

# Author's Accepted Manuscript

*In vivo* Monitoring of Nicotine Biosynthesis in Tobacco Leaves by Low-temperature Plasma Mass Spectrometry

Sandra Martínez-Jarquín, Humberto Herrera-Ubaldo, Stefan de Folter, Robert Winkler



PII: S0039-9140(18)30311-4  
DOI: <https://doi.org/10.1016/j.talanta.2018.03.071>  
Reference: TAL18505

To appear in: *Talanta*

Received date: 7 March 2018  
Revised date: 22 March 2018  
Accepted date: 23 March 2018

Cite this article as: Sandra Martínez-Jarquín, Humberto Herrera-Ubaldo, Stefan de Folter and Robert Winkler, *In vivo* Monitoring of Nicotine Biosynthesis in Tobacco Leaves by Low-temperature Plasma Mass Spectrometry, *Talanta*, <https://doi.org/10.1016/j.talanta.2018.03.071>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# *In vivo* Monitoring of Nicotine Biosynthesis in Tobacco Leaves by Low-temperature Plasma Mass Spectrometry

Sandra Martnez-Jarquín<sup>a</sup>, Humberto Herrera-Ubaldo<sup>b</sup>, Stefan de Folter<sup>b,\*</sup>,  
Robert Winkler<sup>a,\*\*</sup>

<sup>a</sup>Center for Research and Advanced Studies (CINVESTAV) Irapuato, Department of Biochemistry and Biotechnology, Km. 9.6 Libramiento Norte Carr. Irapuato-Len, 36824 Irapuato Gto., Mexico

<sup>b</sup>Unidad de Genmica Avanzada (UGA) - Laboratorio Nacional de Genmica para la Biodiversidad (LANGEBIO), Km. 9.6 Libramiento Norte Carr. Irapuato-Len, 36821 Irapuato Gto. Mexico

---

## Abstract

Low-temperature plasma (LTP) is capable of ionizing a broad range of organic molecules at ambient conditions. The coupling of LTP to a mass analyzer delivers chemical profiles from delicate objects. To investigate the suitability of LTP ionization for mass spectrometry (MS) based *in vivo* studies, we monitored the auxin-regulated nicotine biosynthesis in tobacco (*Nicotiana tabacum*) and evaluated possible biological effects. The measured nicotine concentrations in different experiments were comparable to literature data obtained with conventional methods. The observed compounds suggest the rupture of trichomes, and cell damage was observed on the spots exposed to LTP. However, the lesions only affected a negligible proportion of the leaf surface area and no systemic reaction was noted. Thus, our study provides the proof-of-concept for measuring the biosynthetic activity of plant surfaces *in vivo*.

### Keywords:

ambient ionization, low-temperature plasma, biosynthesis, *in vivo* analysis, nicotine

---

## 1. Introduction

Ambient ionization mass spectrometry (AIMS) represents a major advance in chemical analysis, since objects of complex composition can be studied without prior sample manipulation [1]. Among the multiple AIMS methods, low-temperature plasma (LTP) jets are an attractive option, because of their simple

---

\*Co-corresponding author

\*\*Principal corresponding author

Email addresses: stefan.defolter@cinvestav.mx (Stefan de Folter), robert.winkler@cinvestav.mx (Robert Winkler)

Download English Version:

<https://daneshyari.com/en/article/7676623>

Download Persian Version:

<https://daneshyari.com/article/7676623>

[Daneshyari.com](https://daneshyari.com)