Taylor & Francis
Taylor & Francis Group

Annals of Medicine

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/iann20

Vehicle identification from automotive paints transferred in road accidents

Sandra Coelho, M. Catarina de Almeida & Carlos Família

To cite this article: Sandra Coelho, M. Catarina de Almeida & Carlos Família (2021) Vehicle identification from automotive paints transferred in road accidents, Annals of Medicine, 53:sup1, S82-S83, DOI: 10.1080/07853890.2021.1897431

To link to this article: https://doi.org/10.1080/07853890.2021.1897431

Published online: 28 Sep 2021.

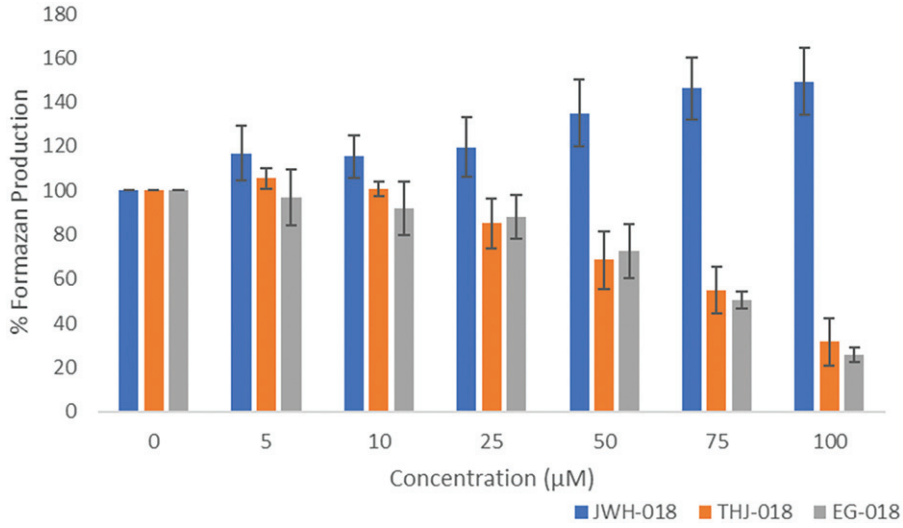

Figure 1. Cytotoxic evaluation by MTT assay of JWH-018, THJ-018 and EG-018 in SH-SY5Y cells. Data are expressed as the mean ± SD ($n = 3$).

References

[1] EMCDDA. EU drug markets report 2019. Lisbon; 2019.
[2] Angerer V, Mogler L, Steitz J-P, et al. Structural characterization and pharmacological evaluation of the new synthetic cannabinoid CUMYL-PEGACLONE. Drug Test Anal. 2018;10(3):597–603.
[3] Mogler L, Halter S, Wilde M, et al. Human phase I metabolism of the novel synthetic cannabinoid 5F-CUMYL-PEGACLONE. Forensic Toxicol. 2019;37(1):154–163.
[4] De Luca MA, Castelli MP, Loi B, et al. Native CB1 receptor affinity, intrinsic activity and accumbens shell dopamine stimulant properties of third generation SPICE/K2 cannabinoids: BB-22, 5F-PB-22, 5F-AKB-48 and STS-135. Neuropharmacology. 2016;105(2016):630–638.

DOI: 10.1080/07853890.2021.1897430

Vehicle identification from automotive paints transferred in road accidents

Sandra Coelho[a], M. Catarina de Almeida[a,b] and Carlos Família[a,b]

[a]Instituto Universitário Egas Moniz (IUEM), Egas Moniz Cooperativa de Ensino Superior, Caparica, Portugal; [b]Centro de Investigação Interdisciplinar Egas Moniz (CiiEM), Egas Moniz Cooperativa de Ensino Superior, Caparica, Portugal

ABSTRACT

Introduction: Paint chips and smears represent the most common types of trace evidence resulting from vehicle-related incidents [1,2]. Analysis of these traces would ideally lead to the identification of the paint producer and ultimately of the vehicle in question [2]. Despite the chemical complexity of automotive paints, several reports showed this identification to be possible through the use Py-GC/MS, SEM-EDX, WDXRF, Raman and FTIR spectroscopy [1,3–5]. However, these studies were focussed on the analysis of each of the individual layers that compose the painting, making the analysis more complex, time consuming and dependent on highly specialised equipment. In the present work, we evaluated the discriminative potential of ATR-FTIR for the identification of paint producers, based on the analysis of the paint as a whole.

Materials and methods: Fragments of 6 different car paints obtained from the hood and lateral panels were milled and analysed through ATR-FTIR, both individually and as mixtures between pairs of paint Figure 1. Spectra were obtained between 450 and 4000 cm^{-1}, with a resolution of 4 cm^{-1} and 16 accumulations.

Results: The obtained results show the paint spectra to have considerable differences both in the number and intensity of IR bands. Furthermore, the mixtures' spectra clearly show bands of both individual paints that are proportional, in intensity, to the ratio of each individual paint.

Discussion and conclusions: These preliminary results show considerable differences between the FTIR spectra of the individual paints that propagate throughout the paint mixtures. This suggests that there are features in the ATR-FTIR spectra of automotive paints, as a whole that might be suitable predictors for the development of highly accurate predictive models.

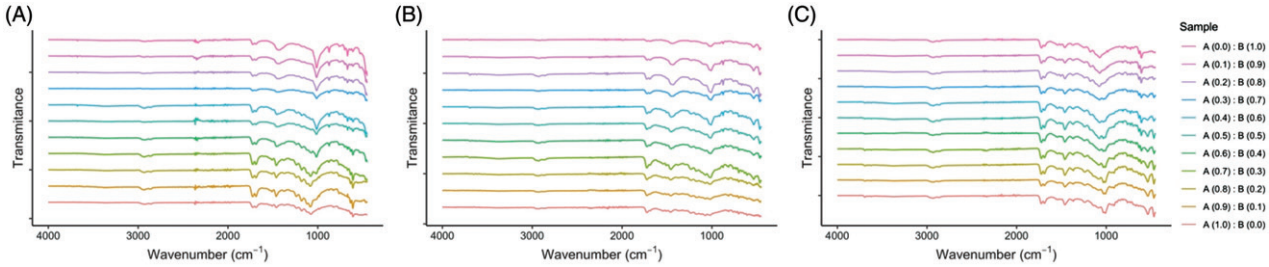

Figure 1. ATR-FTIR spectra of the isolated paints (top and bottom spectra), and of the mixtures at different ratios (middle spectra), where A) corresponds to a blue Volvo (A) and a red Renault (B); (B) to a blue Citröen (A) and a grey Skoda (B); (C) to a black Peugeot (A) and a grey Seat (B).

CONTACT Carlos Família carlosfamilia@egasmoniz.edu.pt

References

[1] Maric M, Van Bronswijk W, Lewis SW, et al. Rapid characterisation and classification of automotive clear coats by attenuated total reflectance infrared spectroscopy. Anal Methods. 2012;4(9):2687–2693.
[2] Zięba-Palus J. Application of micro-Fourier transform infrared spectroscopy to the examination of paint samples. J Mol Struct. 1999;511–512:327–335.
[3] Zięba-Palus J, Milczarek JM, Kościelniak P. Application of infrared spectroscopy and pyrolysis-gas chromatography – mass spectrometry to the analysis of automobile paint samples. Chem Analityczna. 2008;53:109–121.
[4] Rojas-Rojas L, Murillo-Quirós N, Gutiérrez-Fallas D, et al. Análisis de pintura automotriz mediante espectroscopía Raman para uso forense. TM. 2017;30(2):3–13.
[5] Zięba-Palus J, Borusiewicz R. Examination of multilayer paint coats by the use of infrared, Raman and XRF spectroscopy for forensic purposes. J Mol Struct. 2006;792-793:286–292.

DOI: 10.1080/07853890.2021.1897431

Effects of respiratory disease and age in quadriceps muscle mass: a pilot study with ultrasonography

Paula Martins[a,b,c], Laura Noronha[b,d,e], Alexandra André[f], Cátia Paixão[b,e], Patrícia Rebelo[b,e], Ana Oliveira[a,b,e], Silvia De Francesco[a,c] and Alda Marques[a,b,e]

[a]School of Health Sciences (ESSUA), University of Aveiro, Aveiro, Portugal; [b]Institute of Biomedicine (iBiMED), University of Aveiro, Aveiro, Portugal; [c]Institute of Electronics and Informatics Engineering of Aveiro (IEETA), University of Aveiro, Aveiro, Portugal; [d]Universidade Luterana do Brasil, Canoas, Brasil; [e]Respiratory Research and Rehabilitation Laboratory - Lab3R – School of Health Sciences, University of Aveiro, Aveiro, Portugal; [f]Coimbra School of Health, Polytechnic Institute of Coimbra, Coimbra, Portugal

ABSTRACT

Introduction: Patients with chronic obstructive pulmonary disease (COPD) have been shown to present more muscle wasting than their healthy peers, which affects their quality of life [1,2]. The mechanisms behind muscle wasting in COPD are still little understood and even less is known in other chronic respiratory diseases (e.g. interstitial lung diseases – ILD) [3]. Ultrasound (US) is a safe and inexpensive imaging modality which can provide reliable measurements of muscle size and quality [2]. Thus, US may be a useful technique to enhance our understanding of muscle waste in chronic respiratory diseases. This study aimed to explore differences in quadriceps muscle mass in patients with COPD, hypersensitivity pneumonitis (ILD-HP) and healthy people (elderly and young).

Materials and methods: A cross-sectional pilot study was conducted with 10 patients with ILD-HP (68.4 ± 9.8yrs), 10 patients with COPD (69.4 ± 6.7yrs) and 10 healthy elderly volunteers (67.8 ± 8.7yrs). Groups were gender (5f/5m) and age matched. A group of 10 young university students (21.9 ± 3yrs) was also included. An US equipment (GE LOGIQ P6) with multifrequency linear probe (10–13 MHz) was used to obtain B-mode US images. The following measures were taken: Rectus Femoris Thickness (RF_T), Quadriceps Thickness (Q_T) and Rectus Femoris cross sectional area (RF_{CSA}). Data were analysed using SPSS version 24. Data normality and homogeneity were assessed. Between-group differences and correlations were performed with non-parametric tests (Kruskal–Wallis, Mann–Whitney *U*-test and Spearman's correlation coefficient). Statistical significance was set at .05.