Dr Guy DELLA VALLE
Institut National de la Recherche Agronomique (INRA)
UR1268: Biopolymères, Interactions & Assemblages (BIA)
BP 71627
44316 NANTES Cedex 3
FRANCE
tel: 33(0)2 40 67 50 00 (std) 29 (direct) 39 (sec)
fax: 33(0)2 40 67 51 67
mel: guy.della-valle@nantes.inra.fr

EDUCATION & DEGREES

1975 : Bac Sc. (19**75**), CPGE (High School preparing) (->19**77**) Lycée Jean Bart, Dunkerque .

1980 : Engineer Fluid Mechanics (ENSEEIH Toulouse)
MSc (DEA) Mechanical Engineering-Flow in Porous Media (INP Toulouse)

1982 : Ph.D. (Dr.Ing.), Civil Engineering, USTL Montpellier

1993 : Capacitation for Managing research (HDR), Senior Scientist, INP Toulouse

English & Spanish read, written, spoken.

PROFESSIONNAL EXPERIENCE

1978-1980 : Short training periods as workman (2 x 4 weeks) in oil manufacture and engineer (2 x 6 weeks) in ship building and solar cell design .

1983-1984: Fluid mechanics teacher at Managua University (Nicaragua) during National Service (Cooperation, VSNA).

1984: Trials and measurements Engineer on Hydraulics Platform, CETIM Nantes

1984- : Scientist at Institut National de la Recherche Agronomique (INRA) in Nantes : URPOI : Research Unit on Polysaccharides, Organisations & Interactions ; then Biopolymers Interactions & Assemblies (BIA)

1995-1996 : Sabbatical year at Applied Research Centre on Polymers (CRASP), Ecole Polytechnique , Montréal (Pr. P.J. Carreau) : " Plasticized Starches Rheology for biodegradable materials and paper coating".

MAIN CAREER MILESTONES AT INRA

Positions & Responsibilities

1986- : Co-organization of various (inter)national congresses: Plant Polysaccharides, Rheology, Extrusion-cooking, Biopolymer Science.
1988-1991 : URPOI budget management (20p. ~400k€[1])
1988- : Member of scientific councils for various national and regional research groups (TIFAN, PROGEBIO, VANAM, CNRS-Solid Foams)
1993-1997 : " Thermal and mechanical treatments " project leader in the frame of INRA-Plant Processing Dept (TPV - head: Dr P. Colonna)
1994 : Coordination, with P. Colonna, of the book " La cuisson-extrusion " Ed. Lavoisier Tec&Doc. 18 chap., 34 authors, 545 p.
1994- : Manager of projects:
Process/product R&D for various European companies (30k€)
Regional research programs on packaging materials (1992-1996, 50k€)

[1] All costs marginal, i.e. not including salaries.

Research for Industrial companies: 4 projects (40k€, 3 years)
European programs: AAIR-Thermoplastic starches (ATO Wageningen, IFR Norwich, VTT Finland, 1994-1998, 300k€)
French MRT: manager of CANAL-Salve project: "Food Cereal Foams aided Design" (600k€, 4 years, 5 academic-CNRS and 15 private companies partnership)

2000-2004 : Head of URPOI lab (30p, budget 3MF≈ 500k€).

2005-2013: after reorganization of Department lab units, deputy head of BIA (120p., 2,5M€) and lead scientist for "Material processing and behavior" group (MC2).

2007: Coordination of the book "The implementation of agri-food products (Mise en oeuvre des matières agro-alimentaires)" Éditions Lavoisier (Vol 1 - ISBN: 2-7462-1537-3 - 320 pages) and Vol 2 - ISBN: 2-7462-1538-1 - 336 pages).
Contribution to BIA unit and CEPIA division reports for national and international evaluation, respectively.

2008: Lead contribution to DREAM project (Design of REAlistic Model foods) funded by FPVII-UE (6M€).

Training, teaching & consultancy

1986- : 20h/year teaching for Universities , Engineering Colleges, and professional agencies

1988- : Supervision of students : BSc, MSc… **and about 20 PhDs** .

1991- : Referee for Scientific journals J. Cer. Sci., J. Food Eng., J. Food Sci., J. Sc. Food Agric., J. Rheology, Lebens. Wiss. Technol, Starch, Polym.Eng.Sci., Carb. Polym, Food Res. Int.

1994-: **Examination**, expertise & consultancy for **PhD Theses (≈ 30)** and HDR, projects (>20) for National Agencies (Anvar, Ademe, ANR...) & European Union (PCRD V), and various industry companies.

SCIENTIFIC ACTIVITY & PUBLICATIONS

My activity is directed towards " **Starchy products** processing", within URPOI and now BIA, where main objectives are:

(i) to determine materials structure at different scales and its relation with main end use properties (sensory, nutritional, mechanical)

(ii) to understand and model the mechanisms which govern its modifications in concentrated phase (solvent< 50%), by chemical and physical processes.

These objectives require a multidisciplinary approach within the group (MC2) by elaborating reliable pathways in order to promote and model material modifications from lab to industrial scale. Physico-chemical states of the material have been related to heat & mass transfers involved during **extrusion-cooking**. This process is now controlled thanks to specially designed and home made experimental methods (rheometer, energy balance device), mechanistic model (Ludovic® software) and applying recent concepts (thermo-mechanical history, state diagrams). Extrusion has been extended to new applications for processing biopolymers: polysaccharides solubilization, reactive processing, biodegradable plastics, in partnership with companies from pilot scale to industrial production.

Same approach has been developed to study biscuit and **breadmaking**. **Solid foams** concept was then applied to these products. Hybrid baking oven has been designed and built for the study of the bubble growth phenomenon and bread texture acquisition. Imaging techniques (MRI, Xray tomography at ESRF), analysis and numerical modeling (FEM-3D) have been developed jointly for comparison purpose leading to the design of **cereal food foams** structure. Knowledge management has helped to transfer scientific results to partnership and to build up a decision support tool for breadmaking. These works are now extended to other products (cereals or not) using materials science & engineering approach and relying on in-house collaborations for analytical chemical and biochemical supports, either for food or non-food applications.

Today, these works gave more than 100 articles in international Journals with Editorial Board, 3 international patents, 30 notes & chapters in monographs, about 300 oral communications and posters in international congresses and national symposia. Complete list available upon request or on: http://www.angers-nantes.inra.fr

SOME RECENT PUBLICATIONS (2009- today)

A. Ndiaye, G. Della Valle, P. Roussel. Qualitative modelling of a multi-step process: the case of French breadmaking. Expert Syst. with Appli., 39 (2), 1020-1038, 2009.

F.. Robin, J. Engmann, N. Pineau, H. Chanvrier, N. Bovet, G. Della Valle. Extrusion, structure and mechanical properties of complex starchy foams. J. Food Eng., 98: 19-27, 2010.

M. Bonnand-Ducasse, G. Della Valle, J. Lefebvre, L. Saulnier. Effect of wheat dietary fibres on bread dough development and rheological properties. J. Cereal Sci., 52: 200-206, 2010.

M. Núñez, G. Della Valle, A. J. Sandoval. Shear and elongational viscosities of a complex starchy formulation for extrusion cooking. Food Research International, 43: 2093-2100, 2010.

S. Guessasma, L. Chaunier, G .Della Valle, D. Lourdin. Mechanical modelling of cereal solid foods. *Trends in Food Science and Technology,* 22, 142-153, 2011.

A. Shehzad, H. Chiron, G. Della Valle, B. Lamrini, D. Lourdin. Rheological and energetical approaches of wheat flour dough mixing. *J. Food Engineering*, 2012, 60-70

G. Della Valle, H. Chiron, V. Jury, M. Raitière, AL. Réguerre. Kinetics of crust formation during conventional french bread baking. *J. Cereal Sci.*, 56, 440-444, 2012.

A.Turbin-Orger, E. Boller, L. Chaunier, H. Chiron, G. Della Valle, A-L. Réguerre. Kinetics of bubbles growth in wheat flour dough during proofing studied by computed X-ray micro-tomography. *J. Cereal Sci.*, 56, 676-683, 2012.

K. Kansou, H. Chiron, G. Della Valle, A. Ndiaye, P. Roussel, A. Shehzad. Modelling wheat flour dough proofing behaviour: effects of mixing conditions on porosity and stability. *Food and Bioprocess Technology*, 6, 2150-2164, 2013.

F. LeBleis, L. Chaunier, G. Della Valle, M. Panouillé, A.L. Réguerre. Physical assessment of bread destructuration during chewing. *Food Research International*, 50: 308-317, 2013.

L. Hedjazi , C. L. Martin, S. Guessasma, G. Della Valle, R. Dendievel**.** Experimental investigation and discrete simulation of fragmentation in expanded breakfast cereals, *Food Research International, 55, 28-36,* 2014.

G. Della Valle, H. Chiron, L. Cicerelli, K. Kansou, K. Katina, A. Ndiaye, M. Whitworth, K. Poutanen. Basic knowledge models for the design of bread texture. *Trends in Food Science and Technology, 36, 5-14, 2014* .

K. Poutanen, N.Sozer, G. Della Valle. How can technology help to deliver more of grain in cereal foods for a healthier diet? *J. Cereal Sci., 59, 327-336,* 2014.

K. Kansou, H. Chiron, G. Della Valle, A. Ndiaye, P. Roussel. Predicting the quality of wheat flour dough after mixing by modelling expert's know-how. *Food Res. Int, 64,772-782, 2014*

A. Turbin-Orger, G. Della Valle, JL. Doublier, A.-L. Fameau, S. Marze, L. Saulnier. Foaming and rheological properties of the liquid phase extracted from wheat flour dough. *Food Hydrocolloids, 43, 114-124, 2015.*

A. Turbin-Orger, P. Babin, E. Boller, L. Chaunier, H. Chiron, G. Della Valle, R. Dendievel, AL. Réguerre, L. Salvo. Growth and setting of gas bubbles in a viscoelastic matrix imaged by X-ray microtomography: the evolution of cellular structure in fermenting wheat flour dough. *Soft Matter, 11, 3373-3384, 2015,*