

Part A. PERSONAL INFORMATION

	CV date	24-02-2016
First and Family name	Cristina Nerín	
Researcher numbers	Researcher ID	H-6945-2015
	Orcid code	0000-0003-2685-5739

A.1. Current position

Name of University/Institution	University of Zaragoza		
Department	Analytical Chemistry		
Address and Country	María de Luna, 3 – 50018 Zaragoza - Spain		
Phone number	+34976761873	E-mail	cnerin@unizar.es
Current position	Full Professor	From	1998
Espec. cód. UNESCO	2301 – 3309 – 3308		
Palabras clave	Analytical chemistry, food packaging, active packaging, sample treatment, analysis, pollutants, environmental		

A.2. Education

PhD	University	Year
Analytical Chemistry	Zaragoza (Spain)	1980

A.3. JCR articles, h Index, thesis supervised...

Sexenios de investigación: 6 sexenios (six years periods), 2014

Thesis supervised last 10 years: Director of 17 PhD Thesis

Data collected at Web of Science de Thomson Reuters:

Total publications: 221

Citations: 3,958

Total publications in the last 5 years: 67

Average Citations per Paper for the last 5 years: 8.31

h-index: 32

Part B. CV SUMMARY

Over the first 10 years after PhD, the research was mainly focused on environmental studies, developing the analytical procedures for sampling and analysis of pollutants in water, soil and the atmosphere. The two first financed research projects dealt with organochlorine compounds in the atmosphere. The sampling procedure developed using polyurethane foams was later adopted by the EPA (Environmental Protection Agency). Heavy metals, organometallics in the atmosphere and polyaromatic hydrocarbons as well as pesticides were studied and monitored in real situations in new projects. Several BCR (EU) projects were also carried out in this period, most of them dealing with the mentioned pollutants.

In the later 80's I started with the research on food packaging interactions. After a short training in the laboratory of MAFF in UK, I started with the migration problems from packaging materials to the food in contact with them. Since then (1990) this has been the main focus of my research: Migration studies, development of all analytical procedures required to study the different migrants in both food simulants and food, their origin in the packaging (inks, adhesives, materials, etc.) and the identification of all migrants. Advanced analytical techniques were required, studied in depth and optimized for identification of unknowns (included the Non Intentionally Added Substances, NIAS) and quantification of migrants. GC-MS, ICP-MS and LC-MS, including HRMS, play an important role in this.

From the experience acquired with the migration studies, in 2000 I started the research on new active materials (active packaging) to protect the food against oxidation and microbiological infection, to improve food safety and extend the shelf life of packaged food. This new subject began in joint research with an industrial partner (Artibal). New antioxidant and antimicrobial materials were developed, tested at laboratory and industrial scale and patented. Over the last 15 years other active packagings were developed, patented and launched into the market. I can emphasize the research carried out with Artibal, Repsol, GOGLIO (Multinational Company), Samtack (Spain) and NUREL (Spain). In all these developments different technologies were used to incorporate the active agents in the material. I'm inventor in all patents and all of them are in production. I'm proud to say that all these materials are in the market. All the analytical work required to ensuring the safety in use of these new materials, to monitor their behaviour with time and their effects on food were developed in depth over the period.

In 2010 an intelligent indicator of shelf life of food was developed and patented as University of Zaragoza. An agreement for this PCT (worldwide) patent was signed with a Swiss company, who extended our patent to 69 countries and financed the industrial scale-up of this indicator. It will be in the market in 2016.

I have published more than 275 scientific papers, including 10 book chapters, directed 34 PhD Thesis and I'm inventor in 6 patents. I have developed as Principal Investigator nearly 200 research projects, 20 International, and coordinator in two EU projects. I was invited to give 120 conferences around the world. I was awarded several times, being the most important ones the 1st Award for Transfer of Knowledge to the Industrial Sector in 2009; The Award of Heroism (Defender) of Zaragoza in 2008 for the scientific career and the First Environmental Award in Aragón in 1990.

Part C. RELEVANT MERITS

C.1. Selection of Publications

1. Margarita Aznar, Celia Domeño, Cristina Nerín and Osvaldo Bosetti – 2015 – **Set-off of non volatile compounds from printing inks in food packaging materials and the role of lacquers to avoid migration.** *Dyes and Pigments*, 114, 85–92
2. Manso, S.; Pezo, D.; Gómez-Lus, R; Nerín, C. – 2014 – **Diminution of Aflatoxin B1 production caused by an active packaging containing cinnamon essential oil.** *Food Control* 45, 101-108
3. C. Nerin*, P. Alfaro, M. Aznar, E. Canellas, J.L.Ubeda, Y. Dahmani, C. Malo and R. Ausejo – 2014 – **Compounds from multilayer plastic bags cause reproductive failures in artificial insemination.** *Nature (Scientific Reports) Sci. Rep.* 4, 4913
4. E. Canellas, P. Vera, C. Nerín* – 2014 – **Atmospheric pressure gas chromatography coupled to quadrupole-time of flight mass spectrometry as a tool for identification of volatile migrants from autoadhesive labels used for direct food contact.** *J. Mass Spectrometry*, 49, 1181-1190
5. Vera, C.; Canellas, E; Nerín, C.* – 2014 – **Migration of odorous compounds from adhesives used in market samples of food packaging materials by chromatography olfactometry and mass spectrometry (GC-O-MS)** *Food Chemistry*, 145, 237–244
6. C. Nerin*, P. Alfaro, M. Aznar, C. Domeño –2013 – **The Challenge of Identifying The Non Intentionally Added Substances (NIAS) From Food Packaging Materials. A review.** *Anal. Chim. Acta.* 775, 14–24
7. Y. Echegoyen, C. Nerín – 2013 – **Nanoparticle release from nano-silver antimicrobial food containers.** *Food and Chemical Toxicology*, 62, 16–22
8. C. Nerín, J. Salafranca, M. Aznar, R. Batlle – 2009 – **Critical review on recent developments in solventless techniques for extraction of analytes.** *Analytical and Bioanalytical Chem.* 393, 3, 809-835
9. P. López, C. Sánchez, R. Batlle, and C. Nerín – 2007 – **Development of flexible antimicrobial films using essential oils as active agents.** *Journal of Agric. & Food Chem.* 55 (21), 8814–8824
10. P. López, C. Sánchez, R. Batlle, C. Nerín – 2005 – **Solid and vapour-phase antimicrobial activities of six essential Oils: Susceptibility of selected Foodborne bacterial and Fungal Strains.** *Journal of Agricultural and Food Chemistry*, 53 (17): 6939-6946

C.2. Selection of Research projects and grants

1. **IPT-2012-0261-420000 - Desarrollo de nuevos materiales antioxidantes con nanopartículas de selenio para envase flexible (NANOFLEXIPACK)** - Ministerio de Economía y Competitividad, Proyectos I+D+I INNPACTO, 2012-2014 - Principal Investigator: C. Nerín, Universidad de Zaragoza, start date: 01/01/2013, final date: 31/12/2014, amount: 110.185,28 €, Principal Investigator.
2. **AGL2012-37886 - Seguridad alimentaria de envases con nanopartículas y envases multicapa para alimentos.** (SAENMA) - Ministerio de Economía y Competitividad, Plan

Nacional Inv. 2012-2015 - Principal Investigator: C. Nerín, Universidad de Zaragoza, start date: 01/01/2013, final date: 31/12/2015, amount: 166.140,00 €, Principal Investigator.

3. **IPT-2011-1662-060000 - Envasado Activo y Biodegradable para Alimentos Frescos (ACTIBIOPACK)** - Ministerio de Ciencia e Innovación, Proyectos I+D+I INNPACTO, 2011-2014 - Principal Investigator: C. Nerín, Universidad de Zaragoza, start date: 01/09/2011, final date: 31/12/2013, amount: 150.784,20 €, Principal Investigator.

4. **IPT-060000-2010-011 - Envasado activo de nectarinas IV gamma** - Ministerio de Ciencia e Innovación, INNPACTO, 2010-2013 - Project management: ARTIBAL, start date: 01/09/2010, final date: 31/12/2012, amount: 188.692,00 €, - Principal Investigator of the UNIZAR side.

5. **251382 - Safety in Use and Emerging Technologies in Food Packaging (SAFEMTECH)** - UNION EUROPEA, FP7-PEOPLE-2009-IAPP - Principal Investigator: C. Nerín, Universidad de Zaragoza, start date: 01/09/2010, final date: 28/02/2015, amount: 367.760,00 €, Principal Investigator.

6. **AGL2008-04363 - Interacciones positivas y negativas entre el envase y el alimento: Envase activos, envases inteligentes y estudios de migración. (MIGRACTINTELLIG)** - MINISTERIO DE CIENCIA E INNOVACION, 2008-2011, Principal Investigator: C. Nerín, Universidad de Zaragoza, start date: 01/01/2009, final date: 31/12/2011, amount: 269.830,00 €, Principal Investigator.

7. **212544 - Natural Antimicrobials for Innovative and Safe Packaging (NAFISPACK)** - European Community's Seventh Framework, Programme KBBE-2007-2-4-04 Innovative and safe packaging, 2007-2013, Project management: ITENE, start date: 01/11/2008, final date: 31/12/2011, amount: 269.684,00 €, - Principal Investigator of the UNIZAR side.

8. **IPT-2011-1746-370000 - Herramienta para control en tiempo real del transporte de mercancías peligrosas (HECATE)** , Ministerio de Ciencia e Innovación, Proyectos I+D+I INNPACTO, 2011-2014 - Principal Investigator: C. Nerín, Universidad de Zaragoza, start date: 01/10/2011 final date: 31/12/2014 amount: 173.125,50 €. Principal Investigator.

C.3. Selection of Research Contracts

1. **Investigación de adhesivos base poliuretano y minimización de migraciones en materiales multicapa.** Morchem, Cristina Nerin – Universidad de Zaragoza, 2014-2015
2. **Desarrollo de nuevos envases activos de materiales poliméricos, mejora de los ya desarrollados y soporte técnico para su comercialización.** REPSOL YPF LUBRICANTES Y ESPECIALIDADES, S.A., Cristina Nerin – Universidad de Zaragoza, 2012-2013
3. **Estudio de los NIAS en materiales destinados a contacto con alimentos.** REPSOL QUÍMICA S.A., Cristina Nerin – Universidad de Zaragoza, 2012-2016
4. **Screening of NIAS in Adhesives and raw materials.** BASF, Cristina Nerin – Universidad de Zaragoza, 2015
5. **Estudio de migración de adhesivos en films para contacto alimentario (MIGREFILMS).** SAMTACK, Cristina Nerin – Universidad de Zaragoza, 2012-2016
6. **Análisis y caracterización química de nano partículas y productos en el envase de semen porcino.** MAGAPOR, Cristina Nerin – Universidad de Zaragoza, 2013-2015
7. **Non intentionally added substances (NIAS) in EU Manufactured PET Polymers.** CPME (Committee of PET Manufacturers In Europe), Cristina Nerin – Universidad de Zaragoza, 2015
8. **Non intentionally added substances (NIAS).** EFBW (European Federation of Bottled Waters), Cristina Nerin – Universidad de Zaragoza, 2015

9. Nuevos alimentos y envases diseñados para las futuras demandas del consumidor

NUREL, Proyecto CIEN, IP: Cristina Nerin – Universidad de Zaragoza, 2015-2019

C.4. Patents

- Inventor(s)*: Osvaldo Bosetti, Cristina Nerin, Mauro Fedelli, Daniel Carrizo
Patent Number(s): WO 2014/170426 - PCT /EP2014/057882
Title: **Multilayer Assembly**
Priority countries: - *Date of publication*: 23.10.2014 - *Proprietor*: Goglio S.p.A.
- Inventor(s)*: Cristina Nerin, Yolanda Madrid y Carmen Cámara
Patent Number(s): PCT/ES2014/070766
Title: **Materiales antioxidantes con Nanoparticulas de selenio para envase flexible.**
Priority countries: International - *Priority date*: 26.04.2014 - *Proprietor*: Samtack, S.A.
- Inventor(s)*: Nerin de la Puerta C, Gutiérrez Bartolomé L, Sánchez Jarabo C
Patent Number(s): WO 2010128178 A1
Title: **Smart Packaging for detecting microorganisms**
Priority countries: 189 - *Date of publication*: 11.11.2010 - *Proprietor*: Univ de Zaragoza
- Inventor(s)*: Nerin de la Puerta C; Astudillo Campillo M; Covian Sanchez I, et al.
Patent Number(s): WO2007144444-A1
Title: **Active packaging for inhibiting growth of food pathogens**
Priority countries: 106 - *Date of publication*: 21.12.2007 - *Proprietor*: Repsol YPF Lucricantes & Especialidades
- Inventor(s)*: Garces Lardies O; Nerin de la Puerta C
Patent Number(s): EP1657181-A1
Title: **Antimicrobial packaging based on the use of natural extracts and the process to obtain this packaging**
Priority countries: 35 - *Date of publication*: 17.05.2006 - *Proprietor*: Artibal, S.A.
- Inventor(s)*: Garces Lardies O; Nerin de la Puerta C; Beltran Garcia J A, et al.
Patent Number(s): EP1477519-A1, B1
Title: **Antioxidant active varnish**
Priority countries: 31 - *Date of publication*: 17.11.2004 - *Proprietor*: Artibal, S.A.

C.5. Memberships of scientific societies

Membership of SEQA (Soc. Esp. Química Analítica)
American Association of Mass Spectrometry (ASMS)
American Chemical Society
Soc. Española de Espectroscopía
GSICA (Italian Society of Food Science and Technology)

C.6. Consulting member

Consulting member in many International foro (Official bodies, Universities, etc.)

C.7. Expert member

Expert member of the WG recycling in European Food Safety Authority - EFSA
Member of scientific Committee of Agencia Española de Consumo, Seguridad Alimentaria y Nutrición - AESAN-AECOSAN in the period 2011-2015

C.7. Reviewer and Evaluator

Reviewer of the main scientific journals in the area of Analytical Chemistry, Food and Environmental studies.

Evaluator of PhD Thesis and Research Projects at national and international level (Spain, France, Holland, South Africa, New Zealand, Australia, India, Ireland, Sweden, Italy, USA, Israel, Chile, Argentina, Brasil, Colombia).