EVALUATION

OF

BIOWAVE PERFORMANCE

IN

AMMONIA REMOVAL

TITLE

EVALUATION OF BIOWAVE PERFORMANCE IN AMMONIA REMOVAL

TESTING FACILITY

In-House Laboratory Testing

109A, Jalan Gebeng 1/6, 26080 Kuantan, Pahang, Malaysia.

PURPOSE OF STUDY

The purpose of this study is to evaluate and determine the efficacy of the removal of ammonia with Biowave Granulars.

PROJECT RESEARCH TEAM

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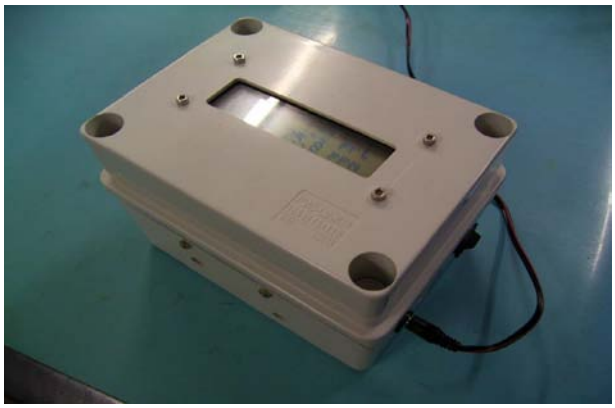
1. Objective

The objective is to evaluate the efficacy of Biowave Granulars in ammonia removal.

2. Details of the Equipment Under Testing

Two units of 250 mL conical flasks c/w glass stopper and a plastic pipette were used for this testing. The detailed information about the tested equipments are listed below:

Biowave Granulars: Size of 2 - 5mm diameter.

	
Volatile Organic Compound Analyzer	Plastic Pipette
	
Biowave Granulars (Diameter of 2 – 5 mm)	Conical flasks c/w stopper

3. Methodology of the Study

3.1 Setup of the Testing System

The performance study was carried out inside a fully enclosed air conditioned meeting room with dimensions 3.3m (W) x 6.6 m (L) x 2.3m (H). The room was free from any chemical odour. Inside the room, there are extension sockets for running a Volatile Organic Compound (VOC) analyzer.

The setup of the testing system is as below:

3.2 Test Parameters and Methodology

Two units of conical flasks c/w glass stopper were used for this study. One of the conical flask was labeled with “ammonia”; and the other was filled with 50 g of Biowave Granulars and was labeled with “ammonia and Biowave”. Using a pipette, two drops of liquid ammonia were transferred to each of the labeled conical flask and covered with a glass stopper. The liquid ammonia was allowed to evaporate in the conical flasks for 5 minutes under room temperature at 25^{o}C.

To record the reading of ammonia evaporation, each conical flask with open stopper was put less than 25 mm distance from the sensor hole of the VOC Analyzer. The highest reading of ammonia evaporation for each conical flask was recorded.

The measurement results of the testing method are summarized as in Table 4.1 format.

Table 3.1 Test Parameter and Methodology

Test Parameter	Test Methodology
Total measurement of ammonia	Continuous measuring of ammonia with a VOC analyzer until the highest ammonia level recording was obtained.

4. Results of Study

Both of the conical flasks were measured for the highest ammonia level with VOC Analyzer. The measurement were stopped once the ammonia level from the conical flasks started dropping.

Based on the measurement result, the ammonia removal efficacy of the conical flask with Biowave Granulars shall be evaluated as follows:

The highest ammonia level attained WITHOUT Biowave Granulars	**X** ppm
The highest ammonia level attained WITH Biowave Granulars	**Y** ppm
Removal Efficacy (%)	[1 - (**Y/X**)] x 100%

It is noted that ammonia removal efficacy of the CONICAL FLASK equipped with Biowave Granulars is about ___%.

PICTORIAL RESULTS:

Left: Conical Flask A Right: Conical Flask B

CONICAL FLASK A: The highest ammonia level attained WITHOUT Biowave Granulars

Before Test:

Ammonia level = 0.0 ppm

After Test (t = 13 sec):

Ammonia Level = 50.1 ppm

CONICAL FLASK B: The highest ammonia level attained WITH Biowave Granulars

Before Test:

Ammonia level = 0.0 ppm

After Test (t = 10 sec):

Ammonia Level = 0.0 ppm

CONICAL FLASK A: The highest ammonia level attained **WITHOUT** Biowave Granulars	50.1 ppm
CONICAL FLASK B: The highest ammonia level attained **WITH** Biowave Granulars	0.0 ppm
Removal Efficacy (%)	[1 - (0.0/50.1)] x 100% = 100%

5. Conclusion

Biowave Granulars were able to remove all the ammonia in the conical flask with a removal efficacy of 100%.

6. Limitation of Measurement

The results obtained in this test are only representative of the pollutant concentration at the specific sampling time, location and under designated conditions. The result should not be extrapolated to other conditions without caution.