

# Adaptation of Eleven Experiments from Forensic Chemistry to Secondary School Chemistry Laboratory

Renato Henriques de Souza\*<sup>1</sup> (PQ), Karime Rita de Souza Bentes<sup>1</sup> (PQ), Lorena Campos de Souza<sup>1</sup> (IC), Camila Macena Ruzo<sup>1</sup> (IC), Evelyn da Silva Ferreira<sup>1</sup> (IC). <sup>1</sup>Universidade Federal do Amazonas.

[rhsouza@ufam.edu.br](mailto:rhsouza@ufam.edu.br) – Departamento de Química

Departamento de Química (DQ); Instituto de Ciências Exatas (ICE); Universidade Federal do Amazonas (UFAM); Setor Norte do Campus Universitário Senador Arthur Virgílio Filho. Av. Gal. Rodrigo Otávio Jordão Ramos, 6200 - Coroado, 69077-000, Manaus-AM.

Palavras Chave: *forensic, low cost experiments*

## Introduction

The forensic science involves knowledge from physics, biology, chemistry, mathematics, among many other sciences, in order to support the investigations related to crimes and justice.

A remarkable question would be how Forensic Chemistry subjects could be brought to the Chemical Education, especially at the high school level? According to PCN+ "... a Química pode ser um instrumento de formação humana que amplia os horizontes culturais e a autonomia no exercício da cidadania, se o conhecimento químico for promovido como um dos meios de interpretar o mundo e intervir na realidade, se for apresentado como ciência, com seus conceitos, métodos e linguagem próprios, relacionada ao desenvolvimento tecnológico e aos muitos aspectos da vida em sociedade". Thus, it is clear that the practices of Forensic Chemistry possibly will fit in an educational context.

One way to work with these practices would be through experiments. These practices, due to some convergence between the needs of Forensic Chemistry and secondary school experiments would be the low cost, simplicity, reproducibility and speed, and it can be fit into a context that is already known by the students, mainly due to the criminal investigation TV series. Thus, the adaptation of Forensic Chemistry practices to secondary school laboratories proved to be viable, lacking, however, a compilation of forensic chemistry practices that could be suitable for these students. This project aims to bring and adapt to the high school chemistry laboratories practices carried out by the Forensic Chemistry.

## Results and Discussion

In a first analysis, a detailed literature review of forensic chemistry was performed, by selecting experiments that (1) were easy to perform, (2) had low cost and (3) high educational potential.

After that, reagents were purchased and adjustments were made in order to make viable these practices. Optimizations were studied for these experiments, aiming few waste and a clear result even when using a minimum amount of reagents. Data were organized in the form of experimental

38ª Reunião Anual da Sociedade Brasileira de Química

manuals. These compilations had a list of materials, procedures, safety instructions and potential educational applications.

The following experiments have been adapted up to date: (a) breathalyzer test; (b) collecting footprints using plaster; (c) airbag operation; extracting DNA from (d) tomatoes and (e) mouth; fingerprint development with (f) cyanoacrylate vapor, (g) ninhydrin, (h) iodine vapor, (i) coal, (j) diazafluorenone and (k) silver nitrate solution. In other words, eleven forensic experiments were tested, adapted to high school, with procedures described and illustrated.

All that experiments were presented in the events and actions organized by the human practice institutional program "Programa Desvendando as Ciências Forenses", from Universidade Federal do Amazonas. It was presented in several cities throughout the state of Amazonas, mainly to high school students, but also to college freshmen and to the general public.

According to the results from questionnaires applied to the public, the experiments, when associated with theory, can stimulate interest in chemistry. The chemical concepts that can be worked with the experiments are still being researched, but it is clear that they can show the social relevance of chemistry, mainly in solving questions related to justice.

## Conclusion

Because of Forensic Chemistry experiments and educational experiments possesses some convergent features, it was possible to adapt typical practices of Forensic Chemistry to school laboratories. Other practices were made possible by simulations concomitant with contextualization.

## Acknowledgements

PROEXTI/UFAM e MEC.

<sup>1</sup> BRASIL. PCN+ *Ensino Médio: Orientações educacionais complementares aos Parâmetros Curriculares Nacionais*. Secretaria de Educação Média e Tecnológica. Brasília: Ministério da Educação, 2002.