEIN AND A-AMYLASE ACTIVITY IN FOUR DIFFERENT VARIETIES OF SORGHUM (*SORGHUM BICOLOR*)
—RASHMI KARANI, SHRISHAILNATH SAJJAN, SUHASINI CHIKKALAKI AND SUMA PATTAR
- 218–225 STUDYING CYTOTOXICITY OF LOW CONCENTRATION ARSENATE AND ARSENITE ON IEC-6 CELLS
—SALMATAJ S.A., SHOBHA KAMATH AND RAMACHANDRAMURTY
- 226–234 SCREENING AND CHARACTERIZATION OF PROTEASE PRODUCING MARINE ACTINOBACTERIA *STREPTOMYCES PACTUM* RA71 ISOLATED FROM PULICAT LAKE, CHENNAI, TAMIL NADU, INDIA
—ROCHELLE FERNANDEZ, RADHIKA RAMACHANDRAN AND KANNAN NALLAKUMAR
- 235–243 PATTERN OF RESISTANCE BY VARIOUS PATHOGENS TOWARDS SELECTED ANTIMICROBIALS AND HEAVY METALS
—H.M. NIRBHAVANE AND U.S. BAGDE
- 244–251 EXPERIMENTALLY INDUCED ARSENATE TOXICITY ATTENUATED BY *IXORA COCCINEA* FLOWER EXTRACT IN IEC-6 CELLS
—SALMATAJ S.A., SHOBHA U. KAMATH, V. RAMACHANDRA MURTY AND SREEDHAR PAI

- 252-259 EFFECT OF HEAVY METALS ON ENZYME ACTIVITY IN THE DIGESTIVE GLANDS OF FRESHWATER BIVALVE, *PARREYSIA CYLINDRICA* FROM DIFFERENT RESERVOIRS OF NASHIK DISTRICT
—RAHANE BALASAHEB AND BHALLA RESHAM
- 260-269 GENETIC COMPARISON AMONG HIGH PHOSPHATE-SOLUBILIZING MUTANTS OF *ENTEROBACTER CLOCAE* VIA RAPD-PCR ANALYSIS
—EL-HAMSHARY, O. I. M., EFFAT A. M. SOLIMAN, HIBA J.K. AL-MUSALAM AND ALAWIAH ALHEBSHI
- 270-276 QUALITY ANALYSIS OF SILKY PUDING OF CORN STARCH EXTRACT DURING COLD STORAGE
—SITTI NURMAH, MURSIDA, ANDI YUSLIM PATAWARI AND TASIR PAMMULA
- 277-283 QUANTITATIVE STRATEGIC PLANNING MATRIX APPLIED TO FOREST CONSERVATION MANAGEMENT IN BALURAN NATIONAL PARK
—A. SISWANTO, MOELJADI, DJUMILAH AND ROFIATY
- 294-290 THE 5'TAQ-NUCLEAZE ANALYSIS FOR DETECTION *CAMPYLOBACTER FETUS* SUBSP. *VENERIALIS* IN CLINICAL SAMPLES OBTAINED FROM CATTLE
—O.O. ZHANSEKNOVA, Y.S. USSEBOKOV, SH. N. KASSYMBEKOVA, M.T. NURGALIYEVA, U.S. TASTAGANOVA AND A.K. KHAMZINA
- 291-295 THE FAMILY HEALTH EMPOWERMENT IN THE STROKE PREVENTION IN THE PUSKESMAS OF ULEE KARENG, BANDA ACEH-INDONESIA
—MARLINA, BADARUDDIN, FIKARWIN ZUSKA AND RAHAYU LUBIS
- 296-299 CORRELATION OF PARTICULATE MATTER TO CORONARY HEART DISEASE IN PALEMBANG
—MARSIDI, M.T. KAMALUDDIN, FAUZIAH N. KURDI AND NOVRIKASARI
- 300-304 APPLICATION OF ANTIOXIDANTS IN RATIONS OF LACTATING COWS FOR INCREASING CONSUMER CHARACTERISTICS OF MILK AND PRODUCTS OF ITS PROCESSING
—AMINA S. DZHABOEVA, MARINA G. KOKAEVA, SAIDA N. EDIGOVA, AMINET B. THAISHAOVA ANNA V. KHMELEVSKEYA, ALEKSANDR V. YARMOCAND GEORGY K. VASILADI
- 305-309 EFFECT OF PROBIOTIC AND ADSORBENT ON PRODUCTIVITY AND METABOLISM OF BROILERS WHEN VIOLATING THE FEEDING ECOLOGY
—ANGELICA A. BAEVA, SERGEI I. KONONENKO, MATVEY N. MAMUKAEV, LADA A. VITYUK, RAISA V. OSIKINA, MARIYA S. GALICHEVA AND TALADIN N. KOKOV
- 310-314 USE OF ANTIOXIDANT AND PROBIOTIC IN DIETS OF LAYERS TO REDUCE THE RISK OF AFLATOXICOSIS
—FATIMA N. TSOGOEVA, RUSTEM B. TEMIRAEV, MATVEY N. MAMUKAEV, RAISA V. OSIKINA, IRINA R. TLETSERUK TALADIN N. KOKOV AND GEORGY K. VASILADI
- 315-318 EFFECT OF DIFFERENT DOSES OF ANTIOXIDANT ON THE PROCESSES OF RUMEN METABOLISM IN DAIRY CATTLE WHEN VIOLATING THE FEEDING ECOLOGY
—MARINA G. KOKAEVA, VIKTORIA V. TEDTOVA, BORIS A. DZAGUROV, INNA I. KORNOUKHOVA, ALJA N. DOEVA, NATALYA V. LYASHENKO AND KHETAG E. KESAEV

CORRELATION OF PARTICULATE MATTER TO CORONARY HEART DISEASE IN PALEMBANG

MARSIDI*^{1,2}, M.T. KAMALUDDIN³, FAUZIAH N. KURDI⁴ AND NOVRIKASARI⁵

¹Environmental Science Department, Postgraduate Program, Sriwijaya University, Palembang, Indonesia

²Public Health Department, Postgraduate Program, BinaHusada College of Health Sciences, Palembang, Indonesia

³Faculty of Medicine, Sriwijaya University, Palembang, Indonesia

⁴Faculty of Education, Sriwijaya University, Palembang Indonesia

⁵Faculty of Public Health, Sriwijaya University, Palembang, Indonesia

(Received 17 February, 2018; accepted 21 March, 2018)

Key words : $PM_{2.5}$, PM_{10} , Coronary Heart Disease, Palembang

Abstracts – The short-term particulate exposures stimulate the heart attacks in the risk-population and increase the mortality. The study aims to prove the correlation of particulate exposure to the coronary heart disease in Palembang. The particulate data ($PM_{2.5}$ – PM_{10}) are obtained from the measurements on the parking zone of 39 puskesmas (primary health care) in Palembang in which the data of coronary heart diseases are obtained from the data of new outpatient who visit at the puskesmas reported at health office department of Palembang. The data is formed in the forms of average, standard deviation, minimum and maximum, and analyzed statistically with Spearman correlation method. The results present that there is no correlation between the particulate exposure ($PM_{2.5}$ and PM_{10}) against coronary heart disease in Palembang.

INTRODUCTION

The recent research suggests that the short-term exposure could trigger the heart attacks in the risk-population and increase the mortality (Brook *et al.*, 2010). Chen *et al.* (2016a) conducted a study on the effect of $PM_{2.5}$ exposure on the population causing death in China and found that the reducing of the mean annual concentration of $PM_{2.5}$ by 35 $mg.m^{-3}$ could decrease the annual death rate for cardiovascular, lung cancer, and respiratory diseases of 89.000, 47.000, and 32.000, respectively. Furthermore, Chen *et al.* (2016b) assessed the risk of ambient PM_{10} causing the death and the results showed that PM_{10} effects in the years of life lost in men and parents

The WHO database compiles $PM_{2.5}$ and PM_{10} from the measurements for approximately 3000 cities around the world and estimates only one in ten people breathing with the clean air (WHO, 2016). The particle pollutants could form the small solid or liquid particles in the air (Dockery, 2009; Brook *et al.*, 2010; WHO, 2016). The ambient particulates have a devastating impact on the

human health (Katsouyanni, 2003; Pope III and Dockery, 2009; Brook *et al.*, 2010; Du *et al.*, 2016; Chen *et al.*, 2016a; Bourdrel *et al.*, 2017). These small particles pose a health risk because the particles can be inhaled, passing through the throat and entering the lungs (Brook and Rajagopalan, 2010; Brook *et al.*, 2010).

The most dangerous particles are the particles that are classified as fine particles, smaller in diameter than 2.5 microns (about 30 times smaller than the diameter of a human hair) (WHO, 2016). These microscopic particles, known as $PM_{2.5}$ that inhale to the lungs, generate the health problems and in the long-term exposure exacerbate the respiratory problems. The high concentrations of $PM_{2.5}$ initiate the coughing, irritation of the eyes, nose, throat (WHO, 2016), lung irritation, and shortness of breath (Brunekreef *et al.*, 2009), cardiovascular (Freitas *et al.*, 2010; Brook *et al.*, 2010; Du *et al.*, 2016; Stockfelt *et al.*, 2017), atherosclerosis (Brook and Rajagopalan, 2010). Some groups are very sensitive to $PM_{2.5}$ including children, the elderly, and people with existing respiratory problems including asthma and respiratory organ

Corresponding author's email: marsidisaid@gmail.com

¹Doctoral Student of Environmental Science

problems and liver. The long-term $PM_{2.5}$ exposure is associated with the increase of mortality (Brook *et al.*, 2010; Du *et al.*, 2016), especially in coronary heart disease (Gill *et al.*, 2011; Ye *et al.*, 2016; Pena and Rollins, 2017). The study aims to prove the correlation of particulate exposure to the coronary heart disease in Palembang

MATERIALS AND METHODS

The data of $PM_{2.5}$ and PM_{10} were obtained from the measurements using mini particle counter DT-96 (CEM, Shenzhen-China) at 39 puskesmas (primary health care) in Palembang in the fourth week of January 2018. The data of patients with the coronary heart disease in 2017 was obtained from the reports of outpatient visitation at 39 puskesmas to health service department in Palembang. All the data was processed in the forms of average data, standard deviation, minimum and maximum and analyzed by Spearman method.

RESULTS

Fig. 1 showed the location of puskesmas in Palembang. The data of particulate measurement and data collection of coronary heart disease at 39

puskesmas in Palembang were shown in table 1. Table 1 and Fig. 2 showed that the ambient of $PM_{2.5}$ had an average value of $10.77 \mu\text{g}\cdot\text{m}^{-3}$ with a standard deviation of 5.59. The minimum and maximum value of $PM_{2.5}$ were $4 \mu\text{g}\cdot\text{m}^{-3}$ and $33 \mu\text{g}\cdot\text{m}^{-3}$ located in the puskesmas of Multi Wahana and Plaju. For the ambient of PM_{10} , the average value was measured as $19.46 \mu\text{g}\cdot\text{m}^{-3}$ with a standard deviation of 9.37 the obtained minimum and maximum value of PM_{10} were $9 \mu\text{g}\cdot\text{m}^{-3}$ and $44 \mu\text{g}\cdot\text{m}^{-3}$, respectively which located in the puskesmas of Multi Wahana and Boom Baru.

Table 1. Data of PM Ambient and CHD of Puskesmas in Palembang.

Variables	Mean	SD	Min	Max
$PM_{2.5}$ ($\mu\text{g}\cdot\text{m}^{-3}$)	10.8	5.59	4	33
PM_{10} ($\mu\text{g}\cdot\text{m}^{-3}$)	19.5	9.37	9	44
CHD (n)	24.5	51.09	0	218

According to the threshold limit value (TLV) by WHO in which the TLV for $PM_{2.5}$ was $25 \mu\text{g}\cdot\text{m}^{-3}$ and PM_{10} was $50 \mu\text{g}\cdot\text{m}^{-3}$, there was only one puskesmas that exceeded the TLV of $PM_{2.5}$, where is the puskesmas of Plaju with the level of concentration equal to $33 \mu\text{g}\cdot\text{m}^{-3}$. For PM_{10} there no

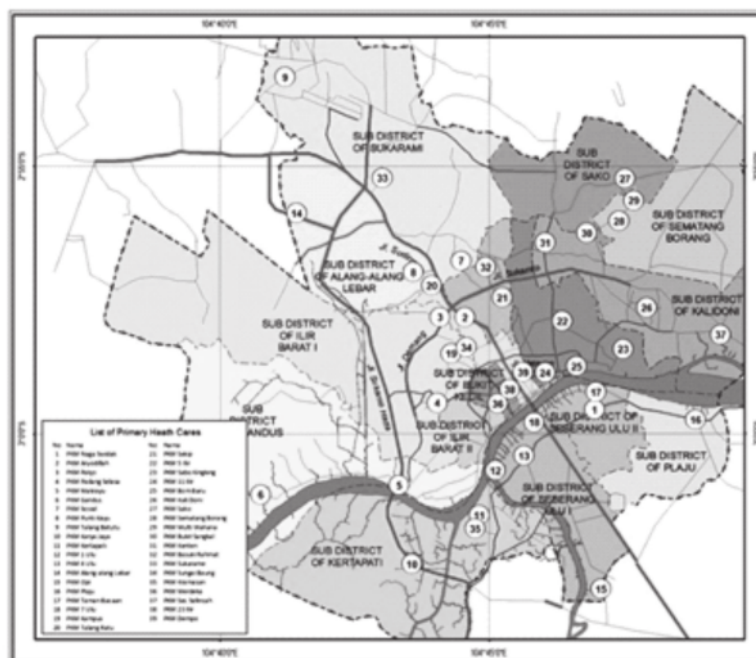


Fig. 1. Map location of Puskesmas in Palembang

puskesmas exceed the TLV.

Table 1 and Fig. 2 represented that the patient of coronary heart disease had an average value of 24.5 patients with a standard deviation of 51.09. The minimum and maximum value of the patient of coronary heart disease were 0 patient (in the puskesmas of Makrayu, Gandus, 1 Ulu, 4 Ulu, Kertapati, Nagaswidak, Taman Bacaan, Kampus, 11 Iilir, 23 Iilir, Talang Ratu, Sekip, Sabokingking, Sei Selincih, Multi Wahana, Talang Betutu and Karya Jaya) and 218 patients (Sukarami).

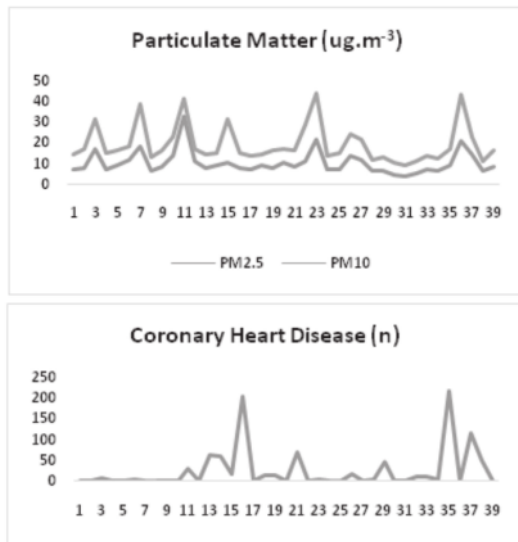


Fig. 2. The results of PM Measurements and CHD outpatients of 39 Puskesmas in Palembang.

Table 2 provided the data of correlation test results between the particulate matters ($PM_{2.5}$ and PM_{10}) and coronary heart disease in Palembang. There was a significantly correlation between $PM_{2.5}$ and PM_{10} ($r = 0.952$; $p = 0.001$). In the other hand, there was an in significantly correlation between $PM_{2.5}$ with coronary heart disease ($r=0.010$; $p=0.954$), and PM_{10} with coronary heart disease ($r = -0.065$; $p = 0.693$).

Table 2. Results of Correlation test with the Spearman method.

Variables		PM_{10}	CHD
$PM_{2.5}$	Cor. Coefficient	0.952	0.010
	Sig. (2 tailed)	0.001	0.954
PM_{10}	Cor. Coefficient		-0.065
	Sig. (2 tailed)		0.693

From the annual report of patients visiting at puskesmas in Palembang, in 2017, the highest patient visiting occurred at the puskesmas of Sukarame (218 patients) but had the low particulate exposure ($PM_{2.5}$ and PM_{10}) level (10 ug.m^{-3} ; 17 ug.m^{-3}) whereas in some puskesmas such as Talang Betutu and Boom Baru, no coronary heart disease patients visit even showing the high level of particulate exposure (22 ug.m^{-3} ; 44 ug.m^{-3}). This showed that the occurrences of coronary heart disease in Palembang was not caused by the particulate exposure but caused by the other factor.

DISCUSSION

The results found that there was no correlation between the particulate exposure with the coronary heart disease because the level of particulate exposure was below the permitted TLV. The most possibilities reason was that the measurement was conducted in the rainy season (wet season) caused the particulate fall faster to the ground. The result was supported by Owoade *et al.* (2012) and Jallad *et al.* (2013) mentioned that the level of particulates varied based on the season in which the dry season had the high concentration and the wet season had a low concentration.

Some factors generating the coronary heart disease could be initiated by several things such as hypertension, dietary patterns, exercise, and emotional stress (Institute of Medicine. 2010; Brook *et al.*, 2010; Gill *et al.*, 2011; Cosselman *et al.*, 2015; WHO, 2016; Stockfelt *et al.* 2017). The coronary heart disease became the center of the world attention because of the number of the patient continuously growing up in some developing country (Gresh *et al.*, 2010; Institute of Medicine, 2010), especially in Indonesia (WHO, 2011).

Cassee *et al.* (2013) obtained the results that most evidence of carbon accumulation generated by the traffic has the bad effect on the human health. Traffic that produced dust coming from roads, brakes, and tires, contributed to adverse the health effects. The duration of particulate exposure had been associated with adverse effects of exposure to the coronary heart disease. The results was supported by Pope III and Dockery (2009); Brook *et al.* (2010), Cosselman *et al.* (2015), and Du *et al.* (2016) that found that the particulate effects related to cardiovascular health and increased the knowledge of the common pathophysiology pathway that connected the particulate exposure

with the cardiopulmonary resulting in the morbidity and mortality.

CONCLUSION

The exposures of PM_{2.5} and PM₁₀ in Palembang was below the threshold limit value arranged by WHO. The results obtained that there was no correlation between the particulate (PM_{2.5} and PM₁₀) against the coronary heart disease in Palembang.

ACKNOWLEDGEMENT

The authors are very thankful to the Directorate General of Higher Education of the Ministry of Research and Technology and Higher Education for this fund research help through the doctoral research grants.

REFERENCES

- Bourdrel, T., Bind, M.A., Béjot, Y., Moreld, O., Argacha, J.F. 2017. Cardiovascular effects of air pollution. *Archives of Cardiovascular Disease*. xxx: xxx–xxx .
- Brook, R.D. and Rajagopalan, S. 2010. Particulate Matter Air Pollution and Atherosclerosis. *Curr Atheroscler Rep*. 12 : 291–300.
- Brook, R.D., Rajagopalan, S., Pope III, C.A., Brook, J.R., Bhatnagar, A., Diez-Roux, A.V., et al. 2010. Particulate Matter Air Pollution and Cardiovascular Disease: An Update to the Scientific Statement From the American Heart Association. *Circulation*. 121 : 2331–2378.
- Brunekreef, B., Beelen, R., Hoek, G., Schouten, L., Bausch-Goldbohm, S., Fisher, P., et al. 2009. Effects of long-term exposure to traffic-related air pollution on respiratory and cardiovascular mortality in the Netherlands: the NLCS-AIR study. *Res Rep Health Eff Inst*. 139: 5-71; discussion 73-79.
- Cassee, F.R., Heroux, M.E., Gerlofs-Nijland, M.E. and Kelly, F.J. 2013. Particulate matter beyond mass: recent health evidence on the role of fractions, chemical constituents and sources of emission. *Inhalation Toxicology*. 25 (14) : 802-812.
- Cosselman, K.E., Navas-Acien, A. and Kaufman, J.D. 2015. Environmental factors in cardiovascular disease. *Nat. Rev. Cardiol*. 152 : 16 pp.
- Chen, F., Deng, Z., Deng, Y., Qiao, Z., Lana, L., Meng, Q., et al. 2016a. Attributable risk of ambient PM₁₀ on daily mortality and years of life lost in Chengdu, China. *Science of the Total Environment*. xxx:xxx–xxx.
- Chen, L., Shi, M., Gao, S., Li, S., Mao, J., Zhang, H., et al. 2016b. Assessment of population exposure to PM_{2.5} for mortality in China and its public health benefit based on BenMAP. *Environmental Pollution*. xxx:1-7.
- Dockery, D.W. 2009. Health Effects of Particulate Air Pollution. *Ann Epidemiol*. 19 : 257–263.
- Du, Y., Xu, X., Chu, M., Guo, Y. and Wang, J. 2016. Air particulate matter and cardiovascular disease: the epidemiological, biomedical and clinical evidence. *J Thorac Dis*. 8(1) : E8-E19.
- Gill, E.A., Curl, C.L., Adar, S.D., Allen, R.W., Auchincloss, A.H., O'Neill, M.S., et al. 2011. Air Pollution and Cardiovascular Disease in the Multi-Ethnic Study of Atherosclerosis (MESA). *Prog Cardiovasc Dis*. 53(5) : 353–360.
- Gersh, B.J., Sliwa, K., Mayosi, B.M., and Yusuf, S. 2010. The epidemic of cardiovascular disease in the developing world: global implications. *European Heart Journal*. 31 : 642–648.
- Institute of Medicine. 2010. *Promoting Cardiovascular Health in the Developing World: A Critical Challenge to Achieve Global Health*. Washington, DC: The National Academies Press.
- Jallad, F.A., Katheeri, E.A. and Omar, M.A. 2013. Concentrations of particulate matter and their relationships with meteorological variables. *Sustain. Environ. Res*. 23(3) : 191-198.
- Owoade, O.K., Olise, F.S., Ogundele, L.T., Fawole, O.G. and Olaniyi, H.B. 2012. Correlation Between Particulate Matter Concentrations And Meteorological Parameters at a Site in Ile-Ife, Nigeria. *Ife Journal of Science*. 14(1) : 83-93.
- Pant, P., Guttikunda, S.K. and Peltier, R.E. 2016. Exposure to particulate matter in India: A synthesis of findings and future directions. *Environmental Research*. 147: 480–496.
- Pena, M.S.B. and Rollins, A. 2010. Environmental Exposures and Cardiovascular Disease: A Challenge for Health and Development in Low-and Middle Income Countries. *Cardiol Clin*. 35(1) : 71–86
- Pope III, C.A. and Dockery, D.W. 2009. Health Effects of Fine Particulate Air Pollution: Lines that Connect. *Journal of the Air & Waste Management Association*. 56(6) : 709-742.
- Stockfelt, L., Andersson, E.M., Molnar, P., Gidhagen, L., Segersson, D., Rosengren, A., et al. 2017. Long-term effects of total and source-specific particulate air pollution on incident cardiovascular disease in Gothenburg, Sweden. *Environmental Research*. 158:61–71.
- WHO. 2016. *Ambient Air Pollution: a global assessment of exposure and burden of disease*. Geneva: World Health Organization.
- WHO. 2011. *Global Atlas on cardiovascular disease prevention and control*. Geneva: World Health Organization.
- Ye, X., Peng, L., Kan, H., Wang, W., Geng, F., Mu, Z. et al. 2016. Acute Effects of Particulate Air Pollution on the Incidence of Coronary Heart Disease in Shanghai, China. *PLoS ONE*. 11(3):e0151119. 11 pp.

CORRELATION_OF_PARTICULATE_MATTER_TO_CORONARY_H...

ORIGINALITY REPORT

20%

SIMILARITY INDEX

14%

INTERNET SOURCES

9%

PUBLICATIONS

7%

STUDENT PAPERS

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

1%

★ staff.sci.ubu.ac.th

Internet Source

Exclude quotes Off

Exclude matches Off

Exclude bibliography Off