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How to anticipate the behavior of food and dairy products to spray drying and how to optimize the energy cost ?

Pierre Schuck, Anne Dolivet, Serge Mejean, E. Blanchard, Romain Jeantet

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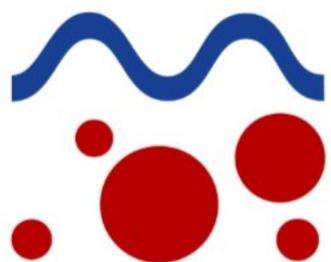
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The logo features a blue wavy line above four red circles of varying sizes, with the largest one in the center.

IDS 2014

19th International Drying Symposium

August 24-27, 2014

Lyon, France

PROGRAM AND GENERAL INFORMATION



<http://www.ids2014.fr>

ids2014@univ-lyon1.fr

TABLE OF CONTENTS

CHAIRMAN'S ADDRESS.....	4
CONFERENCE VENUE.....	6
COMMITTEES.....	8
AWARDS.....	9
GENERAL INFORMATION.....	10
SOCIAL PROGRAM.....	11
GENERAL TIMETABLE.....	12
ORAL PRESENTATIONS TIMETABLE.....	14
POSTERS.....	23

CHAIRMAN'S ADDRESS

It is my pleasure to welcome you to the 19th IDS held in Lyon. This is the second time this event has been held in France, 26 years later after the successful 6th IDS held in Versailles in 1988. As with all of the previous IDS since the first one in 1978, the ambition of IDS 2014 is to attract researchers and engineers of various sectors to provide a global forum for disseminating new results and data in research development and applications in the field of drying/dewatering sciences and technologies.

All the selected and reviewed full papers have been classified in the classical themes as follows: Modelling and simulation of transport phenomena; Thermodynamic and transport properties of materials; Industrial processes: equipment; optimization; control, scale-up; Energy efficiency and environmental issues; Freeze-drying of pharmaceuticals and biologicals; Drying of foods and biologicals: product quality and process kinetics; Spray-drying and fluidized bed drying.

In response to real societal and economic demands, this 19th IDS aims to have a focus on industrial dryer design and optimization, and on energy savings and environmental issues with increased significant participation coming from industry and R&D Centers. With the efficient help of our international scientific committee, around 340 full manuscripts have been selected, reviewed (two reviewers per paper) and corrected prior to publication on this IDS 2014 CD-ROM. These papers will be presented by Oral (150 communications) or as Posters during the conference itself. About 350 delegates from more than 30 countries representing the 5 continents will participate to the different presentations, discussions and forums. All the discussions will be enhanced and stimulated by eight invited largely well-known specialists coming from all over the world.

The organization of our Symposium would not have been possible without the help and the assistance of many people, institutions or companies through a cooperative effort. Thus, I would like to express my gratitude to Prof. Arun MUJUMDAR for his advice and suggestions, and also to the two previous IDS Chairmen, Prof. Evangelos TSOTSAS and Prof. Xiao Dong CHEN who accepted to share their experience and some data on their previous and perfect IDS management.

I would like to thank deeply all 45 members of the IDS 2014 International Scientific Committee who each took on the really challenging task of reviewing about 20 full paper reviews in a quite short time, and for advertising the event in their laboratories, institutions and countries.

I would like also to express my gratitude to institutions or companies who accepted to support the Award program of IDS 2014, namely the public French Agency for Energy and Environment (ADEME), the French Association for Drying in Industry and Agriculture (AFSIA), largely known by our drying community as the previous organizer of European Drying Conferences, and three private companies (NESTLE, SANOFI, TAYLOR & FRANCIS). Their financial contribution is hereby gratefully recognized in these times of economic hardship that we have still in Europe.

This event was also supported by the Process Control and Chemical Engineering Laboratory of the University of Lyon 1 (LAGEP-UMR CNRS 5007). The administrative part of IDS 2014 management was operated by the Congress Office (Cellule Congrès) of the University Lyon 1.

I am also grateful to all my colleagues of our local organizing committee, especially to my devoted colleagues of LAGEP laboratory, Prof. Roman PECZALSKI who accepted the heavy task of managing our web submission site, SAGA, and who was a major contributor in the edition of this IDS 2014 CD-ROM, as well as to Prof. Séverine VESSOT who assumed efficiently many scientific, logistical, and organizational tasks.

Prof. Julien ANDRIEU
Chairman IDS 2014

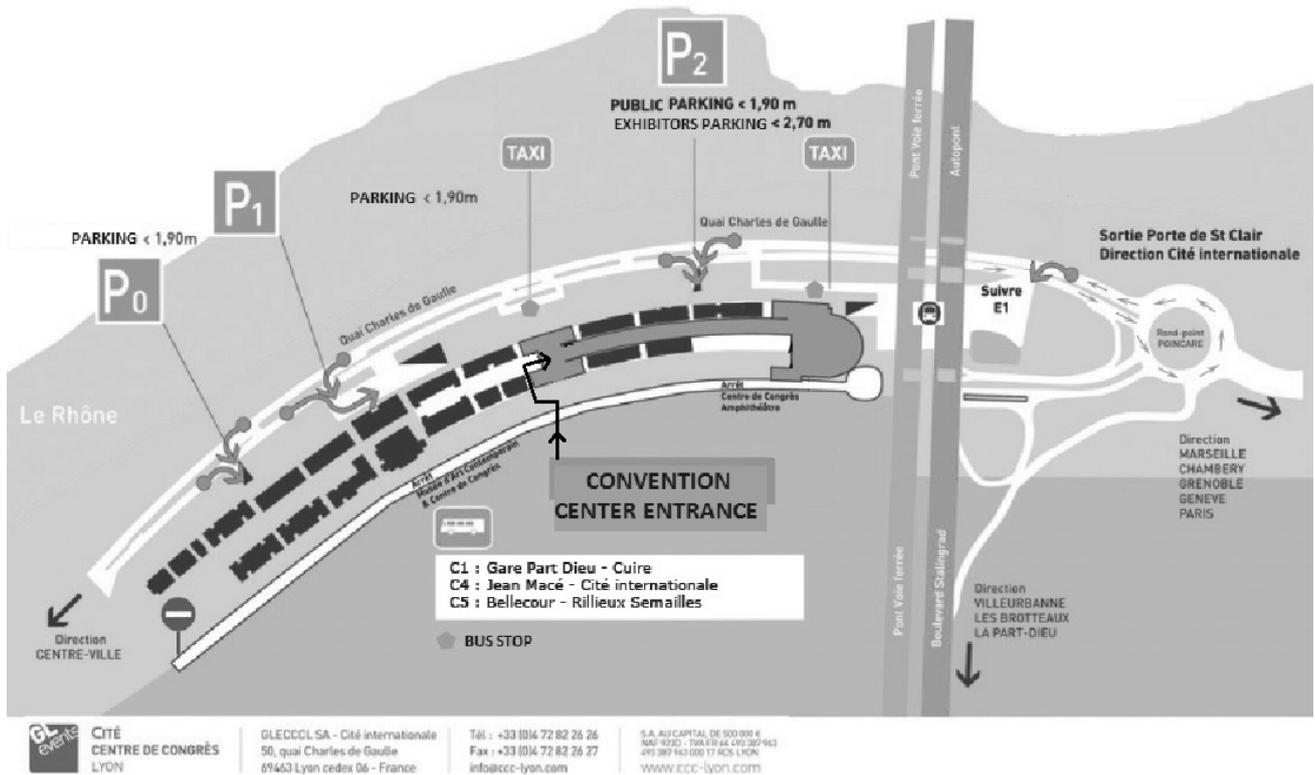
CONFERENCE VENUE

The 19th International Drying Symposium will take place at the Lyon Convention Center :

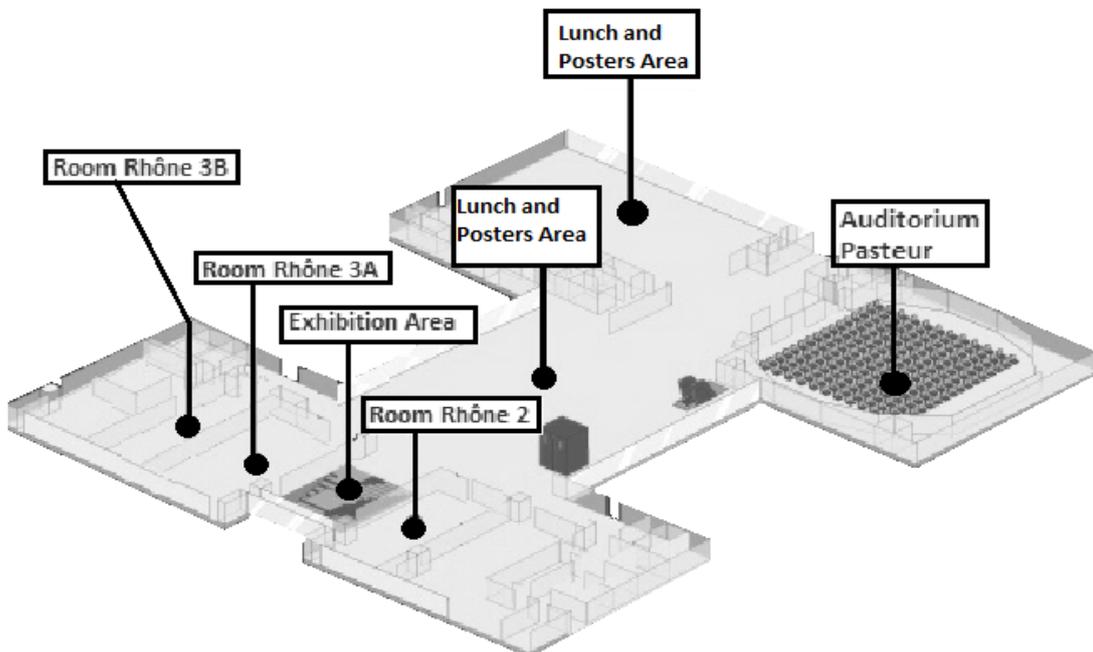
Centre de Congrès - Cité Internationale 50 quai Charles de Gaulle, Lyon, France

The Lyon Convention Center has an exceptional location, between the Rhône river bank and the Parc de la Tête d'Or, the largest public garden in Lyon.

CITÉ | CENTRE DE CONGRÈS | LYON



Floor 1 - Rhône Pasteur



Transfer to the Convention Center

- **From Saint-Exupéry Airport to Part-Dieu Station**

The access from Saint Exupéry Airport to Lyon centre is made via Rhônexpress tramway (<http://www.rhoneexpress.fr>).

Tickets can be bought at the RhônExpress station.

Departure every 15 min to 30 min, from 5.00 am to 12.00 am, and runs everyday including bank Holiday.

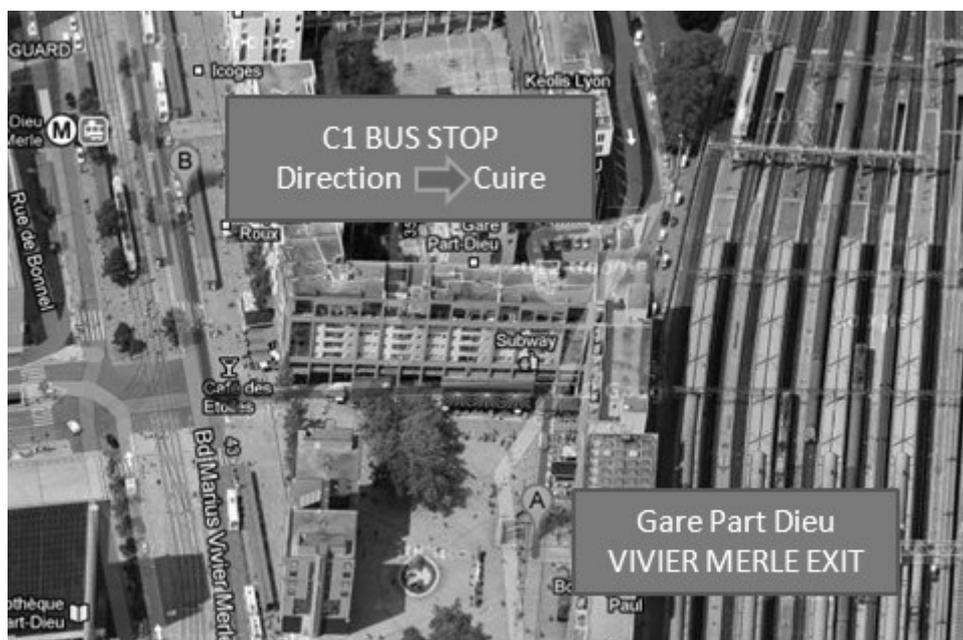
The RhônExpress links the airport to Railway station “La Part-Dieu” in 30 min.

Price: for a one way ticket (at the station), 15,70€ - Round-trip ticket (at the station) 27,20 €

You can also take a taxi : around 50,00 € to the Convention Center

- **From Part-Dieu Station and Rhône Express Tramway (from St-Exupéry AIRPORT)**

Take Bus C1, direction “CUIRE” and get off at “Cité Internationale -Centre des Congrès”



If you arrive at St Exupéry Airport and take the RhônExpress Tramway, you will arrive **at Part-Dieu Station**. Please cross the station and get out at the **Vivier Merle exit** to reach the Bus Stop.

COMMITTEES

Chairmen

Chairman of the Symposium: Julien ANDRIEU, University of Lyon

Honorary Chairman: Arun S. MUJUMDAR, University of Singapore

Local Organization Committee (University Lyon 1)

Julien ANDRIEU

Claudia COGNÉ

Hélène DESMORIEUX

Pierre LAURENT

Roman PECZALSKI

Séverine VESSOT-CRATES

International Scientific Committee

President : Patrick PERRÉ (France)

Members

ALVES-FILHO O. (Norway)

AKRITIDIS C. (Greece)

ALLAF K. (France)

ANDRIEU J. (France)

ARLABOSSE P. (France)

BARRESI A. (Italy)

BONAZZI C. (France)

BRUTTINI R. (Italy)

CHEN X. D. (China)

DAUD W.R. (Malaysia)

FARKAS I. (Hungary)

GIANFRANCESCO A. (Switzerland)

GLOUANEC P. (France)

HEMATI M. (France)

ITAYA Y. (Japan)

JINESCU G. (Romania)

JOMAA W. (France)

KECHAOU N. (Tunisia)

KEMP I. (United Kingdom)

KOWALSKI S. (Poland)

KUDRA T. (Canada)

LANGRISH T. (Australia)

LEONARD A. (Belgium)

MULET A. (Spain)

NAKAGAWA K. (Japan)

PAKOWSKI Z. (Poland)

PANG S. (New Zealand)

PECZALSKI R. (France)

RAGHAVAN V. (Canada)

RENSTROM R. (Sweden)

ROQUES M. (France)

ROSELLO C. (Spain)

SILVA M. (Brazil)

SOPONRONNARIT S. (Thailand)

TARANTO O. (Brazil)

THORAT B. (India)

TSOSTSAS E. (Germany)

TURNER I. (Australia)

VAN BOXTEL T. (Netherlands)

VESSOT S. (France)

ZBICINSKI I. (Poland)

AWARDS

Several awards will be handed out in a ceremony during the conference banquet of IDS2014.

Awards

Sponsored by

Excellence in Drying Research Award

recognizing individual's career achievements and contribution to drying, sponsored by **ADEME (the French Agency for research in Energy and Environment)**



Excellence in Drying Pharmaceuticals and Biologicals

recognizing the excellence in fundamental and applied research in soft drying techniques (vacuum contact drying, freeze-drying; etc.) carried out with pharmaceuticals products like drugs, vaccines, proteins, biologicals, etc. by **SANOFI Pasteur (R.&D. Centre in Lyon)**



Excellence in Drying Award 2014

recognizing the transfer of fundamental results to practice, sponsored by the Association Francaise de Séchage dans l'Industrie et l'Agriculture (**French Working Party on Drying**)



Nestlé Drying Technology Award IDS2014

for the best paper on food drying. Different technologies, such as spray drying, freeze-drying or vacuum drying are largely used in food industry. By sponsoring the **Nestlé Drying Technology Award**, Nestlé would like to encourage scientists to be more active in this field with a focus on industrial sustainable applications to deliver high quality foods with improved Nutrition, Health and Wellness attributes.



IDS Founder's Award 2014 co-sponsored by Taylor & Francis

in recognition of Outstanding Contribution to Drying Research and Excellence in Promotion of Future R&D.



Poster Award

for the 3 best posters presented at IDS2014, rewarding a scientifically valuable content and highly attractive graphical form, granted by the Laboratory of Process Control and Engineering (LAGEP), University Lyon 1.



GENERAL INFORMATION

Reception / Registration

The welcome desk will be located in the main entrance. At your arrival you will be given your badge and your conference bag with documentation related to the conference. Please note that the meeting, breaks, lunches and exhibition area are accessible only with your badge.

Language of the congress

The language of the congress is English.

Insurance

The organizers do not accept responsibility for individual medical, travel or personal insurance, participants are strongly advised to take out their own insurance policies.

Certificate of presence

Each participant will receive a certificate of presence.

Internet

Wireless access will be available for all participants in the entrance hall and exhibition room.

Currency and Bank

The official currency is Euro €. Currencies can be exchanged in banks and exchange currency offices which you can find in the city center and the airport.

Telephone

The international dialing code for France is 33. To give a phone call from France to international, type 00 then the dialing code of the country your trying to reach, then, the phone number of your recipient.

Emergency phone numbers

These numbers are free
Medical care : SAMU : 15.
Police : 17

Touristic Information center

Pavillon du Tourisme - Place Bellecour - B.P. 2254, 69214 Lyon Cedex 2
Tel: +33 (0)4 72 77 69 69
<http://www.lyon-france.com>

Contacts

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69622 Villeurbanne Cedex
Tél : 04 72 43 10 11
Fax : 04 72 43 12 61
Email : solange.perrel@univ-lyon1.fr / aurelie.havyaramana@univ-lyon1.fr
Mobile phone during the conference: 06 89 19 76 60

SOCIAL PROGRAM

WELCOME COCKTAIL on Sunday, August 24th – 7.30 pm to 9.30 pm

A welcome cocktail will be held at Lyon Convention Center. We invite you to come to the “Salon Pasteur”, at the end of the registrations.

RECEPTION on Monday, August 25th – 8.00 pm to 10.00 pm

WINE AND CHEESE

Alain, Marc, Guillaume and Frédéric are from the southwest of Lyon, in the heart of the Coteaux du Lyonnais. They have created the Clos St Marc, which produces red wines and white wines AOC Coteaux du Lyonnais since 1983.

Over time the area has continued to grow, and now they cultivate 24 hectares of vines, of which 3 are dedicated to white wine.

The four partners carry out the work of the vine to wine production and sales.

GALA DINNER on Tuesday, August 26th – 8.00 pm to 10.30 pm



The Gala Dinner will take place at the restaurant “Le Pavillon du Parc”, located in the Park of the Tête d’Or.

At the heart of the town’s biggest garden, close to the Lyon Convention Center, the Restaurant « Le Pavillon du Parc » offers a wide range of high-quality food. A little extra that makes the difference: its magnificent terrace offering a superb view over the wooded park and the lake. An oxygenating step.

Address:

Le Pavillon du Parc
Parc de la tête d'Or
69006 Lyon

GENERAL TIMETABLE

Day 1 – Sunday, August 24th

Registration	16:00 – 19:00
<i>Welcome cocktail</i>	19:00 – 21:00

Day 2 – Monday, August 25th

Registration	8:00 – 9:00
Opening address	9:00 – 9:30
Plenary lectures 1 and 2	9:30 - 10:40 Auditorium Pasteur
<i>Coffee break</i>	10:40 - 11:00
Oral thematic sessions: A1 : Modeling and simulation of transport phenomena B1 : Industrial processes : equipment, control, scale-up C1 : Drying of food and biologicals. Product quality. D1 : Spray and fluidized bed drying. Particles characteristics.	11:00 – 13:00 Room Rhône 2 Room Rhône 3A Auditorium Pasteur Room Rhône 3B
<i>Lunch break</i>	13:00 – 14:20
Oral thematic sessions: A2 : Modeling and simulation of transport phenomena B2 : Industrial processes : equipment, control, scale-up C2 : Drying of food and biologicals. Product quality. D2 : Spray and fluidized bed drying. Particles characteristics.	14:20 - 16:40 Room Rhône 2 Room Rhône 3A Auditorium Pasteur Room Rhône 3B
<i>Coffee break</i>	16:40 – 17:00
Poster session 1 (odd numbers)	17:00 – 19:00
Meeting of EFCE Working Party on Drying	18:00 – 19:30
<i>Social gathering</i>	20:00 – 21:00

Day 3 – Tuesday, August 26th

Plenary lectures 3, 4 and 5	8:10 - 10:10 Auditorium Pasteur
<i>Coffee break</i>	<i>10:10-10:40</i>
Oral thematic sessions: A3 : Modeling and simulation of transport phenomena B3 : Drying of food and biologicals. Product quality. C3 : Spray and fluidized bed drying. Particles characteristics. D3 : Energy efficiency and environmental issues	10:40 – 12:40 Room Rhône 2 Auditorium Pasteur Room Rhône 3A Room Rhône 3B
<i>Lunch break</i>	<i>12:40 – 14:00</i>
Oral thematic sessions: A4 : Modeling and simulation of transport phenomena B4 : Drying of food and biologicals. Product quality. C4 : Spray and fluidized bed drying. Particles characteristics. D4 : Freeze-drying of pharmaceuticals and biologicals	14:00-16:20 Room Rhône 2 Auditorium Pasteur Room Rhône 3A Room Rhône 3B
Jubilee J. Andrieu	16:20 – 16:40
<i>Coffee break</i>	<i>16:40 – 17:00</i>
Poster session 2 (even numbers)	17:00 – 19:00
Advisory Panel meeting	18:00 – 19:00
<i>Banquet and Awards ceremony</i>	<i>20:00 – 22:30</i>

Day 4 – Wednesday 27 August

Plenary lectures 6, 7 and 8	8:10 - 10:10 Auditorium Pasteur
<i>Coffee break</i>	<i>10:10-10:40</i>
Oral thematic sessions: A5 : Drying of food and biologicals. Product quality. B5 : Freeze-drying of pharmaceuticals and biologicals C5 : Drying of food and biologicals. Process kinetics. D5 : Thermodynamic and transport properties of materials	10:40 – 12:40 Auditorium Pasteur Room Rhône 2 Room Rhône 3A Room Rhône 3B
<i>Lunch break</i>	<i>12:40 – 14:00</i>
Oral thematic sessions: A6 : Drying of food and biologicals. Product quality. B6 : Energy efficiency and environmental issues C6 : Drying of food and biologicals. Process kinetics. D6 : Energy efficiency and industrial equipment	14:00 – 16:20 Auditorium Pasteur Room Rhône 2 Room Rhône 3A Room Rhône 3B
<i>Closing ceremony</i>	<i>16:00 – 16:20</i>

ORAL PRESENTATIONS TIMETABLE

Day 1 – Sunday, August 24th

Registration	16:00 – 19:00
Welcome Cocktail	19:00 – 21:00

Day 2—Monday, August 25th

Auditorium Pasteur										
08:00	Registration	08:00								
09:00	Opening address	09:00								
09:30	Keynote Lectures 1 and 2 Chairs : E. Tsotsas ; Z. Pakowski Perspectives on Drying R&D: Past, present and future A. Mujumdar The proper use of mass diffusion equation in drying modelling: from simple configurations to non-Fickian behaviours P. Perré	09:30								
10:40	Coffee break	10:40								
	<table border="1" style="width:100%"> <tr> <th style="width:50%">Room Rhône 2</th> <th style="width:50%">Room Rhône 3A</th> </tr> <tr> <td>Session A1</td> <td>Session B1</td> </tr> <tr> <td>Modeling and simulation of transport phenomena</td> <td>Industrial processes : equipment, optimization, control, scale-up</td> </tr> <tr> <td><i>Chairs: P. Perré ; O. Taranto</i></td> <td><i>Chairs: T. Kudra ; T. Ullum</i></td> </tr> </table>	Room Rhône 2	Room Rhône 3A	Session A1	Session B1	Modeling and simulation of transport phenomena	Industrial processes : equipment, optimization, control, scale-up	<i>Chairs: P. Perré ; O. Taranto</i>	<i>Chairs: T. Kudra ; T. Ullum</i>	
Room Rhône 2	Room Rhône 3A									
Session A1	Session B1									
Modeling and simulation of transport phenomena	Industrial processes : equipment, optimization, control, scale-up									
<i>Chairs: P. Perré ; O. Taranto</i>	<i>Chairs: T. Kudra ; T. Ullum</i>									
11:00 a1-1	Drying kinetics of a single droplet containing solids using a Reaction Engineering Approach. S Pawar, J Padding, N Deen, A Jongsma, F Innings, H Kuipers	Modern sustainable drying technologies - pilot case studies O Alves-Filho	11:00 b1-1							
11:20 a1-2	Mathematical modeling of the drying of extruded fish feed and its experimental demonstration. A Haubjerg, B Simonsen, S Løvgreen, Bo N. Jørgensen, C T. Veje	Quality drying of medicinal plants A Martynenko, T Kudra	11:20 b1-2							
11:40 a1-3	Modeling liquid film rings during convective drying of particle packings Y Wang, H Tariq Mahmood, A Kharaghani, E Tsotsas	Pulse combustion spray-drying: some case studies Z Wu, Haitao Su, W Li, Z Li, J Li, J A. Rehkopf, A Mujumdar	11:40 b1-3							
12:00 a1-4	Numerical modeling of mixed flow grain drying with CFD and DEM. H Scaar, F Weigler, M Delele, G Franke, J Mellmann, E Tsotsas	CFD modelling of a co-current pilot spray drying tower M Molaei, T Mahmud, P J Heggs, A Bayly, M Ghadiri, P Bach, H Ahmadian	12:00 b1-4							
12:20 a1-5	Effects of different constructions on impact dryer performance - numerical analysis J Bigda, K Ignasiak, K Slowik	Design of solar dryers for small-scale farmers in developing countries P Talbot, C Heilporn, A Schubert, C Delannoy, B Haut	12:20 b1-5							
12:40 a1-6	Identification of solvent transport coefficient in silica gel during convective ambient pressure drying R Adamski, Z Pakowski, A Kamińska	Control of freezing as a mean for process intensification in freeze-drying I Oddone, R Pisano, S Grassini, A Barresi	12:40 b1-6							
13:00	Lunch	13:00								
	<table border="1" style="width:100%"> <tr> <th style="width:50%">Session A2</th> <th style="width:50%">Session B2</th> </tr> <tr> <td>Modeling and simulation of transport phenomena</td> <td>Industrial processes : equipment, optimization, control, scale-up</td> </tr> <tr> <td><i>Chairs: S. Kowalski ; P. Glouannec</i></td> <td><i>Chairs: A. Barrési ; F. Courtois</i></td> </tr> </table>	Session A2	Session B2	Modeling and simulation of transport phenomena	Industrial processes : equipment, optimization, control, scale-up	<i>Chairs: S. Kowalski ; P. Glouannec</i>	<i>Chairs: A. Barrési ; F. Courtois</i>			
Session A2	Session B2									
Modeling and simulation of transport phenomena	Industrial processes : equipment, optimization, control, scale-up									
<i>Chairs: S. Kowalski ; P. Glouannec</i>	<i>Chairs: A. Barrési ; F. Courtois</i>									
14:20 a2-1	Air flow simulation in timber (lumber) kilns: shape and geometry effects J Rodríguez-Ramírez, F Ignacio-Caballero, L Leticia Méndez-Lagunas, S Sandoval-Torres	Multi-objective optimization of combined sludge drying "Hot Air - Direct Conduction" A Fuentes, J-P Ploteau, P Glouannec	14:20 b2-1							
14:40 a2-2	Modeling of PVC powder drying kinetics in a batch fluidized bed dryer. A Aubin, R Ansart, M Hemati, T Lasuye, M Branly	A first step in drying simulation with a commercial chemical engineering software C Lambert, H Romdhana, P Baudet, F Courtois	14:40 b2-2							

15:00 a2-3	Influence of plate size on the evaporation rate of a heated droplet A-L Ljung, E Lindmark, T. Staffan Lundström	Energy efficiency and product quality aspects of Flame Spray Drying M Taradaichenko, M Piatkowski, I Zbicinski	15:00 b2-3
15:20 a2-4	Convective drying of agitated particle beds - Experiments and DEM-CFD simulations. F Sudbrock, H Kruggel-Emden, S Wirtz, V Scherer	Optimal configuration and operational strategy in super critical CO2 dehydration of foodstuffs C Alemida-Rivera, S Khalloufi, A Mudaliar	15:20 b2-4
15:40 a2-5	Modeling and simulation of self-assembly process of nanoparticles in liquid-gas interface A Uzi, Y Ostrovsky, A Levi	Real time monitoring of gas-solid fluidized bed granulation: evolution of particle size, fluidization regime transitions and psychometric parameters O Taranto, C A. M. Silva	15:40 b2-5
16:00 a2-6	Experimental and simulated investigation of particle dynamics in a rotating drum D Araújo dos Santos, R Scatena, F Osmarini Dadalto, C R Duarte, M A de Souza Barrozo	Economic evaluation of solar cabinet dryer system: a case study on onion drying A Gada, Vaibhav Tidke, A Mujumdar, B Thorat	16:00 b2-6
16:20 a2-7	Mathematical description of intermittent convective drying of carrot with osmotic pretreatment assisted with ultrasound. S J Kowalski, A Pawłowski, D Mierzwa, J Szadzińska	Fundamentals and experimental comparison of high pressure air and steam instant controlled pressure drop in the three-stage spray-drying of milk powder S Mounir, T Allaf, I Sulaiman, K Allaf	16:20 b2-7
16:40	Coffee break		16:40
17:00	Poster session 1 : odd numbers (17:00 – 19:00)		17:00
18:00	Business meeting of the EFCE WP Drying (18:00 – 19:30)		18:00
20:00	Social gathering (20:00 – 22:00)		20:00

ORAL SESSIONS

Day 2 – Monday 25 August

	Auditorium Pasteur		
08:00	Registration		08:00
09:00	Opening address		09:00
09:30	Keynote Lectures 1 and 2 Chairs : E. Tsotsas ; Z. Pakowski Perspectives on Drying R&D: Past, present and future A Mujumdar The proper use of mass diffusion equation in drying modeling: from simple configurations to non-Fickian behaviours P. Perré		09:30
10:40	Coffee break		10:40
	Auditorium Pasteur	Room 3B	
	Session C1	Session D1	
	Drying of food and biologicals. Product quality. <i>Chairs: A. Mulet ; V. Raghavan</i>	Spray and fluidized bed drying. Particles characteristics. <i>Chairs: T. Langrish ; P. Schuck</i>	
11:00 c1-1	Evaluation of some thin-layer models of carrot V Mitrevski	Formulation and processing conditions influencing viability retention of probiotics during spray-drying J Perdana, M B. Fox, R M. Boom, M A.I. Schutyser	11:00 d1-1
11:20 c1-2	Textural properties of apple rings (Var. Golden delicious) subjected to different dehydro-freezing conditions. L Ben Haj Said, S Bellagha, K Allaf	Effect of acidity on crystallization of lactose powders during spray-drying M Saffari, T Langrish	11:20 d1-2
11:40 c1-3	Characterizing processing effects of partially drying/DIC/freezing/thawing apples through a comparative study of two texture assessment methods of compression-relaxation and puncture. L Ben Haj Said, S Bellagha, K Allaf	Monodisperse particles containing docosahexaenoic acid (dha) made with monodisperse droplet generator coupled with an air-drying chamber L Che, X You, Y Wang, B Wang, X Dong Chen	11:40 d1-3
12:00 c1-4	Microwave-assisted hot air drying characteristics of osmotically dehydrated broccoli stalk slices N Salina Md Salim, Y Garipey, V Raghavan	Particle morphology as a means for investigating single-droplet drying of dairy products T Thu Hang Tran, K Terrazas-Velarde, J Avila-Acevedo, E Tsotsas	12:00 d1-4

12:20 c1-5	Recent developments in the high-quality drying with energy saving characteristics for fresh foods M Zhang	Formation of microspherical particles from carbohydrate polymers via anti-solvent vapour precipitation J Yuan Tan, V Menh Tang, J Nguyen, S Mansouri, M Wai Woo, K Hapgood, X Dong Chen	12:20 d1-5
12:40 c1-6	Microwave-assisted pulse-spouted bed freeze drying of stem lettuce slices -effect on product quality Y Wang	Absorption-dehydration strategy in sub-micron particle production from atomised droplets via anti-solvent vapour precipitation S Chew, D Wardhana, Mukhyiddin, S Mansouri, K Hapgood, M Wai Woo, D Chen Xiao	12:40 d1-6
13:00	Lunch		13:00
	Session C2	Session D2	
	Drying of food and biologicals. Product quality.	Spray and fluidized bed drying. Particles characteristics.	
	<i>Chairs: M. Silva ; B. Thorat</i>	<i>Chairs: A. Gianfrancesco ; I. Zbicinski</i>	
14:20 c2-1	Optimization of combined drying technology for lettuce based on response surface methodology Y Yuan, Z Zhao	Experimental investigation of continuous fluidized bed spray granulation with internal classification M Schmidt, A Bück, E Tsotsas	14:20 d2-1
14:40 c2-2	Selection of operational strategies in a microwave drying process of cellulose-alginate capsules J Mardaras, J Ignacio Lombraña, I González, L Bergara	Influence of drying conditions to the product quality during continuous fluidized bed spray granulation T Hoffmann, C Rieck, M Schmidt, A Bück, E Tsotsas, M Peglow	14:40 d2-2
15:00 c2-3	Application of ultrasonic treatment to improvement of the functionality of dried cashew apples S Rodrigues, T Fonteles, K Leite, F Fernandes	Analysis influence of drying rate on spatial morphology of agglomerates M Dadkhah, M Peglow, E Tsotsas	15:00 d2-3
15:20 c2-4	Protein-based microencapsulation with freeze pretreatment K Nakagawa, T Jarunglumlert, S Adachi	Multi-zone model for dynamic behavior in horizontal fluidized bed granulator K Meyer, A Bück, E Tsotsas	15:20 d2-4
15:40 c2-5	Ultrasound assisted osmotic dehydration: Effect on drying kinetics and quality of carrot J Szadzińska, S J Kowalski	Study of different excipients on the obtainment of copaifera langsdorffii spray-dried extracts. A Costa-Machado, L Freitas	15:40 d2-5
16:00 c2-6	Effect of dextrose equivalent of maltodextrin on the stability of emulsified coconut-oil in spray-dried powder T Matsuura, R Matsushita, A Ogawa, M Tomabechi, T Loon Neoh, S Gohtani, H Yoshii	Effect of fluidized bed drying temperature on kinetic and quality of partially parboiled white waxy rice P Jaiboon, S Prachayawarakorn, S Devahastin, S Soponronnarit	16:00 d2-6
16:20 c2-7	Mechanisms of drying acceleration by ultrasounds G Musielak, D Mierzwa, J Kroehnke	Spray-drying of sodium caseinate aggregates loaded with β -carotene: an influence of aggregate structure on encapsulation efficiencies K Nakagawa, T Jarunglumlert, S Adachi	16:20 d2-7
16:40	Coffee break		16:40
17:00	Poster session 1 : odd numbers – (17:00 – 19:00)		17:00
18:00	Business meeting of the EFCE WP Drying (18:00 – 19:30)		18:00
20:00	Social gathering (20:00 – 22:00)		20:00

ORAL SESSIONS

Day 3 – Tuesday 26 August

Auditorium Pasteur			
08:10	Keynote Lectures 3, 4 and 5 Chairs : P. Perré ; S Kowalski Multi-scale approaches to processes that combine drying with particle formation E. Tsotsas Reaction Engineering Approach (REA) to modeling drying problems : ideology versus reality X.D. Chen, A. Putranto Achieving food products performance by mastering the drying process A. Gianfrancesco	08:10	
10:10	Coffee break		10:10
	Room Rhône 2	Auditorium Pasteur	
	Session A3	Session B3	
	Modeling and simulation of transport phenomena	Drying of food and biologicals. Product quality.	
	<i>Chairs: A. Mujumdar</i>	<i>Chairs: N. Kechaou ; T. Van Boxtel</i>	
10:40 a3-1	Two phase CFD model of counter current spray-drying process P Wawrzyniak, M Jaskulski, I Zbicinski, M Podyma	Impact of spray-drying process parameters on dairy powders surface composition and properties Y Nikolova, J Petit, A Gianfrancesco, C Sanders, C Gaiani, J Scher	10:40 b3-1
11:00 a3-2	CFD model of spray-drying with particle agglomeration M Jaskulski, P Wawrzyniak, I Zbicinski	Investigations on the microwave induced drying and expansion of extruded starch-based pellets S Kraus, H P. Schuchmann, V Gaukel	11:00 b3-2
11:20 a3-3	Effect of water vapour on lower limit temperature during drying of polymer films cast from a polymer-organic solvent solution M Yoshida, T Yamane, T Shibayanagi	Ethanol as drying accelerator of guaco leaves (mikania laevigata schultz bip. ex baker) M G. Silva, R M. S. Celeghini, M Aparecida Silva	11:20 b3-3
11:40 a3-4	The effects of internal and external forces on the particle dynamics and internal flow in suspension droplets Y Ostrovski, A Uzi, A Levy	Drying characteristics and product quality of cowpea dried in a convective tunnel dryer Z Wu, J Shi, Qing Liu, A Mujumdar	11:40 b3-4
12:00 a3-5	Moving away from macroscopic modelling of transport processes in porous media: two-scale approaches and their applications. E Carr, P Perré, I Turner	Drying of vegetable products in closed systems J Stawczyk, M Krempski-Smejda, K Śmigielski, R Prusinowska	12:00 b3-5
12:20 a3-6	Enhancement of drying of paper with phase change material Y Khakpour, J Seyed-Yagoobi	Drying of hydrolyzed collagen with grape pulp in spouted bed: influence of process variables on the powder production efficiency J Junior Butzge, F Condi De Godoi, S Cristina Dos Santos Rocha	12:20 b3-6
12:40	Lunch		12:40
	Session A4	Session B4	
	Modeling and simulation of transport phenomena	Drying of food and biologicals. Product quality.	
	<i>Chairs: Z. Pakowski ; R. Renstrom</i>	<i>Chairs: R. Jeantet ; K. Allaf</i>	
14:00 a4-1	2-D Hydro-viscoelastic model for highly deformable product convective drying simulation L Hassini, R Peczalski, S Azzouz	Near infrared spectroscopy as a technique to monitor water and polyphenol contents of rose leaves during their drying P Talbot, O Abbas, V Baeten, B Haut	14:00 b4-1
14:20 a4-2	Drying of multilayer porous media by combined radiative-convective heating: application to gypsum plasterboard P Le Bideau	Production of natural color powder from <i>Centella Asiatica l.</i> leaves: effects of pretreatment and drying methods. L Ngamwonglumert, S Devahastin, N Chiewchan	14:20 b4-2
14:40 a4-3	Experimental investigation of hydro-mechanical coupling during clay drying N Prime, L Fraikin, A Léonard, R Charlier, S Levasseur	Effects of air drying treatments on the retention of 6-gingerol in ginger G Szrednicki, H Gan	14:40 b4-4

15:00 a4-4	Pore network simulations to determine influence of pore structure on wetting-drying kinetics of porous particles A Rahimi, A Kharaghani	Lysine loss during spray-drying of dairy products: combined effect of reaction kinetics, drying kinetics and spray-drying conditions. An experimental-numerical study. I Schmitz-Schug, U Kulozik, P Foerst	15:00 b4-5
15:20 a4-5	Effect of wheat kernel shape on the evaluation of drying-related phenomenological properties: an irreversible thermodynamics approach G T. Santos, M Fortes, J Helvécio Martins, R P. Amantéa	Effect of air-drying temperature on technological properties, color, total phenols and flavonoids kinetics' of lemon (Citrus limon. v. lunari) peels N Ghanem, C Bonazzi, D Mihoubi, N Kechaou, N Boudhrioua Mihoubi	15:20 b4-6
15:40 a4-6	Isothermal drying of pore networks in the presence of capillary liquid films – Comparison of experiments with simulation results N Vorhauer, E Tsotsas, M Prat	Microbial analysis of dried fish and comparative study using different drying methods N Nagwekar, V Tidke, B Thorat	15:40 b4-7
16:00 a4-7	Study of model application for drying of pulp fruit in spouted bed with intermittent feeding and accumulation T Naianne Pires Dantas, F Canindé Moraes Filho, J Silva Souza, J Araújo Oliveira, S C dos Santos Rocha, M de Fátima Dantas Medeiros	The influence of ultrasounds on retention of bioactive compounds in osmo-convectively dried sour cherries K Siucińska, M Mieszczakowska-Fraç, A Połubok, D Konopacka	16:00 b4-8
16:20	Jubilee ceremony J. Andrieu	Auditorium Pasteur	16:20
16:40	Coffee break		16:40
17:00	Poster session 2 : even numbers – (17:00 – 19:00)		17:00
18:00	Advisory Panel Meeting (18:00 – 19:00)		18:00
20:00	Banquet and Awards (20:00 – 22:30)		20:00

ORAL SESSIONS

Day 3 – Tuesday 26 August

Auditorium Pasteur			
08:10	Keynote Lectures 3, 4 and 5 Chairs : P. Perré ; S Kowalski Multi-scale approaches to processes that combine drying with particle formation E. Tsotsas Reaction Engineering Approach (REA) to modeling drying problems: ideology versus reality X.D. Chen, A. Putranto Achieving food products performance by mastering the drying process A. Gianfrancesco		08:10
10:10	Coffee break		10:10
	Room Rhône 3A	Room Rhône 3B	
	Session C3	Session D3	
	Spray and fluidized bed drying. Particles characteristics. <i>Chairs: I. Kemp ; X.D. Chen</i>	Energy efficiency and environmental issues. <i>Chairs: O. Alves-Filho ; A. Leonard</i>	
10:40 c3-1	Spherical crystalline amino-acid particles from spray-drying R Lin, M Wai Woo, W Liu, C Selomulya, X Dong Chen	Convective drying of sawdust/sludge mixtures in a fixed bed: The effect of sludge origin J Li, L Fraikin, T Salmon, D Toye, A Léonard	10:40 d3-1
11:00 c3-2	Monte Carlo modelling of particle coating in fluidized beds C Rieck	Comparison of moisture and temperature distribution in a single rice kernel subjected superheated steam drying and hot air drying H Xiaoli, W Zhenhua, X Bo, W Zhonghua, L Xiangdong	11:00 d3-2
11:20 c3-3	Fluidized Bed Technology: Microencapsulation of lactic acid bacteria and their protection after a coating process V Oehl	Drying characteristics and quality evaluation of mixed culture mesophilic sludge under hot air and heat pump drying method. W Chern Kau, S Kian Chin, P Eong Poh	11:20 d3-3
11:40 c3-4	Model based prevention of powder build-up in spray driers, including visualization M Fox, H Straatsma, M Verschueren, C Akkerman	High efficiency rotary steam drying of moist minerals and fuels C-G Berg, H Mansikkaviita	11:40 d3-4
12:00 c3-5	Experimental analysis of the microstructure of single particles and micro droplets F Sondej, A Bück, E Tsotsas	Energetic and exergetic analysis of two-dimensional grain driers R P. Amantéa, M Fortes, J Helvécio Martins, G T. Santos	12:00 d3-5

12:20 c3-6	Modelling of the impact of the initial droplet properties and the drying process parameters on surface composition of a multi-component particle A Porowska, A Gianfrancesco, L Fries, S Palzer, S Heinrich	Energy aspects in electrohydrodynamic drying T Kudra, A Martynenko	12:20 d3-6
12:40	Lunch		12:40
	Session C4	Session D4	
	Spray and fluidized bed drying. Particles characteristics. <i>Chairs: E. Tsotsas ; T. Kudra</i>	Freeze-drying of pharmaceuticals and biologicals <i>Chairs: K. Nakagawa ; S. Vessot</i>	
14:00 c4-1	Replacing the traditional roasting process with fluidized bed drying technique for processing immature green paddy W Phomkong, L Wiset, N Poomsa-ad, A Ekpong	Freeze-drying microscopy as a tool to study sublimation kinetics P Raman, C Rielly, A Stapley	14:00 d4-1
14:20 c4-2	Microwave-assisted fluidized bed drying of yeast immobilized on potato pulp carrier M Paslawska, B Stępień, W Drożdż	A freeze-drying microscopy study of the kinetics of sublimation in a model lactose system P Raman, C Rielly, A Stapley	14:20 d4-2
14:40 c4-3	How to anticipate the behaviour of food and dairy products to spray-drying and how to optimize the energy costs? P Schuck, A Dolivet, S Mejean, E Blanchard, R Jeantet	Drying conditions affect the antioxidant properties of agricultural products: a study on hot-air-dried and freeze-dried spirulina maxima K Nakagawa, W Ritcharoen, P Sri-uam, P Pavasant, S Adachi	14:40 d4-3
15:00 c4-4	Protein kind driven particle morphology and resulting dairy powders properties C Sadek, P Schuck, Y Fallourd, N Pradeau, C Le Floch-Fouéré, R Jeantet	Stratified packed bed structures could increase the drying rates in spray freeze-drying systems R Bruttini, A Liapis	15:00 d4-4
15:20 c4-5	Spray-drying with a two-fluid nozzle to produce fine particles : atomisation, scale-up and modelling I Kemp, T Hartwig, R Herdman, R Wadley, P Hamilton, A Bisten, M Pinto	Chamomilla recutita extract microencapsulation by spray freeze-drying S Pereira, A Lanchote, L Freitas	15:20 d4-5
15:40 c4-6	Comparative study of the efficiency of whey protein isolate in protecting <i>Lactobacillus Plantarum</i> A17 against spray-drying B May, S Khem	A mutual gas diffusion model improves the prediction of mass transfer in freeze-drying I C Trelea, F Fonseca, S Passot, D Flick	15:40 d4-6
16:00 c4-7	Minimization of particle dispersion in a continuous horizontal fluidized bed P Bachmann, E Tsotsas	Freeze-drying of pharmaceuticals with non-aqueous solvent. Influence of freezing protocol and of formulation on drying times and on residual solvents contents R Daoussi, S Vessot, J Andrieu, J Jose, O Monnier	16:00 d4-7
16:20	Jubilee ceremony J. Andrieu	Auditorium Pasteur	16:20
16:40	Coffee break		16:40
17:00	Poster session 2 : even numbers – (17:00 – 19:00)		17:00
18:00	Advisory Panel Meeting (18:00 – 19:00)		18:00
20:00	Banquet and Awards (20:00 – 22:30)		20:00

ORAL SESSIONS

Day 4 – Wednesday 27 August

	Auditorium Pasteur		
08:10	Keynote Lectures 6, 7 and 8 Chairs : X. D. Chen ; I. Zbicinski Ultrasound assisted hybrid drying of biological materials S. Kowalski Vaccines freeze-drying, a century of challenges P. Vacus Recent developments in spray-drying T. Ullum		08:10
10:10	Coffee break		10:10

	Auditorium Pasteur	Room 2	
	Session A5	Session B5	
	Drying of food and biologicals. Product quality	Freeze-drying of pharmaceuticals and biologicals	
	<i>Chairs: F. Courtois ; A. Mulet</i>	<i>Chairs: R. Bruttini ; P. Vacus</i>	
10:40 a5-1	Effect of air drying temperature on individual phenolic compounds and antioxidant activity kinetics of orange peels N M'hiri, I Ioannou, M Ghoul, N Boudhrioua Mihoubi	Synthesis of zeolite fibers by unidirectional freezing and steam-assisted crystallization H Tamon, T Iwaya, H Mori, N Sano	10:40 b5-1
11:00 a5-2	Effect of water activity and storage time on lipid oxidation of babassu coconut milk powder A Santana, L Kurozawa, R Oliveira, K Park	Effect of the drying conditions on the drying curves and the solvent retention capacity of Barely groats Ó Rodríguez, M Krempski, I Zbicinski, S Simal	11:00 b5-2
11:20 a5-3	Effect of impinging stream drying temperature on mechanical property and head rice quality of parboiled rice P Pruengam, S Soponronnarit, S Prachayawarakorn, S Devahastin	Freeze-drying of initially unsaturated porous material frozen from aqueous solution W Wang, D Hu, Y Pan, K Yu, G Chen	11:20 b5-3
11:40 a5-4	Characteristic roasting and coloring curves for coffee beans D Pramudita, T Araki, Y Sagara	Microencapsulation of extra virgin olive oil with spray-drying and freeze-drying methods: effect of wall material type and composition A Zungur, M Koç, F Kaymak-Ertekin	11:40 b5-4
12:00 a5-5	Dehydration and quality characterization of moringa olifera leaves K Prasad, Y Singh	Process monitoring and design when using tert-butanol/water cosolvent systems in pharmaceutical freeze-drying R Pisano, D Fissore, A. Barresi	12:00 b5-5
12:20 a5-6	Energy recovery of olive mill wastewater through pellets production from their blend with lignocellulosic biomass: drying step investigation N Kraiem, M Amine Balti, N Kechaou, M Jeguirim, R Said	Three-dimensional measurement of ice crystals in frozen materials by near-infrared imaging spectroscopy G Do, T Araki, Y Bae, K Ihikura, Y Sagara	12:20 b5-6
12:40	Lunch		12:40
	Session A6	Session B6	
	Drying of food and biologicals. Product quality	Energy efficiency and environmental issues.	
	<i>Chairs: G. Szrednicki ; K. Allaf</i>	<i>Chairs: S. Pang ; Y. Itaya</i>	
14:00 a6-1	Microwave vacuum drying of probiotics embedded in a protective foam matrix S Ambros, U Kulozik	Sewage sludge drying in a continuous pilot-scale paddle dryer: experiments and modeling with a markovian approach M Milhé, M Sauceau, P Arlabosse	14:00 b6-1
14:20 a6-2	Effect of using konjac glucomannan in combination with maltodextrin on antioxidant activity of mulberry leaf extract powder by spray-drying N Surapun, K Duangmal, C Borompichaichartkul	The development of large pressurized fluid bed steam dryers from fundamental research to industrial plants. A Sloth Jensen	14:20 b6-2
14:40 a6-3	Drying kinetics and energy consumption of combined convective- electrohydrodynamic drying of mushroom slices M Havet, S Taghian Dinani	Large scale drying in superheated steam under pressure A Sloth Jensen	14:40 b6-3
15:00 a6-4	Experimental and mathematical studies of sesame by-products' microwave drying Y Khaldi, K Kriaa, B Hadrach, M Amine Balti, N Kechaou	Sludge treatment system combined with bio-drying and carbonization N Kobayashi, H Hamabe, Y Itaya	15:00 b6-4
15:20 a6-5	Extraction of essential oils of citronella: Part2: Effect of the drying on the yield and the quality of essential oil M Amine Balti, K Kriaa, B Hadrach, M Néji Kadri, N Kechaou	CAPE for environmental efficiency: application to industrial process for biomass drying H Romdhana, C Bonazzi, J-P Belaud, C Sablayrolles, M Montrejaud-Vignoles, C Penicaud, M Esteban-Decloux	15:20 b6-5
15:40 a6-6	Influence of cooking as a pre-treatment to microwave drying of manioc roots N Rosa Pereira, L Tinoco Gonçalves, T Silva Soares, L Poses Mussi, K Silva Ferreira	Using of an experimental design to characterize the convective drying behavior of different sludges L Fraikin, B Herbreteau, T Salmon, F Nicol, M Crine, A Léonard	15:40 b6-6
16:00	Closing ceremony		16:00
16:20	End		16:20

ORAL SESSIONS

Day 4 – Wednesday 27 August

Auditorium Pasteur		
08:10	Keynote Lectures 6, 7 and 8 Chairs : X. D. Chen ; I. Zbicinski Ultrasound assisted hybrid drying of biological materials S. Kowalski Vaccines freeze-drying, a century of challenges P. Vacus Recent developments in spray-drying T. Ullum	08:10
10:10	Coffee break	
	Room 3A	Room 3B
	Session C5	Session D5
	Drying of food and biologicals. Process kinetics.	Thermodynamic and transport properties of materials
	<i>Chairs: G. Chen ; M. Fortes</i>	<i>Chairs: O. Taranto ; M. Roques</i>
10:40 c5-1	Intensification of convective drying process by ultrasonic assisted pre-treatments: effects on tissue water status and drying kinetics of apples Ó Rodríguez, P J. Liábres, J Cárcel, R González, S Simal	Dualism of the hydration water visualized in drying processes of foods Y Konishi, M Kobayashi
11:00 c5-2	Influence of air routing on the drying behavior of air dried apple – an experimental and simulation approach A-M Nuñez Vega, C Rombach, W Hofacker	Effect of the instant controlled pressure drop treatment on the properties of carrot T Nguyen, J-L Lanoisellé , K Allaf
11:20 c5-3	Direct formulation of <i>Citrus Aurantium</i> peels by osmotic dehydration process: study of the mass transfer kinetics M Ben Zid, C Dhuique Mayer, A Servent, A Collignan, M Dornier, A Sahli, S Bellagha	Study on shrinkage deformation of food in microwave vacuum drying T Tsuruta, H Tanigawa, H Sashi
11:40 c5-4	The effect of selected microwave powers on the drying kinetics of corn husk A Akdoğan, G Çalışkan, S. Nur Dirim	Sorption isotherm and mass diffusivity determined in teak wood used as building material C A Houngan, M Anjorin, A Vianou, P Perre
12:00 c5-5	Influence of vegetable structure on ultrasonically assisted convective drying C Ozuna, A Mulet, J Vicente García-Pérez, E Riera, J Andrés Cárcel	Desorption isotherms and drying kinetics of cactus/brewer's grains mixture fermented with lactic bacteria I Chkir, M Amine Balti, L Ayed, S Azzouz, N Kechaou, M Hamdi
12:20 c5-6	A critical analysis about using of a thin layer drying concept to model the drying of leaves R A. B. Lima, K C. Ribeiro, M do Carmo Ferreira, J T. Freire	Method for measuring stickiness in spray drying based on particle impact T Petersen, J Sloth, T Ullum, O Hassager
12:40	Lunch	

	Session C6	Session D6	
	Drying of food and biologicals. Process kinetics.	Energy efficiency and industrial equipment	
	<i>Chairs: A. Mulet ; J. Andrieu</i>	<i>Chairs: R. Peczalcki; R. Rémond</i>	
14:00 c6-1	Drying of droplet containing insoluble nanoscale particles: falling rate drying stage U Maurice, M Mezhricher, A Levy, I Borde	Design and optimization of industrial woody biomass pretreatment addressed by a multiscale computational model: particle, bed and dryer levels J Colin, R Rémond, P Perré	14:00 d6-1
14:20 c6-2	Drying kinetics and bioactivity of beetroot slices pre-treated in concentrated chokeberry juice and finish dried with vacuum microwaves A Figiel, K Lech, M Serowik, M Szarycz, A Wojdyło, M Korzeniowska	How to replace primary energy with a superheated steam dryer The BMA fluidized bed steam dryer WVT J Gaßmann, H Fersterra, G Caspers, H Hafemann	14:20 d6-2
14:40 c6-3	Impact of ultrasound pretreatment on the osmo-dehydration kinetics and sensory evaluation of beetroot slices A Ochoa-Martínez, B Esquivel-González, S Marina González-Herrera, J Morales-Castro	From feasibility to commissioning - process development at CLARIANT M Dyballa	14:40 d6-3
15:00 c6-4	Evaluation of degradation kinetics of nutritional components during drying of fresh foods X Jin, A J B van Boxtel, X Dong Chen	Numerical investigation of wood drying with intermittent energy source at low exergy content R Rémond, P Perré	15:00 d6-4
15:20 c6-5	Effect of different infrared drying temperatures on drying kinetics, antioxidant activities, biochemical and functional parameters of fresh and dried green algae "Ulva sp." (Chlorophyta, ulvales). S Trabelsirekik, B Hadrich, K Kriaa, G Bedoux, N Bourgougnon, N Kechaou	The drying of a single whey protein droplet: vacuole and hole formation J Bouman, P Venema, M Schutyser, R de Vries	15:20 d6-5
15 :4 0 c6-6	Pulsed fluidized bed behaviour with changes in pressure chambers sizes G Rogula, M Rychlik	Increasing the dry matter content of the feed of spray dryers C Akkerman, M Weeks	15 :40 d6-6
16:00	Closing ceremony		16:00
16:20	End		16:20

POSTERS

1 - Modeling and simulation of transport phenomena		
P1	Ali Darvan, Martin Sommerfeld	A new approach to modelling of single droplet drying
P2	Lars Nilsson	Mathematical models for compressible flow in porous media
P3	Fernanda Casciatori, Andreas Bück, Joao Cláudio Thoméo, Evangelos Tsotsas	Two-phase two-dimensional model for heat and moisture transfer for a packed bed solid-state bioreactor
P4	Shima Yousefi, Zahra Emam-Djomeh, M Mousavi, M Shahriari, I Zbicinski	Anthocyanin degradation of spray-dried raspberry juice powder: Explanation of temperature and moisture profiles using computational fluid dynamic simulation technique
P5	Shuxia Qiu, Peng Xu, Arun S. Mujumdar	A numerical study of heat and mass transfer in unsteady impinging jet on the rough surface
P6	Rafael Oliveira Defendi, Rodrigo Orgeda da Silva, Gisleine Elisa Cavalcante da Silva, Paulo Roberto Paraíso, Luiz Mário de Matos Jorge	Simulation and analysis of periodic and conventional drying of soybeans in fixed bed
P7	Rafael Oliveira Defendi, Gisleine Elisa Cavalcante da Silva, Paulo Roberto Paraíso, Luiz Mário de Matos Jorge	The initial grain moisture effect on soybean drying curves and mass transfer coefficients
P8	Joanna Bigda, Krzysztof Stowik, Karina Ignasiak	Experimental and numerical investigation of coal drying in new type of impact dryer.
P9	Mulugeta Admasu Delele, Fabian Weigler, Holger Scaar, Georg Franke, Jochen Mellmann	Modelling of air and solid flow in a rotary dryer for agricultural products
P10	Guangyuan Jin, Min Zhang, Zhengwei Cui, Qifeng Zhong	Fluid Dynamic Study on Spout Elevation of a Gas-Particle Spouted Fluidization Bed in Microwave-Vacuum Dryer
P11	Imen Hammouda, Daoued Mihoubi	Thermo-hydro-mechanical modeling of combined convective, microwave and infrared drying of saturated porous material.
P12	Csaba Mészáros, Istvan Farkas, Klaus Gottschalk, Ágnes Bálint	Novel-type solutions of convection-anomalous diffusion equation for porous media
P13	Zdzisław Pakowski, Sławomir Kwapisz	A single particle model for superheated steam drying of low rank coal at high pressure.
P14	Thiago Pádua, Rodrigo Béttega	CFD simulation of a spouted bed feeder into a riser
P15	Beatriz Silvério, Isabela Resende, Kássia Santos, Cláudio Duarte, Marcos Barrozo	Effect of the friction, elastic and restitution coefficients on the fluid dynamics behavior of a rotary dryer operating with fertilizer
P16	Loubna Kahlerras, Thiery Salmon, Federique Michel, Luc Courard, Azeddine Belhamri, Angélique Léonard	Modelling heat and mass transfer during convective drying of a building material
P17	Nour-Eddine Benaouda, Belkacem ZEGHMATI, Xavier Chesneau, Abdellah Khellaf	Performances evaluation of a modular solar dryer
P18	Zhanyong Li, Shaotie Wang, Jin Wang, Xinyuan Gao, Qing Xu	Application of reaction engineering approach to modeling of drying of green beans in a fluidized bed with slotted gas distributor
P19	Qing Xu, Hang Yin, Mianhua Chen, Ruifang Wang, Arun S. Mujumdar	Effect of pulsed steam flow on ethanol separation in solid-state fermentation process
P20	Ruifang Wang, Zhe Wang, Huihui Huo, Qing Xu, Zhanyong Li	Improvement of electromagnetic field uniformity in a microwave rotary dryer
P21	Hiroyuki Kagami	More minute thickness control of a thin film after drying through temperature, evaporation and concentration management in drying process of a polymer solution coated on a flat substrate
P22	Hedi Romdhana, Charlene Lambert, Daniel Goujot, Francis Courtois	Comparing simulations from compartmental and classic PDE approaches to model drying of food solids
P23	E Hernandez-Bautista, S Sandoval-Torres, P Felipe de Jesus Cano-Barrita, J Rodriguez-Ramírez.	Heat and moisture transfer with hydration reaction in a cement-based material during a curing/drying process with water vapor
P25	Toma Chitu, Séverine Vessot, Roman Peczański, Julien Andrieu, Bertrand Woinet, Alain Françon	Influence of operating conditions on the freeze-drying of frozen particles in a fixed bed and modelling data

2 - Thermodynamic and transport properties of materials

P26	Giovanni Di Muoio, Niels S. Tiedje, Bjørn B. Johansen	Investigation of moisture levels in water based foundry coating and furan sands using an automatic vapor sorption analyzer
P27	Mona Edrisi Sormoli, Timothy A.G. Langrish	GAB parameters for spray-dried pure orange juice powder
P28	Anders Haubjerg, Benny Simonsen, Sti Løvgreen, Bo N. Jørgensen, Christian T. Veje	Prediction of mechanical durability of dried, extruded fish feed using structural mechanics models and experimental justification of relaxation times
P29	Banu Koç, Figen Kaymak-Ertekin	Glass transition and sorption behaviour of spray dried maltodextrin
P30	Robert Adamski, Zdzisław Pakowski, Anna Kamińska	Experimental investigation of sorption isotherm and surface area of silica hydrogel.
P31	Boumediene Touati, Karima Mir, Amel Saad, Asma Abdenbi, Said Bennaceur	Moisture sorption isotherms of the desert truffle (<i>Tirmania pinoyi</i>)
P32	Hugo Perazzini, Fábio Bentes Freire, José Teixeira Freire	Interrelations between theory and experiment in drying kinetics of inorganic particulate compounds
P33	Acácia Lima, Leonardo Machado, Luciano Monteiro, Álvaro Lima, Odelsia Alsina	Osmotic dehydration of mangaba (<i>Hancornia speciosa</i>)
P34	Gustavo Dias Maia, Ana Laura Pelizer Pelegrin, José Teixeira Freire	Determination of adsorption-desorption isotherms of brazilian barley kernels
P35	Xin Jin, Xiao Dong Chen	Intuitive exploration of shrinkage mechanism and drying mechanism during drying of biological materials
P36	Manel Ben Abdelhamid, Daoued Mihoubi, Jalila Sghaier, Ahmed Bellagi	Convective drying of hardened cement paste: Experimental characterization and drying kinetics
P37	Ayihaou Armand Djossou, Comlan Aristide Houngan, Aliou Moussa Djibril, Malahimi Anjorin, Antoine Vianou	Comparative study of thermal effusivity and thermal conductivity at various moisture content of two tropical wood species used as building materials
P38	Said benaceur, Belkacem Draoui, Lyes Bennamoun, Boumediene Touati	Determination of moisture sorption-isotherms of leaves (<i>Waronia saharae</i>) harvested in the Algerian Sahara
P39	Charlene Lambert, Hedi Romdhana, Francis Courtois	Toward another method to determine effective diffusion coefficient in food-stuffs
P40	Rosa Zabalaga, Natalia Piedemonte, Livia Carvalho, Carmen Tadini	Equilibrium moisture and sorption isotherms of unripe banana
P41	Mariana Pereira, Veronica Flammia, Livia Carvalho, Carmen Tadini	Study of osmotic dehydration of green banana (<i>Musa cavendishii</i>) using non caloric solutions
P42	Wanyr R. Ferreira, Mauri Fortes, Luiz Cláudio A. Crespo	Evaluation of transport coefficients for natural and mixed convection drying of a horizontal cylinder
P43	Loubna Kahlerras, Frederic Michel, Luc Courard, Thierry Salmon, Lyes Bennamoun, Azeddine Belhamri, Angélique Léonard	Experimental study of the drying kinetics of mortar
P44	Ali Zerrouati, Martine Rueff, Bachir Bouchekima	Experimental study and modelling of desorption isotherms of papers made of bleached kraft pulps
P46	Luis A. Segura, Daniela L. Garrido, Fabiola V. Villagra, Guillermo G. Badillo	The effect of capillary pressure on shrinkage during drying. Experiments on 2D deformable micromodels.
P47	Abdelouahab Benseddik, Ahmed Azzi, Karim Allaf, Lazhar Serir, Farouk Chellali	Elaboration cards iso-values of meteorological variables influencing the process of solar drying in Algeria
P48	Emna Bettaieb, Lamine Hassini, Amira Touil, Mohamed Afif Elcafsi	Desorption isotherms of prickly pear seeds and effect of drying conditions on the quantity and quality of its oil
P49	Raja Lamloumi, Gisèle Lecomte-Nana, Lamine Hassini, David Smith, Mohamed Afif Elcafsi	Comparative drying behavior of a clay material and a fiber-clay composite
P50	Rim Bahar, Romain Remond, Eric Mougel, Soufiene Azzouz, Afif Elcafsi	Moisture diffusion of spruce and oak

3 - Industrial processes: equipment, control, scale-up		
P51	Giovanni L. Di Muoio, Niels S. Tiedje, Bjørn B. Johansen	Measurement of moisture in foundry coatings using resistance based measuring devices
P52	Alişan Gönül, Özden Ağra, Hakan Demir, Şevket Özgür Atayılmaz, Mustafa Kemal Sevindir	Investigation of drying of cini ceramic raw materials in a convective dryer
P53	Siti Noor Suzila Maqsood ul Haque, Robert Driscoll	A study on the effects of solar radiation and buoyancy of air flow on drying of coffee beans in a heat recovery solar dryer
P54	Florian Thienger, Bernd Jödicke	High speed non tactile measurement of volume and color of agricultural products within the process of convective drying
P55	Roger Renström, Jonas Berghel	Experimental results from drying sawdust below the fiber saturation point using a vertical pneumatic dryer
P56	Beatriz Silvério, Pedro Lucas Sá, Edu Arruda, Cláudio Duarte, Marcos Barrozo	Study of the performance of a rotoerated dryer using different configuration of mini-pipes
P58	Konstantin Sosnin, Victor Tkachov, Svetlana Us, Mariia Taradaichenko	Multiobjective identification of convective drying of grain based on fuzzy sets
P60	Sameh Mkaouar, Neila BAHLOUL, Karim KRIAA, Antony GELICUS, Karim ALLAF, Nabil KECHAOU	Optimisation of the extraction of polyphenols from olive (olea euraopea) leaves with instant controlled pressure drop (DIC)
P62	Serm Janjai, Chayapat Phusampao, Wanich Nilnont, Busarakorn Mahayothee, Yutthasak Boonrod	Modeling a large-scale solar greenhouse dryer for drying macadamia nuts
P63	Sushant Konnur, Bhaskar Thorat	Experimental Investigation of Jaggery Drying to Produce Granular Jaggery
P64	Helene Desmorieux, Tchamyé Boroze	Drying in Sub Saharan Zone : the choice of a technology and its energy type
P65	Isha Sehgal, Ankit Gada, Vaibhav Tidke, B.N. Thorat	Socio-economic impact of solar dryer
P67	michel havet, Olivier Rouaud, Dominique Tarlet, Merouane Hamdi, Erik Bardy	Selection of optimal process parameters by infrared thermography for EHD Drying in a channel

4 - Energy efficiency and environmental issues		
P68	Katarzyna Zalewska, Odilio Alves-Filho	Green technology for drying and preserving mushrooms
P69	Néstor David G. Lopez, Suzanna B. Badra, Marina L. Verzola, Sandra Cristina S. Rocha, Melissa G. A. Vieira	Effect of drying conditions on color stability of recycled paper with the addition of natural dyes
P70	Marcin Blazniak, Rasmus Toftegaard	Modelling of superheated steam drying process and evaluation of similarities between air drying and superheated steam drying processes
P71	Yvon-Bert Pambou, Laurent Fraikin, Thierry Salmon, Michel Crine, Angélique Leonard	Impact of a high linear weight polymer co-conditioning with Polyaluminium chloride on dewatering and convective drying of urban residual sludge.
P72	Yacine Chryat, Martine Esteban-Decloux, Hedi Romdhana, Christian Labarde, Audrey Darraspen, Emmanuel Deur	Design description of a Super Heated Steam particle dryer pilot
P73	Zafer Erbay, Arif Hepbasli	Exergoeconomic performance assessment of a pilot scale heat pump conveyor dryer using the Specific Exergy Costing (SPECOC) method
P74	Aline Argenta, Carolina Gonçalves, Gabriela Rosa, Elizangela Oliveira	Drying characteristics of solids waste (pomace) of wine processing
P75	Ashwini Gaikwad, Tushar Gaware, Vaibhav Tidke, Bhaskar Thorat	Solar drying of turmeric

5 - Freeze-drying of pharmaceuticals and biologicals		
P76	Tamás Antal, Kerekes Benedek, László Sikolya, Mohamed Tarek	Study on a two-stage vacuum freeze and hot-air drying method for apple cubes
P77	Gulsah Caliskan, Safiye Nur Dirim	Determination of the freeze drying kinetics of pumpkin (<i>Cucurbita Moschata</i>) puree
P78	Kadriye Ergun, Gulsah Caliskan, Safiye Nur Dirim	Determination of the freeze drying kinetics of kiwi (<i>actinidia deliciosa</i>) puree with and without the addition of maltodextrin
P79	Tatiana Konkova, Mariia Gordienko, Marina Alekhina, Natalia Menshutina, Svetlana Alves	The synthesis of nanoporous silica gels with adjustable structure by using the sol-gel method and various drying techniques
P80	Purnima Raman, Chris Rielly, Andy Stapley	A freeze drying microscopy study of the sublimation kinetics of frozen coffee solutions
P81	Lyes Bennamoun, Angélique Léonard	Contact vacuum drying of fungal biomasses and thermo-sensitive products
P82	Monika Janowicz, Iwona Sitkiewicz, Dariusz Piotrowski, Elżbieta Krasowicz	Structure of freeze-dried strawberries
P83	Livia Calixto, Luciana Tacon, Tatiane Souza, Aurea Lanchote, Luis Freitas	Spray freeze drying of a Brazilian herbal extract: effect on quality
P84	thouaiba htira, Claudia Cogne, Emilie Gagnière, Denis Mangin	Simulation of the freeze wastewater treatment on cold surface
P85	Zehra Gulsunoglu, Fatma Neşe Kok, Necla Aran	The effect of freeze drying on viability of encapsulated <i>L. acidophilus</i> LA5 and the effect of genipin concentration on the swelling ratio of freeze-dried microcapsules
P178	Cyril Iaconelli, A Charriau, L Beney and P Gervais	Production, stabilization and conservation of the extremely oxygen sensitive bacteria: <i>Faecalibacterium Prausnitzii</i>

6 - Drying of food and biologicals. Product quality.		
P86	Odilio Alves-Filho, Svetlana Goncharova-Alves, D. O'Keeffe	Production of high quality blueberries applying energyeffective drying technology
P87	Patricia Azoubel, Mariana Amorim, Sofia Oliveira, João Rodrigues, Louise Kurozawa	Influence of ultrasound and osmotic dehydration pretreatments on papaya drying
P88	S Mtiri, S Ben Mabrouk	Influence of drying under variable temperature on colour characteristics, essential oil quality and antioxidant capacity of tunisian rosemary leaves
P89	Anna Horszward, Odilio Alves-Filho	Innovative blueberry heat pump drying technology: evaluation of anthocyanins, antioxidant capacity and kinetics
P90	Hiroki Saito, Ken-ichiro Suehara, Takaharu Kameoka, Atsushi Hashimoto	Effects of hot air temperature conditions on combined infrared and convective drying characteristics of seasoned instant noodles
P91	Mehmet KOÇ, Figen Kaymak-Ertekin	Effect of spray drying conditions on hydroxymethylfurfural content and physical properties of honey powder
P92	Merve Eser, Mehmet Koç, Figen Kaymak-Ertekin	Comparison of drying methods and conditions for tomato powder properties
P93	Jennifer Thieme, Florian Thienger, Werner Hofacker, Bernd Joedicke	Correlation between volume and water content during drying of agricultural products
P94	Saskia Arendt, Werner Hofacker, Wolfgang Speckle	Quality Analysis of Fresh and Dried Tomatoes
P95	Janire Mardaras, Jose Ignacio Lombraña, María Carmen Villarán, Noelia Hidalgo.	Viability evaluation of microencapsulated probiotics dehydrated by different microwave drying condition
P96	Malek Ben Zid, Claudie Dhuique Mayer, Adrien Servent, Antoine Collignan, Manuel Dornier, Sahli Ali, Sihem Bellagha	Blanching pretreatment: a useful method for debittering Citrus aurantium peels
P97	Masoumeh Fotohi, Zahra Emam-Djomeh, Gholamreza Askari	Optimization of drying process of pomegranate seeds in a microwave assisted fluidized-bed dryer using response surface methodology
P98	Mahboubeh Fazaeli, Zahra Emam-Djomeh, MS Yarmand	Quality evaluation of spray-dried ice cream mixes as affected by process condition and stabilizer concentration
P100	Hirokazu Shiga, Ai Ninomiya, Sae Adachi, Tze Loon Neoh, Shuji Adachi, Hidefumi Yoshii	Effect of oil droplet size on the stability of emulsified flaxseed oil by spray drying
P101	Rafael Oliveira Defendi, Gisleine Elisa Cavalcante da Silva, Paulo Roberto Paraiso, Luiz Mário de Matos Jorge	Experimental study of the advantages of periodic drying of soybeans in fixed bed
P102	Ángel Calín-Sánchez, Abdolreza Kharaghani, Krzysztof Lech, Adam Figiel, Ángel A. Carbonell-Barrachina, Evangelos Tsotsas	Physical and sensory properties of chokeberry fruits dried with different methods
P103	Preeda Prakotmak, Somkiat Prachayawarakorn	Production of banana powder [musa sp. (aa group) "kluai khai"] by foam-mat drying
P104	Sae Adachi, Hirokazu Shiga, Shoma Iwamoto, Tze Loon Neoh, Shuji Adachi, Hidefumi Yoshii	Encapsulation of emulsified fish oil by spray drying
P105	Eng Sh'ng Siew, Siew Kian Chin	Drying characteristics and quality evaluation of kiwi slices under hot air drying method.

P107	Manuela Santiago, Ana Gouvêa, Renata Borguini, Ronoel Godoy, Regina Nogueira, Luzimar Nascimento, Sidney Pacheco, Fernanda Peixoto	Influence of convective drying on the stability of anthocyanins in Jamelão (<i>Syzygium cumini</i>) based natural colorant
P108	Irasema Anaya Sosa, Keila Sarin Loyola Arenas, Mario Gonzalo Vizcarra Mendoza	Effect of agitated bed drying on the retention of phenolic compounds, anthocyanins and antioxidant activity of roselle (<i>hibiscus sabdariffa</i> l.)
P109	Lilia Leticia Méndez-Lagunas, Karina Gacria-Lucas, Juan Rodríguez-Ramírez, Sadoth Sandoval-Torres	Influence of spray drying operating parameters on the characteristics of pitaya juice powder as a natural colorant.
P110	Fabiano A.N. Fernandes, Sueli Rodrigues, Juan A. Carcel, Jose Vicente García-Pérez, Antonio Mulet	Evaluation of vitamin preservation and availability on ultrasound-assisted air drying of apples (Royal Gala var.)
P112	Aline H Rosanova, Maria do Carmo Ferreira	A comparison of two preservation techniques for keeping quality of tomatoes (cv. Paron)
P113	Erandi Hernández García, Mario Gonzalo Vizcarra Mendoza, Irasema Anaya Sosa, José Luis Morales Pineda	Effects of thin-layer drying on the antioxidant capacity and phenolic compound retention of purple maize (<i>Zea mays</i> L. Amilaceae)
P114	Viridiana Pérez Pérez, Irasema Anaya Sosa, María Teresa Cruz y Victoria	Effects of fixed-bed drying on the retention of enzymatic activity of proteases and amilases of white maize (<i>zea mays</i> l)
P116	Araceli Ochoa-Martínez, Nalleli Trancoso-Reyes, Luis Arturo Bello-Pérez, Juliana Morales-Castro, Néstor Gutiérrez-Méndez	Effect of microwave-assisted drying on color, carotenoid content and functional properties in sweet potato flour
P117	Artur Wiktor, Małgorzata Nowacka, Magdalena Śledź, Katarzyna Rybak, Tadeusz Chudoba, Dorota Witrowa-Rajchert	Color and structure of the convective dried carrot treated by pulsed electric field
P118	Vânia Rosal Guimarães Nascimento, Rafael Augustus de Oliveira, João Domingos Biagi	Drying of <i>Moringa oleifera</i> grains associating convective method with infrared radiation
P119	Audirene Amorim Santana, Luiz Gabriel Pereira Martin, Rafael Augustus de Oliveira	Effect of osmotic dehydration on the physical-chemical properties of pineapple
P120	Tales Costa-Silva, Claudia Souza, Suraia Said, Wanderley Oliveira	Drying of enzyme immobilized on low cost substrates
P122	Aleksandra Jedlińska, Emilia Janiszewska, Dorota Witrowa-Rajchert, Anne-Marie Seuvre, Andrée J. Voilley	The physicochemical properties of industry microencapsulated grapefruit aroma
P123	Md Amdadul Haque, Peter Aldred, Jie Chen, Benu Adhikari	The efficacy of lactose and trehalose in protecting whey protein isolate from denaturation during convective air drying
P124	Audirene Santana, Louise Kurozawa, Rafael Oliveira, Kil Park	Storage stability of spray-dried pequi pulp
P125	Zhaogai Wang, Lijuan Chen, Hui Yang	Effect of drying methods on the quality and antioxidant activity of <i>toona sinensis</i>
P126	Kaciane Andreola, Antonio Marsaioli, Osvaldir Taranto	Effect of microwave-assisted convective drying regimes on drying kinetics and color of carrot
P127	Rosilene Costa, Osvaldir Taranto	Drying of açai (<i>Euterpe oleracea</i> Mart.) in spouted bed of inert particles
P128	Ali Ferradji, Hakima Acheheb	Optimization of osmotic dehydration of tomatoes slices in salt and sucrose solutions using Response Surface Methodology
P129	Mianhua Chen, Hong Gao, Nina Sun, Yajuan Gao, Yueju Peng, Ling Zhang	Effect of drying process on hydroxy-acid form of monacolin k in functional <i>monascus</i> rice
P130	Ali Ferradji, Hakima Acheheb	Optimization of osmotic dehydration of medlars slices (<i>Eriobotrya japonica</i> , lindeley) in sucrose solution using Response Surface Methodology.
P131	Mercedes Rasia, Jefferson Correa, Jose Vicente García-Pérez, Antonio Mulet, Juan A. Carcel	Osmotic dehydration of pineapple: Influence of solution concentration and the use of ultrasound
P132	Magdalena Śledź, Artur Wiktor, Katarzyna Rybak, Dorota Witrowa-Rajchert	Quality changes during microwave-convective drying of ultrasound and water steam blanching pre-treated parsley leaves
P133	Magdalena Śledź, Artur Wiktor, Katarzyna Rybak, Dorota Witrowa-Rajchert	The influence of ultrasound pre-treatment and water steam blanching on the microwave-convective drying of parsley leaves – kinetics and energy approach
P134	Miloud Lahbari, Djamel Fahloul, Ishak Azani, Hocine Benmoussa, Samir Mezdour	Effect of solar and vacuum drying on the kinetics of loquat fruit
P135	La Choviya Hawa, Suriah Binti Ali, Sachie Fujii, Noriko Yoshimoto, Shuichi Yamamoto	Effect of pre-treatment on color degradation of lemon peel during drying
P136	Iwona Sitkiewicz, Monika Janowicz, Dariusz Piotrowski, Łukasz Szlendak, Elżbieta Krasowicz	Selected physical properties and structure of convective and vacuum dried strawberries
P138	Helene Desmorieux, Claudia Cogne, Aurelien veyrat Lechenal, Yves Lozano, Paul Lozano	Characterization of <i>Nannochloropsis occulata</i> drying according to different heat transfer types
P139	Osman Yağız Turan, Eda Aktaş, Gizem Muazzez Yılmaz, Ebru Fıratlıgil-Durmuş	Effect of edible coatings on osmotic dehydration of carrot slices
P141	Michał Krempek-Smejda, Jan Stawczyk, Alicja Zawadzka	Low temperature drying of carrots

7 - Spray and fluidized bed drying. Particles characteristics.		
P142	Matheus B. Braga, Sandra C. S. Rocha	Spouted bed drying of milk-blackberry pulp: product stability and effect of adjuvant on powder production efficiency
P143	Tugba Basargan, Duygu Şen, Sezen Ece Önal, İpek Akkaya, Metin Durakoğlu, Gülhayat Nasün-Saygılı	Spray dried hydroxyapatite-chitosan composites
P144	Thomas Hagemeyer, Andreas Bück, Evangelos Tsotsas	Characterization of particle dynamics in fluidized beds by means of PTV
P145	Gustavo Nakamura Alves Vieira, Fábio Bentes Freire, José Teixeira Freire	Simulation of a neural network-based inferential controller of moisture content of milk powder produced on a spouted bed dryer
P146	Janire Mardaras, Jose Ignacio Lombraña, Igor González, Hector Yustos	Modelling and simulation of a microwave drying process of alginate-cellulose capsules in a fixed-fluidized bed
P147	Ana Lúcia Fernandes Pereira, Francisca DÍva Lima Almeida, Ana Laura Tiberio deJesus, Fabiano André Narciso Fernandes, JOse Maria Correia da Costa, Sueli Rodrigues	Probiotic cashew apple powder obtained by spray-drying
P148	Maisa Tonon Bitti, Fábio Bentes Freire, José Teixeira Freire	Analysis of the influence of base angle on the drying pastes in a spouted bed
P149	Debolina Das, Timothy Langrish, Shimali Jayakodi	The effect of phosphate inhibition on the solid-phase crystallization of lactose
P150	Mariia Gordienko, Eugenia Ershova, Natalia Menshutina, Dmitry Zhukov, Svetlana Alves	Investigation of the hot-melt granulation process based on the self-emulsifying systems
P152	Regina Isabel Nogueira, Manuela Cristina Pessanha de Araújo Santiago, Diego Renan Sobreiro Falcão Paim, Luis Filipe Cavalcanti Santos, Aline Luiza Machado Carlos, Viktor Christian Wilberg, Ronel Luiz de Oliveira Godoy, Sueli Pereira Freitas	Aqueous extract of pomegranate peels (<i>punica granatum</i>) encapsulated by spray drying
P153	Lucimara Benelli, Diego Cortes-Rojas, Claudia Souza, Wanderley Oliveira	Fluidized bed drying and agglomeration of herbal extract compositions
P154	Diego Cortes-Rojas, Claudia Souza, Wanderley Oliveira	Encapsulation of <i>syzygiumaromaticum</i> extract in lipid based spray dried microparticles
P155	Cécile Gavory, Robin Abderrahmen, Jean Pierre Valour, Didier Chaussy, Mohamed Naceur Belgacem, Hatem Fessi, Stéphanie Briancon	Pressure sensitive adhesive microencapsulation by spray-drying and spray-cooling
P156	Renata Cunha, Ana Vitória Campos, Cláudio Roberto Duarte, Marcos Antônio Barrozo	Analyzes of the effect of ultrasonic pretreatment on spouted bed drying of a mixture made from acerola waste and soybean
P157	Swapnali Vanjiwale, Vaibhav Tidke, Bhaskar Thorat	Drying kinetics of Indian- Cardamom
P158	Enrique Arriola, Luís Virgen, Enrique J. Herrera, Jorge A. García, Rosa I. Corona, Guadalupe M. Guatemala	Heat and mass transfer zones recognition in a continuous multistage spouted bed during coffee beans drying

8 - Drying of food and biologicals. Process kinetics.

P159	Stanislav Rudobashta, Galina Zueva, Nikolay Zuev	Stimulation of drying seeds by oscillating infrared heating
P160	Kamel ben dhib, Ahmed Koubaa, Soufien Azzouz, Sahbi Ouertani, Afif ELCAFSI	The Study of the effect of temperature and pressure on the kinetics, and the drying quality of the black spruce wood, using an under vacuum and uplift process (Vacutherm).
P161	Alişan Gönül, Özden Ağra, Şevket Özgür Atayılmaz, Hakan Demir, Nurullah Kayacı	Drying kinetics of kiwi fruits
P162	Baohe Wang, Qun Li, Xiulan Wang, Liangzhi Xia, Wei Wang	Drying kinetics of magnesium hydroxide nanorods
P163	Juan Vicente Santacatalina, Jose Vicente García-Pérez, Carmen Rosselló, Antonio Mulet, Juan Andres Cárcel	Combined effect of temperature and air velocity on low-temperature drying of apple assisted by power ultrasound
P165	Chaiwat Rattanamechaiskul, Somchart Soponronnarit, Somkiat Prachayawarakorn, George Srzednicki	Mechanism of rice starch gelatinization of paddy dried by fluidization technique
P166	Michael Bantle , Inna Petrova , Jasmin Raiser , Trygve Magne Eikevik	Dynamic model and kinetics of convective drying of ham with different salt contents.
P167	Carolina Sánchez-Sáenz, Rafael Augustus de Oliveira, Kil Jin Park	Effect of continuous convective drying with infrared application on texture and rehydration kinetics of chicory roots.
P168	Rafael Augustus de Oliveira, Carolina Sánchez-Sáenz, Kil Jin Park	Structural changes in dried chicory roots in continuous convective process with infrared radiation application
P169	Artur Wiktor, Magdalena Śledź, Małgorzata Nowacka, Katarzyna Rybak, Tadeusz Chudoba, Dorota Witrowa-Rajchert	Pulsed electric field pretreatment for drying of carrot tissue – experimental and mathematical modeling studies
P170	Janos Beke, Zoltán Kurják, Kornél Bessenyei	Influence of morphological structure on the water movement during convective and microwave drying
P171	Dominik Mierzwa, Stefan Jan Kowalski, Joanna Kroehnke	Hybrid drying of carrot preliminary processed with ultrasonically assisted osmotic dehydration.
P172	Chaiane Caneda, Elizangela Oliveira, Andressa Jacques, Gabriela Rosa	Experimental investigation and analysis of thin layer drying of red pepper
P173	Vanessa Secolin, Claudia Souza, Wanderley Oliveira	Novel spray dried lipid based compositions containing green tea polyphenols
P174	Shuichi Yamamoto, Suriah Binti Ali, Kazune Shimizu, Sachie Fujii, Noriko Yoshimoto	Drying behavior of amorphous sugar solutions gelled with surface active agents
P175	Thiago Guimaraes, Jéssica S. Costa, Alessandra L. Viçosa, Luís Alexandre P. Freitas	Spray-dried mannitol: a multivariate experimental approach for product quality
P176	Lara Poses Mussi, Pollyane Gomes Correa, Karla Silva Ferreira, Selma Bergara Almeida, Nadia Rosa Pereira	Spouted bed drying of jambolan residue: effect of drying kinetics on the anti-oxidant activity
P177	Swati Shimpi, Vaibhav Tidke, Bhaskar Thorat	Experimental studies of Natural convection solar drying of cassava.



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