**Nitrate in groundwater and related health risk: a case study in a village in Bachok district, Kelantan, Malaysia**

ABSTRACT

Objectives: To determine concentration of nitrate in groundwater and its associated health risk to residents in Bukit Bator Village in Bachok district, Kelantan state, Malaysia. Methods: This study was implemented in the month of January 2019. A total of forty-five (45) respondents took part in the study with the same number of wells sampled for nitrate. Respondents were chosen based on the criteria that they only used groundwater for drinking and cooking and they do not have any type of filtration systems installed in their homes. Nitrate concentration was determined using a HANNA Instrument brand multimeter with an attached nitrate electrode. Samples were collected in duplicates and the readings were then averaged. Other data such as weight of respondents, age and depth of wells, as well as distance of well from source of nitrate were also recorded. Results: Nitrate in sampled groundwater ranged from 0.61 to 25.10mg/L NO3 - with a mean of 3.61 +SD 1.88mg/L. Statistical analysis showed that there is a significant difference in nitrate concentration between sampling sites (p0.05). All respondents were calculated to have a Hazard Quotient (HQ) of less than 1 (HQ<1), meaning there is a potential non-cancer risk to the users. Conclusion: Nitrate levels in groundwater is low and is not detrimental to health. Nevertheless, periodic assessment is encouraged to ensure the levels stay low at all times.

**Keyword:** Nitrate; Groundwater; Hazard quotient; Bachok; levels