doi:10.20396/revpibic262018956

XXVI Congresso de Iniciação Científica Unicamp
17 a 19 de outubro Campinas | Brasil

# Validation of an analytical method to dye auramine analysis in the surface water samples

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**Abstract**
The dye auramine, used in textile and paper factory, is possibly carcinogenic according to Internation Agency for Research on Cancer (IARC). Its production and commercialization are forbidden in Europe, however, it still being sold and produced in another countries, even Brazil. Then, this work is proposed validate an method for analysis of auramine in surface water samples using LLE and HPLC-DAD-UV.

***Key words:***
*Auramine, Dye, Validation of analytical method*

## Introduction

Dyes may be classified as emerging contaminants, a group of potentially harmful compounds whose effects on the environment are poorly understood and their levels of use and contamination are increasing.[1] Auramine dye is used in dyeing fabrics and paper factories, and as a component in paints. Currently the production of this dye is banned in the US and Europe due to carcinogenicity, and is now producing in India and China.[2] There are no data on the use of this compound in Brazil, but several studies have been carried out and their presence in the hydrosphere has been found.[3] Thus, this project aimed to validate the method of quantification of auramine in river water samples using LLE and HPLC- DAD-UV.

## Results and Discussion

The optimized sample preparation method is depicted in **Image 1** below:

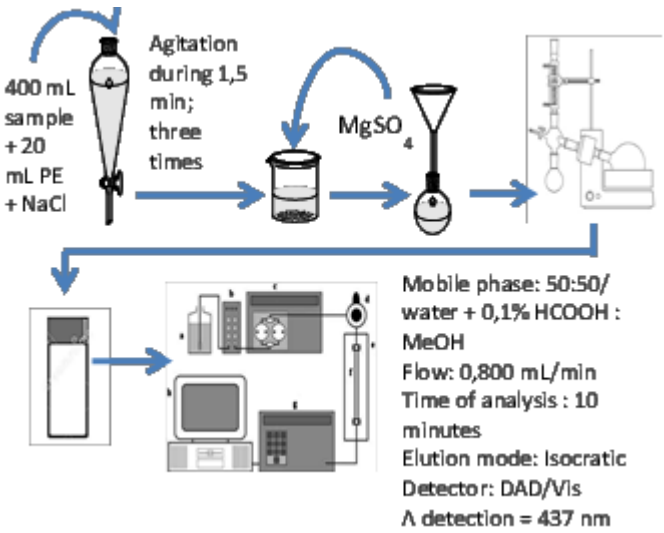


**Image 1.** Representation of the new liquid-liquid extraction method.

where the extractive phase is a 1:2.5 MeOH:$CH_2Cl_2$ and the extraction time is 5 min. In addition, there is the addition of the washing step with 3 mL of the extractive phase of the round bottom flask after evaporation of the solvent in the rotary evaporator. With this, the problems of repeatability were corrected and it followed with the validation of the method, obtaining the results:

**Chart 1.** Results obtained in the method validation

| | |
|---|---|
| LOD (instrumental) | 3,63 µg/L |
| LOQ (instrumental) | 12,1 µg/L |
| LOQ (method) | 0,03 µg/L |
| Linearity ($R^2$) | 0,9974 |
| Calibration Curve | y = 207,5 x - 27,205 |
| Linear range | 12,1 - 100 µg/L |
| Selectivity | The method is selective |
| Accuracy (Recovery %) | Level low (0,5 µg/L) : 82 ± 24 |
| | Level central (1 µg/L): 90 ± 8 |
| | Level high (5 µg/L): 87 ± 5 |
| Precision (RSD %) | Level low (0,5 µg/L): 29,4 |
| | Level central (1 µg/L): 8,9 |
| | Level high (5 µg/L): 5,6 |
| Robustness | Parameters like flow and mobile phase proportion modify the recovery. |

The data in **Chart 1** indicate the method is suitable for the analysis of auramine, which can be used to determinate the risk assessment, considering the LOQ obtained is lower than the PNEC value of 1.2 µg / L, stipulated to auramine. [3]

## Conclusions

It was obtained a validated method for the analysis of auramine using ELL and HPLC-DAD-UV with a detectability of 0.03 µg/L, suitable for the risk assessment considering the value of PNEC (1.2 µg/L).

## Acknowledgement

Thank the CNPQ for the scholarship granted.

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