Nitrogen determinations in the surroundings of an agricultural environment

Frank Kennes, Jeroen De Vroe, Thimo Goossens

Introduction

Nitrogen (N) is one of the most abundant and important elements on earth. It plays an important role in the soil, air and the human body. Depending on the chemical structure and the concentration it is in, it has both positive and negative effects. In this project, the presence of nitrogen in the soil and water is mainly important. Nitrogen is mainly present in the soil as a result of agricultural fertilization and in water as a result of over-fertilization. Nitrogen determinations are performed on agricultural land, non-agricultural land and in a watercourse between the two plots. This to prove the significant or non-significant differences in concentration.

Methods for nitrogen determination

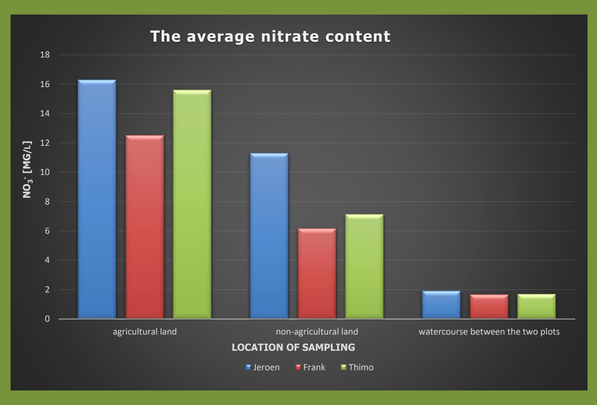
- **Photometric analyses NO_2^-, NO_3^-, NH_4^+**

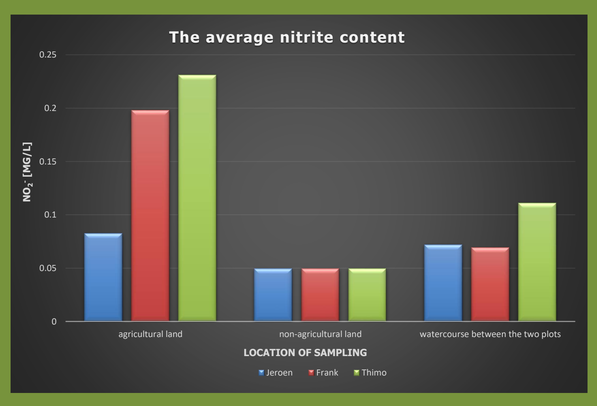
- **Kjeldahl method**

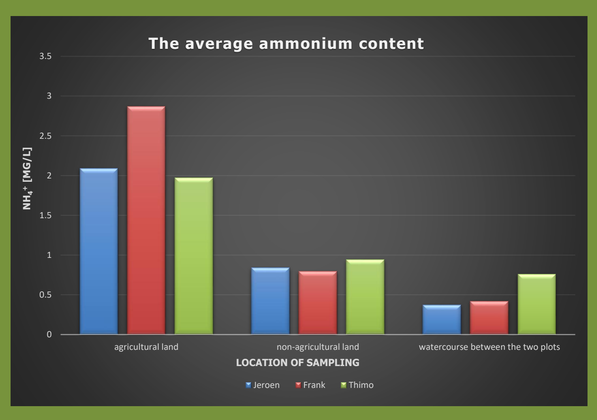
- **Spectrophotometric determination of NO_3^-**

Results

Photometric analyses







Conclusion

Based on the results from the graphs above, it can be concluded that there is a significant difference between agricultural land and non-agricultural land, especially for nitrate and ammonium and less so for nitrite. This is because nitrite easily oxidizes to nitrate and is therefore present to a lesser extent. The difference between the two plots is due to the fertilization with, among other things, mineral fertilizer products. The results from the 3 locations fall under the maximum fertilization limit according to the Manure Decree and therefore do also not cause eutrophication in the watercourse.
With the Kjeldahl determination we obtained values that where negative or too low and when using a standard, we only recovered slightly more than 50% of the nitrogen.
In the spectrophotometric determination of NO_3^- no results could be obtained due to a late delivery date of the suitable product. This resulted in a lack of time to perform the test correctly. We can therefore only base ourselves on the photometric analyses.

Promotor research: Jacoby Laurent
Program Technology, campus Gasthuisberg, Herestraat 49, 3000 Leuven