

UNIVERSITI TEKNOLOGI MARA

**RELATIONSHIP BETWEEN
NITRATE CONCENTRATION AND
CHEMICAL OXYGEN DEMAND
(COD) OF A STREAM IN
VEGETABLE FARM AREA IN
CAMERON HIGHLANDS**

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In the name of Allah, The Most Gracious, The Most Merciful.

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ABSTRACT

Background: Excessive fertiliser application in agricultural activities, especially in vegetable farms, can be washed into the streams and decline the water quality. Nitrate from fertiliser may increase organic loading in the river and indirectly increase the oxidising activity especially chemical oxygen demand (COD). This research aims to determine the relationship between Nitrate concentration and COD of a stream flows within the vegetable farm area.

Methods: This study used a cross-sectional study design. Water samples were collected at seven sampling points of Sungai Ulung, Cameron Highlands representing the river upstream and downstream. The COD and nitrate were analysed by using HACH-DR 2400 datalogging spectrophotometer.

Results: The concentration for nitrate and COD in the stream was slightly increased, where the concentration for both parameters at downstream was higher than those in the upstream river. The mean concentration of nitrate and COD upstream was 1.5 mg/L and 11.5 mg/L, respectively, while the mean concentration downstream after the river through the vegetable crop was 2.0 mg/L and 14.0 mg/L. The increases of both parameters have resulted on decline of dissolve oxygen (DO) of the river. Besides, the result also shows a positive correlation of nitrate with COD ($r = 0.865$), R-square = 0.62 with p value of 0.012.

Conclusion: The degradation river quality of Sungai Ulung was probably due to the agricultural activity near the river. Farmers can practice Best Management Practices (BMPs) for their crop to reduce the chance of nutrient losses to the impaired water bodies.

Keywords: *nitrate, COD, relationship, water quality, vegetable farm*

CHAPTER 1

INTRODUCTION

1.1 Background of study

Streams are freshwater bodies that flow on the earth's surface and give many benefits, including drinking water, crops, recreational activities, animal and plant habitats, hydroelectricity generation, and others. Water flowing on the earth's surface, namely streams or rivers, flows from a higher to a lower elevation due to the earth's gravity. As a small stream flows downhill, it will feed into a larger stream or river and merge to form many tributaries, which will then end up in the ocean. The upper streams should be clean and safe since they will drain and act as a catchment area for the water supply to the lowland. However, pollutants from anthropogenic activities such as agriculture, urban activities, and industry near the river may decrease the water quality and create water pollution. This activity near tributaries is often creating pollution of the mainstream since the tributaries from upstream to downstream carry all the runoff and pollution.

Water scarcity due to water pollution has become a global issue faced by 21st century societies. The rapid growth of the population may increase the water demand for consumption since the availability of safe and clean surface water resources is now a deficit. As stated by Veldkamp *et al.* (2017), the large-scale human interventions in the environment, such as the use of land use for development, agriculture, construction of dams, and others, have affected the hydrological cycle, which led to river pollution, water availability and water scarcity. The water pollution issue has led to a major health hazard not only to humans but also to the environment.

Water pollution can come from many sources, and one of the main sources is agricultural activities. This activity discharge pollutants, including nutrients from