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ODOUR POLLUTION AT THE COASTAL TOWN OF LUMUT, PERAK, MALAYSIA

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Abstract
Stench related to odouris one of the main issues in human physical surroundings nowadays.Thisarticle aims to study the odour pollution level in Lumut town, Perak. Lumut town has been selected as a study area with six stations involved. Data collection was done by using the OMX-SRM Handheld Odour Meter to measure the odour rate levels in October 2017, which covers morning, noon and evening observations. The intensity of the odour in Lumut is at an extreme level, especially in the afternoon. The minimum value recorded for all stations is 1.17 OU/M3, the maximum value is at 22.23 OU/M3, and an average is at 7.72 OU/M3.The diversity of human activity has become a source of rising levels of odour in Lumut town. Hence, local authorities should take appropriate action as the Lumut town is one of the major tourist destinations in Perak State.

Keywords-- Odour Pollution, environmental pollution, waste stench, Lumut Town.

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INTRODUCTION

Odour pollution is one of the kinds that ever existed as environmental pollution in Malaysia, especially in air pollution. The study of odour pollution in Malaysia is still not as extensive as other studies, especially air pollution, water pollution, noise pollution and so on although the issue of odour pollution has often highlighted in the media. The reasons due to the equipment constraints and complete guidelines to study odour pollution (Zaini et al., 2012). Therefore, the odour pollution study in Malaysia is still limited.

Hence, the study of odour consists of various scopes such as intensity, concentration, type of gases, standardized contamination, physical and human impact, odour measurements and laws related to odour pollution. Odour is one of the components in the complex physical environment. Changes to natural features or through human activity on an odour source will give a positive and negative effecton people such as quality of life. Positive effects can be detected through a comfortable, fresh and pleasant odour while the adverse effect is from the foul odour, causing disorder, the well-being of the quality of life, the health and the individual psychology (Yuwono& Lammers, 2004). Yuwono and Lammers(2004) relate the odour formulate as a disruption to the environment and usually come from the increase in industrial activity and lack of awareness among the people to maintain cleanliness.

The selfish attitude of the community, which is less concerned with environmental hygiene becomes the source of the pollution problem. The source of pollution comes from various sources such as industry, livestock farm, waste disposal centre, sewage centre, human activity, and others. The primary source of pollution came from the waste stench, such as solid waste, liquids, and gases (Zaini et al., 2012; Zaini et al., 2012).Usually, the main contributors are domestic waste; disposal is food businesses such as restaurants and cafeterias in Malaysia. Hence this study aims to detect the odour of pollution in Lumut Town, Perak.

BACKGROUND

Lumut town is one of the popular tourist destinations in Perak state. This town located at the opposite of Pangkor Island and is known as the entrance/exit to the island as the only existing ferry and ferry facility carrying visitors to Pangkor Island. Lumut town falls under the jurisdiction of the Manjung district administration. Tourist arrival data in Lumut town has shown a significantnumber visitor such in the year 2017, where approximately 857,033 visitors havearrived (Manjung Municipal Council, 2017).

Lumut town is famous for its seafood and handicraft products. Since Lumut town is a tourist destination, many business activities can generate income for the local community. This include, among others,is a restaurant which is a necessity for visitors. There are many restaurants available in Lumut Town, which provides a variety of menu options to visitors. Apart from the food business, there are also business premises that sell handicrafts, clothing, seafood, retail stores and banking services. Besides, in Lumut town, there are many places to stay, such as hotels and homestays. Regularly Lumut town will host many visitors daily and will be considered atthe weekend, especially on Friday, Saturday and Sunday.

The arrival of considerably visitors spurred more human activities in Lumut town and has produced a considerably more solid waste generation of more than 800 000 tonnes for the year 2017 (Manjung Municipal Council, 2017) which saw about 800 000 tourists populate the Lumut town, which was mostly on weekends. Solid waste such as garbage if not adequately managed will causepollution and not only odour pollution but some other pollution too such as environmental pollution from the leachate. According to Seow (2004), the problem of solid waste is a big issue and most likely being high debated in Malaysia. Most of the solid waste is collected and sent to the landfill for disposal. According to Zaini et al. (Zaini et al., 2012), most of the solid waste collected and discharged into the dumpsites either with a proper disposal technique or vice versa.

There are two popular methods of waste disposal commonly practised today, namely land reclamation and combustion methods. Careful control of these two techniques also sometimes will create a severe problem in the local environment.

The population grows in tandem with industrialization and urbanization in Malaysia. In urban areas without proper sanitation, facilities are the leading cause of pollution problems. The rapidly expanding industrial activity has worsened the problem through industrial operations that produce stench into the adjacent area. Unwanted odours usually contribute to the deterioration of air quality and affect the human lifestyle. Odour pollution causes unpleasant effects on people.

Human activity is among the significant contributors to the increase of solid waste generation, especially in urban areas. Solid waste generation occurs daily as a consequence of human action. Solid waste management is one of the most significant steps to ensure the welfare of the community. The landfill is one of the most significant ingredients of solid waste management since the landfill is the last finish for the lifespan of a waste. Nevertheless, the lack of systematic management, less advanced and low technology can negatively impact because of the stench that comes from the dumps of waste always be a significant source of contamination. Odour pollution will cause displeasure to the community.

Since the Lumut town has become one of the tourist attractions, many economic activities are becoming usable in the country such as seafood and handicraft business, hospitality, dining and eating house and retail. The tourism activities found in Lumut town can certainly be a development catalyst and boost the country's economic system. However, at the same time, at that place are some business activities, especially food businesses such as eateries, restaurants, stalls, and do not manage their waste right.

The waste is streamed directly to the drain and causes the drain to become rotten. The resulting stench is one of the sources of pollution in Lumut town. This result is in line with the study by Seow (2004) which states that in Malaysia alone, the problem of solid waste is a frequently debated topic. The urban area in Malaysia generates about 15,000 metric tons of solid waste per day. Nearly 80% of the total solid waste is collected. This solid waste collected will be collected and delivered to the landfill for disposal. According to Zaini et al. (2012) and Zaini (2012)that waste dumps will be poured into garbage disposal sites, either using the correct disposal techniques or vice versa. There are two popular methods of waste disposal that are commonly practised today, such as landfill and incineration methods.

Even though waste will be off from the vicinity, but the two techniques will also post a severe problem to the environment. Besides, Lumut City receives many visitors and tourists every day. The presence of these tourists is indeed generating income to traders and improving the country's economy. At the same time, solid waste generation also increases. The dumping of dump trash not only produces lesser looking views but also produces an unpleasant smell. There are also close to irresponsible individuals throwing garbage everywhere, including throwing garbage into the drains. This activity will cause drainage to clog and produce a bad smell. The stench becomes one of the origins of contamination.

Air-pollution associated with odour also occurs when our air environment contains carbon monoxide, sulfur dioxide, nitrogen dioxide, gaseous waste, hydrocarbons and photochemical contaminants resulting from light or heat reaction. The rotten smellalso counted as one of the air pollutions (Bell et al., 2001). Jacobs (2000) submits that there are around 10 000 types of smells identified in the cosmos, but in general, the smell can be separated into two kinds of fun and unpleasant.

Delightful and disgusting odours appear as an upshot of the odour associated with past experiences. When the smells are associated with a pleasant experience, the odours will be categorized as a pleasant smell. When the scent is related to an unpleasant experience, the scent will be categorized into an unpleasant aroma. In addition to this human,the odour is also available to animals.

The sense of olfactory perception is also capable of detecting more than 10 000 different types of smells, but the sense of smell of animals is sharper than humans like dogs, cats, and tigers (Nurafifah, 2016). Among the ten types of aromas are the odour of scent, the smell of wood, the smell of plants, the odour of fruits, the aroma of the chemical, the smell of sour, the deciduous smell, the delicious smell, the smell of carcasses, and the odour smell. Generally, suspended storms and trapped in the air, and the air will interfere with environmental harmony surrounding it (Castro et al., 2013).

According to Zaini (2012), smell measuring has been done in two parameters, such as objective parameters and subjective parameters. This parameter is a method or steps to measure the smell somewhere. This objective parameter is to recognize or give knowledge and understanding related to research conducted concerningodour. These objective parameters are more of the tools used and able to identify and detect odours. According to St. Croix Sensory (2003), four parameters can be discussed and examined to the olfactory perception;

1) Odour concentrations are evaluated and reported as detector limits in the unit of odour unit per cubic m (ou/m³);
2) Odour intensity of the unit used a ppm equivalent of butanol, using the Odour Intensity Referencing Scale (OIRS) scale. The intensity scale of 0 (no odour) so the scale 6 (powerful odour) will be seen by the smelly panels;
3) Odour residuals are described as a part of the relationship between odour concentration and odour intensity;
4) Odour Character Descriptors - any smell that can be inhaled and expressed in the scale of the OMX-SRM Hand-Held Odour Meter category.

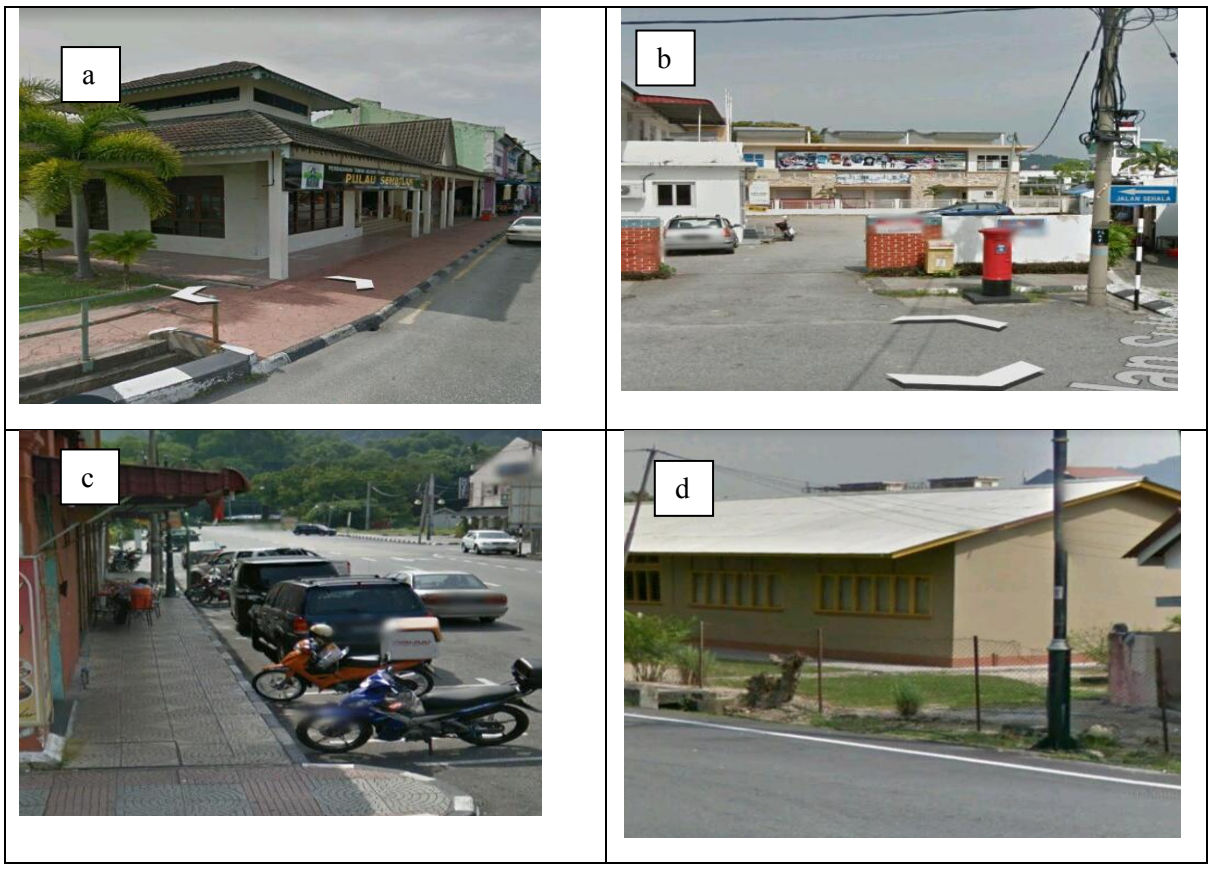
MATERIALS AND METHODOLOGY

Study Area

The study was conducted in Lumut Town, Perak. The Lumut town has a similarity to the other urban areas and being the attraction for both tourists and locals. The sampling stations located based on their distinctive characteristic of which each station in the vicinity of Lumut Town (Figure 1).

Lumut is one of the seaside towns facing the Strait of the Dinding and the Straits of Melaka in Perak. The Strait of the Dinding is a strait that separates Pangkor Island and Lumut town. Historically, this area was once an area under the Straits Settlements of British together with Penang, Malacca, and Singapore. The Perak District Resettlement Ceremony was held on 16 February 1935 in front of Rest House Lumut. Then, on January 1, 1982, the colony known as Dinding was renamed as Manjung District, which included an administrative unit covering Mukim Beruas and Sitiawan (Manjung Municipal Council, 2017).

Figure 1. Study area and sampling stations



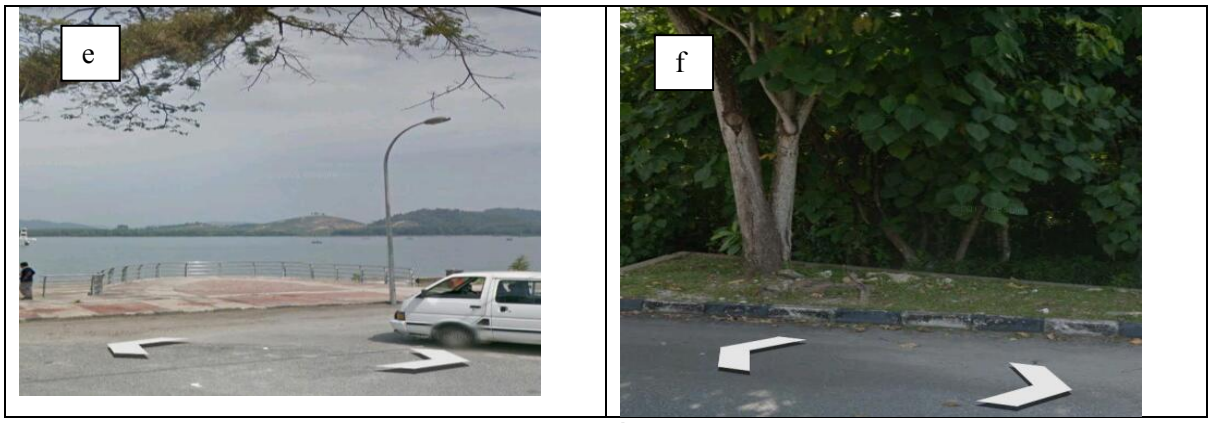


Figure 2. Sampling stations

Table 1. The coordinates of each sampling stations

Station	Latitude	Longitude
Station 1	4.235885	100.63323
Station 2	4.23577	100.63252
Station 3	4.234685	100.63155
Station 4	4.23359	100.63233
Station 5	4.23357	100.63018
Station 6	4.233176	100.62768

Data Analysis

The analysis used in the study of odour pollution analysis in Lumut town is descriptive. According to Mohd Majid (DOEP Australian, 2002), descriptive analysis is a statistic used to describe events. It is also a collection of techniques that concisely describe data or information. The data collected through the observation method at the sampling location were recorded in the Statistical Packages for Social Science (SPSS) software in the form of descriptive statistical analysis which then presented in the form of graphs through SPSS software and in the form of maps using GIS software. The data that needs to be analyzed is the data of the pollution stage in the sampling location. Through this descriptive analysis, it will also be able to analyses odour concentration based on the maximum value, minimum value, and average value.

RESULTS AND DISCUSSIONS

According to Castro et al., (2013), ten categories of scent can exist and can be inhaled by the smell of fragrant wood, the smell of wood, the smell of plants, the smell of fruit, the smell of the chemical, the smell of sour, the deciduous smell, the smell of smell, the smell of carcasses and spicy scent. Deposits in the atmosphere and disturbing the welfare of the environment will be considered a pollution of odour,whether the scent or delicious smell and lousy smell or bad smell. According to St. Croix Sensory (2003), the perception of this smell divided into two stages. The first stage is related to the psychology in which the senses that drive or detect the smell as the receiving agent are the nose. The second stage is psychology, where it involves humans or other human responses through the sensory response of the nose to the brain directly. Table 2 shows the intensity of odour intensity proposed by St Croix Sensory Inc. (2003), which is further explained by concentration values according to Weber-Fechner and Stevens Law in OU units. This article will only use the level of intensity of smell, the smell type according to the value in Stevens Law.

Table 2. Intensity Scale of Odour, Odour type and Concentration

Odour Intensity Level	The present of Odour Type	The concentration of n-butanol (ppm)	Concentration from Weber-Fechner (OU)	Concentration through Stevens Law (OU)
0	None	0	0.34	-
1	Slight/very weak	25	0.92	1.1
2	Weak	75	2.5	2.6
3	Noticeable/distinct	225	7	7.8
4	Strong	675	19	20
5	Very noticeable/strong	2025	52	42
6	Extremely strong		144	79

Source: Adaptation from St Croix Sensory Inc. (2003); DOEP Australian (2002)

Generally, this study epicentre is Lumut Jetty area by setting up several stations to observe the concentration of odour. The areas involved during the observation are surrounding areas of Dato 'Ishak's food court stalls as station 1, post office as station 2, restaurant as station 3, road junction as station 4, Hotel Orient Star as station five and a big tree in front of the beach as the last station 6 (Figure 2a-f). Odour observations are taken three times at each station known as R1, R2, and taken in the morning, noon and evening. The total observation made is 18 times. An average of R1, R2, and R3 is calculated as a value for that particular station. At Station 1 (Figure 2a), the highest odour value was in the afternoon which recorded an average reading of 14.13 OU/m³ compared to readings in the morning and noon which is only 5.37 OU/m³ and 4.6 OU/m³. The odour concentration varies from every observation made. The first reading in the morning at station 1 was 2.3 OU/m³, the second reading recorded at 3.8 OU/m³ and the reading continued to increase at the third reading of 10 OU/m³, which is from the odour intensity level from none to weak and noticeable and weak as for the average value. At noon, the reading for the odourwas slightly different from the readings recorded in the morning. For the first reading atnoon, the value recorded at 2.2 OU/m³ and increased to 8.6 OU/m³ and then decreased by 5.6 OU/m³ to 3 OU/m³.The odouraverage intensity level is still weak at the noon observation (4.6 OU/m³), and the valuechanged drastically at station 1 in the afternoon. The first value recorded is 17.8 OU/m³ and subsequently decreased to 13.8 OU/m³ and further decreased to 10.8 OU/m³ as in Table 3.

Table 3. Dato 'Ishak Medan Station (Station 1)

	R1	SL	TIB	R2	SL	TIB	R3	SL	TIB	Average	SL	TIB
Morning	2.3	0	None	3.8	2	Weak	10	3	Noticeable	5.37	2	Weak
Noon	2.2	0	None	8.6	3	noticeable	3	2	Weak	4.6	2	Weak
Afternoon	17.8	3	Noticeable	13.8	3	noticeable	10.8	3	Noticeable	14.13	3	Noticeable

Legends:

SL- Stevens Law | TIB – Odour Intensity Level | R1 – Observation 1 (OU/M³) | R2 – Observation 2 (OU/M³) | R3 - Observation 3 (OU/M³)

Next, to station 2, the highest odour was in the afternoon which recorded an average of 19.8 OU/m³ compared to the average value in the morning which only recorded 4.53 OU/m³ and noon 3.7 OU/m³. In the morning, the first value recorded is 2.2 OU/m³, while the second reading recorded is 5.2 OU/m³ and further increased to 6.2 OU/m³ in the third observation. In the afternoon, the first value was recorded only 3 OU/m³ and increased to 4.6 OU/m³ then decreased to 3.5 OU/m³ in the third observation. The odour rate in the afternoon changed and recorded high reading where the first value recorded is 17.6 OU/m³and then increased to 24.1 OU/m³ in the second observation and decreased to 17.7 OU/m³ in the third observation (Table 4).

Table 4. Opposite to Post Station (Station 2)

	R1	SL	TIB	R2	SL	TIB	R3	SL	TIB	Average	SL	TIB
Morning	2.2	1	None	5.2	2	Very weak	6.2	2	Very weak	4.53	2	Very weak
Noon	3	2	Very weak	4.6	2	Very weak	3.5	2	Very weak	3.7	2	Very weak
Afternoon	17.6	3	Noticeable	24.1	4	strong	17.7	3	noticeable	19.8	3	Noticeable

Legends:

SL- Stevens Law | TIB – Odour Intensity Level | R1 – Observation 1 (OU/M³) | R2 – Observation 2 (OU/M³) | R3 - Observation 3 (OU/M³)

For station 3, in the eateryarea, which hosting food stalls, the average reading is 16 OU/m³, in the afternoon (Table 5). Just like the two stations previously, the highest value recorded for the odour was in the evening, where the first value recorded is 14.1 OU/m³and increased by 3.2 OU/m³ to 17.3 OU/m³ in the second observation but decreased to 16.6 OU/m³ on the third observation. In contrast to the observation value recorded in the morning. The first value showed that the level of the odour was only 3.1 OU/m³and decreased to 2.4 OU/m³ in the second observation, and the third value only recorded 1.5 OU/m³. In the afternoon, the first observation obtained was 3.5 OU/m³ decreased to 2.2 OU/m³ and increased slightly to the third observation of 0.1 OU/m³ to 2.3 OU/m³.

Table 5. Food stalls area (Station 3)

	R1	SL	TIB	R2	SL	TIB	R3	SL	TIB	Purata	SL	TIB
Morning	3.1	2	Weak	2.4	1	Very weak	1.5	1	Very weak	2	1	Very weak
Noon	3.5	2	Weak	2.2	1	Very weak	2.3	1	Very weak	2.67	2	Weak
Afternoon	14.1	3	noticeable	17.3	3	noticeable	16.6	3	noticeable	16	3	noticeable

Legends:

SL- Stevens Law | TIB – Odour Intensity Level | R1 – Observation 1 (OU/M³) | R2 – Observation 2 (OU/M³) | R3 - Observation 3 (OU/M³)

At station 4, at the road junction, the value recorded the highest odour reading was in the afternoon which recorded an average reading of 14.17 OU/m³ compared to value readings in the morning and noon each of only 1.43 OU/m³ and 2.9 OU/m³ respectively. The first reading in the morning at station 4 was 1.3 OU/m³, the second reading recorded is 1.7 OU/m³ further down to 1.3 OU/m³ in the third observation. In the afternoon, the value was slightly different from the value in the morning. For the first observation, valueat noon only recorded 3.1 OU/m³ and decreased to 2.4 OU/m³ and then increased by 0.8 OU/m³at the third observation to 3.2 OU/m³. The value changed drastically at station 4 in the afternoon. The result of data collection at station 4 shows the first value recorded is 14.4 OU/m³ and increased to 15.1 OU/m³ and decreased back to 13 OU/m³ (Table 6).

Table 6. Road junction (Station 4)

	R1	SL	TIB	R2	SL	TIB	R3	SL	TIB	Average	SL	TIB
Morning	1.3	1	Very weak	1.7	1	Very weak	1.3	1	Very weak	1.43	1	Very weak
Noon	3.1	2	Weak	2.4	1	Very weak	3.2	2	weak	2.9	2	weak
Afternoon	14.4	3	noticeable	15.1	3	noticeable	13	3	noticeable	14.17	3	noticeable

Legends:

SL- Stevens Law | TIB – Odour Intensity Level | R1 – Observation 1 (OU/M³) | R2 – Observation 2 (OU/M³) | R3 - Observation 3 (OU/M³)

The observation at station 5, in front of the Orient Star Hotel, found that the highest odourvalue was in the afternoon which recorded an average of 22.23 OU/m³compared to the average reading in the morning which recorded only 2.57 OU/m³and at noon is 2.83 OU/m³. In the morning, the first value recorded is 3.5 OU/m³ while there was a slight decrease in the second reading of 2.4 OU/m³and further decreased to 1.8 OU/m³in the third reading. While in the afternoon, the first reading recorded only 2.6 OU/m³and increased to 2.7 OU/m³, but then increased to 3.2 OU/m³in the third reading. Level of odourin the afternoon changed drastically and recorded the high reading, with the first reading recorded at 22.4 OU/m³and then decreased by 2.3 OU/m³to 20.1 OU/m³in the second reading and increased to 24.2 OU/m³in the third reading (Table 7).

Table 7. Hotel Orient Star (Station 5)

	R1	SL	TIB	R2	SL	TIB	R3	SL	TIB	Average	SL	TIB
Morning	3.5	2	Weak	2.4	1	Very weak	1.8	1	Very weak	2.57	1	Very weak
Noon	2.6	2	Weak	2.7	2	weak	3.2	2	weak	2.83	2	weak
Afternoon	22.4	4	Strong	20.1	4	strong	24.2	4	strong	22.23	4	strong

Legends:

SL- Stevens Law | TIB – Odour Intensity Level | R1 – Observation 1 (OU/M³) | R2 – Observation 2 (OU/M³) | R3 - Observation 3 (OU/M³)

At station 6, in front of the big trees near the coast, found that the highest odour reading was in the afternoon which recorded an average reading of 16.73 OU/m³ compared to morning readings of only 1.17 OU/m³ and 1.8 OU/m³ at noon. The morning observation at station 6, the first reading in the morning at station 6 was 3.5 OU/m³, the second reading was 0 OU/m³, and this reading was the same as the third reading. In the afternoon, the reading for the odourwas slightly different from the readings found in the morning. For the first reading at noon, it recorded 1.1 OU/m³ and increased by 1.0 OU/m³ to 2.4 OU/m³ and then increased to 2.2 OU/m³ at the third observation. The reading for odourobservations also drastically changed at station 6 in the afternoon. The changes are clear from the result of data value at station six where the first reading value is 20.6 OU/m³ decreased to 14.1 OU/m³ and increased by 1.4 OU/m³ to 15.5 OU/m³ in the third reading (Table 8).

Table 8. Tree near to the beach (Station 6)

	R1	SL	TIB	R2	SL	TIB	R3	SL	TIB	Average	SL	TIB
Morning	3.5	2	Weak	0	0	None	0	0	None	2.57	1	Very weak
Noon	1.1	1	Very weak	2.1	1	Very weak	2.2	1	Very weak	1.8	1	Very weak
Afternoon	20.6	4	Strong	14.1	3	strong	15.5	3	strong	16.73	3	strong

Legends:
SL- Stevens Law
TIB – Odour Intensity Level
R1 – Observation 1 (OU/M³)
R2 – Observation 2 (OU/M³)
R3 - Observation 3 (OU/M³)

Next, this article will show the average pollution level of odour based on all observation stations at the time of observation. Based on Table 9, the average mean (lowest) value obtained for all stations from the morning, noon and evening is 1.17 OU/m³. The maximum value is at 22.23 OU/m³, where the intensity level is extreme. Compared to the median value, which shows the value of 4.11 OU/m³that showed avigorousintensity level. The average value of the concentrate for the whole is 7.72 OU/M3, i.e., all stations at all times have powerful intensity. However, the standard deviation value for the whole is 6.98 OU/m³ indicating that the level of diversity is still detected that the level of value is not only concentrated to very strong only indicating there is still a still low level of intensity.

Table 9. Average value of descriptive analysis for all stations

Value	All	SL	TIB	AM	SL	TIB	NOON	SL	TIB	PM	SL	TIB
Min	1.17	1	Very weak	1.17	1	Very weak	1.8	1	Very weak	14.13	3	noticeable
Max	22.23	4	strong	10.0	3	noticeable	4.6	2	weak	22.23	4	strong
Med	4.12	2	weak	2.45	1	Very weak	2.87	2	weak	16.37	3	noticeable
Mean	7.72	2	weak	2.9	2	Weak	3.08	2	weak	17.18	3	noticeable
Standard deviation	6.98	2	weak	1.55	1	Very weak	0.99	-	None	2.95	2	weak

Legends:
SL - Stevens Law
TIB – Odour Intensity Level
AM – Morning
NOON – Noon
PM – Afternoon

Based on Table 9, the average mean value obtained in the morning is at 1.17 OU/m³,or slightly detected odour. The maximum and median values are 10 OU/m³ (noticeable odour intensity) and 2.45 OU/m³ (odour intensity is weak), which meansthat in the morning, there is a station that shows a weak level and there is also a noticeable level of odour. The average concentration of odours in the morning is 2.9 OU/m³ (weak intensity) indicating that overall all stations have a weak odourlevel intensity. Furthermore, the standard deviation of the standard concentration of the morning odour is at 1.55 OU/m³, indicating that the values for the average grouped in an area only at feeble levels.

Table 9 also shows the average mean value of noon for six observation stations obtained, such as 1.8 OU/m³ (very weak). The maximum value and the median is 4.6 OU/m³ (weak) and 2.87 OU/m³ (weak). The average concentration of odour in the afternoon was 3.08 OU/m³ (weak). Hence, the standard deviation of the standard concentration of the stink at noon is 0.99 OU/m³. Overall, during the day there is a station with a significant intensity of the odour. At the same time in all the observation stations on average are at very significant levels with constant values ranging from 3 OU/m³ only. Based on Table 9, it is also possible to identify the average mean value of the evening time obtained is 14.13 OU/m³ (noticeable). The maximum and median values are 22.23 OU/m³ (stable) and 16.37 OU/m³ (noticeable). The average concentration of odour in the afternoon is 17.17 OU/m³ (stable). Next, the standard deviation of the odour concentration in the evening is 2.95 OU/m³. Overall, the intensity levels of all the stations in Lumut Town in the afternoon are stable. The mean value of the entire station for all observation time shows that there is a diversity of values with existing stations in Lumut City at certain times have a slight degree in the morning (1.2 OU/m³) and at noon (1.8 OU/m³) compared to very high afternoons (14.1 OU/m³). The maximum value obtained for all stations shows that all stations recorded high values with high-intensity levels of between 10 OU/m³ to 22.2 OU/m³.

CONCLUSION

As a result of the amount of odour pollution data around the Lumut Jetty area, the highest levels of odour pollution at designated stations are in the evening. The intensity of the odour in the afternoon at all stations is at an extreme level. This extreme level of smell should be taken seriously by the responsible parties, especially the Manjung Municipal Council as Lumut City is the gateway to tourists to Pangkor Island. The unpleasant smell of these will affect the local tourism sector, and the problem of pollution caused by the diversity of human activities should seriously consider at all levels. All communities involved in Lumut town either they are local fishermen, residents, tourists, government agencies, people in business and all people who reside or visit Lumut town to take responsibilities by minimizing the odour level surrounding this town. Less garbagein this town will make more people come in and enjoy their holiday, and they will keep coming to this town.

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