

## **R E S U M E – Avi Shpigelman**

Full name: **Avi Shpigelman** ; Marital status: Married +3; Web site: <https://shpigelmanlab.net.technion.ac.il/>

### **ACADEMIC DEGREES**

**2012**, PhD in Biotechnology, Technion IIT.

**2008**, MSc (Cum Laude) in Biotechnology and Food Engineering, Technion IIT.

**2002**, BSc in Food Engineering and Biotechnology, Technion IIT.

### **ACADEMIC APPOINTMENTS**

**Since 10/2014** Assistant Professor, Faculty of Food Engineering and Biotechnology, Technion- Israel Institute of Technology, Haifa, Israel

**2012-2014** Post-Doctoral Researcher with Prof. Marc Hendrickx and Prof. Ann Van Loey, Laboratory of Food Technology, Dept. Microbial and Molecular systems (M2S), KULeuven, Heverlee, Belgium

**2008-2012** Teaching Assistant, Dept. of Food Engineering and Biotechnology, Technion- Israel Institute of Technology, Haifa, Israel

### **PROFESSIONAL EXPERIENCE**

**2005 – 2006** Deputy in command in the IDF Navy Laboratories.

**2004 – 2005** Polymer Officer and Commander of the Polymer Department in the IDF Navy Laboratory

**2003 – 2004** Chemical Officer and Commander of the Organic Department in the IDF Navy Laboratory

**2002 – 2003** Officer in the Purchasing Department of the Medical Corps, IDF

### **RESEARCH INTERESTS**

- Novel Processing Technologies
- Food bioactives (polyphenols, vitamins etc. ) and their stability during the different production stages from “farm to fork”
- Processing induced modifications of biopolymers
- The process-structure-function relation of fruit and vegetable based system
- Food production waste reduction and utilization

### **TEACHING EXPERIENCE**

**Lecturer (Technion, from 2014):** Advanced technologies in food engineering and biotechnology (undergraduate), Advanced analytics in Biotechnology and food engineering (graduate), Thermodynamics in Food Engineering (undergraduate), Food Technology (undergraduate), Mass transport phenomena (undergraduate)

**Teaching assistant (Technion, before 2012):** Thermodynamics in Food Engineering (undergraduate), Mass transport phenomena (undergraduate), Laboratory for Materials and Biological Processes Engineering” (undergraduate)

### **TECHNION ACTIVITIES**

**2016 -** Technion EIT FOOD managing member

**2009 – 2012** Council member of the Technion Teaching Staff Organization (TSO, representative of Biotechnology and Food Engineering junior teaching staff)

**PUBLIC PROFESSIONAL ACTIVITIES****Reviewer for:****Journals (Since 2014)**

Food Chemistry, Innovative Food Science and Emerging Technologies, Journal of molecular recognition, Colloids and Surfaces A, Journal of food engineering, Journal of agricultural food engineering, Food Hydrocolloids, Food Biophysics

**Since 2015** - European Union COST evaluation

**2016** - 2017 Israeli Ministry of Agriculture (Chief scientist)

**MEMBERSHIP IN PROFESSIONAL SOCIETIES**

**IFT**, Institute of Food Technologists

**FELLOWSHIPS, AWARDS and HONORS**

**2013-2014** European Union Erasmus Mundus Action 2 (EMAIL II) fellowship

**2012-2014** ISEF foundation fellowship

**2012-2013** KULeuven research fund F+ fellowship

**2009-2012** Vatat (Israel National Planning and Budgeting Committee of high education) "interdisciplinary technologies" scholarship

**2008** Excellence Award in Memory of Prof. Arie Litan

**2006** Jacobs Excellence Scholarship

**GRADUATE STUDENTS****Completed PhD theses****Completed MSc theses**

**Sion Sharabi**, 2017, Effect of ultra-high pressure homogenization on vitamin stability and anti-oxidative properties of milk, Asst. Prof. Avi Shpigelman

**RESEARCH GRANTS****External**

2015-2018 Ministry of health, Fund on food and nutrition with implications on public health, 450,000 NIS, Asst. Prof. Avi Shpigelman

2016-2017 Israeli Dairy board (evaluation by Ministry of health chief scientist office), 120,000 NIS, Asst. Prof. Avi Shpigelman

2016-2019 Ministry of Science in Hanover, Niedersachsen-Israel. 125,000 Euro to the Israeli PI, Asst. Prof. Avi Shpigelman, German PI - Prof. Stefan Toepfl (total grant 250,000 Euro)

2017-2021 Israel Science Foundation: Individual Research Grant 1,160,000 NIS, Asst. Prof. Avi Shpigelman

2018, Ministry of Agriculture, Chief Scientist fund, 200,000 NIS, PI: Asst. Prof. Avi Shpigelman (60,000 NIS to PI, 200,000 total)

2018, EIT Food (Education), total grant 250,000 Euro, CI, Asst. Prof. Avi Shpigelman (~28,000 Euro to CI)

**Technion, Internal**

2017 Laura Gurwin Flug Family Fund (Technion, Internal) PI: Avi Shpigelman (55,600 USD)

## PUBLICATIONS

### Theses

**2008** (MSc) Mechanisms of Saccharide Effect on PNIPA Behavior in Aqueous Media as a Model for Water-Saccharide-Protein Systems

**2012** (PhD) Nano-Delivery by Beta-Lactoglobulin, and Protection of EGCG from Green Tea, for Preventive Medicine

### Refereed papers in professional journals

#### **Published papers**

- 1) **Avi Shpigelman**, Irina Portnaya, Ory Ramon, Yoav D. Livney; **Saccharide-structure effects on poly N-isopropylacrylamide phase transition in aqueous media; Reflections on protein stability.** *Journal of Polymer Science Part B: Polymer Physics* (2008) Vol. 46, Issue 21, 2307-2318
- 2) **Avi Shpigelman**, Gal Israeli, Yoav D. Livney; **Thermally-Induced Protein- Polyphenol Co-Assemblies: Beta lactoglobulin-Based complexes as Protective Nanovehicles for EGCG.** *Food Hydrocolloids* (2010) Vol. 24 Issue 8, 735-743.
- 3) **Avi Shpigelman**, Yaron Paz, Ory Ramon and Yoav D. Livney **Isomeric sugar effects on thermal phase transition of aqueous PNIPA solutions, probed by ATR-FTIR spectroscopy; insights to protein protection by sugars.** *Colloid and Polymer Science* (2011) Vol. 289, Issue 3, 281-290
- 4) Nurit Manukovsky, **Avi Shpigelman**, Ravit Edelman, Yoav D. Livney; **Hydration-mediated effects of saccharide stereochemistry on poly(N-isopropylacrylamide) gel swelling.** *Journal of Polymer Science Part B: Polymer Physics* (2011) Vol. 49, Issue 7, 523-530
- 5) **Avi Shpigelman**, Yifat Cohen, Yoav D. Livney; **Thermally-induced  $\beta$ -lactoglobulin- EGCG nanovehicles: loading, stability, sensory and digestive-release study.** *Food Hydrocolloids* (2012 ) Vol. 29, Issue 1, 57-67
- 6) Uri Cogan, **Avi Shpigelman**, Irina Protania, Yosef Scolnik, Meir Shinitzky; **Intermolecular Chiral assemblies in R (-) and S (+) 2-Butanol Detected by Microcalorimetry Measurements.** *Chirality* (2012) Vol 24, Issue 7, 500-505.
- 7) **Avi Shpigelman**, Adi Zissapel, Yifat Cohen, Yoav D. Livney; **Mechanisms of saccharide protection against epigallocatechin-3-gallate deterioration in aqueous solutions.** *Food Chemistry* (2013) Vol. 139, Issue 1-4, 1105-1112
- 8) **Avi Shpigelman**, Clare Kyomugasho, Stefanie Christiaens, Ann M Van Loey, Marc E. Hendrickx; **Thermal and high pressure high temperature processes result in distinctly different pectin non-enzymatic conversions.** *Food Hydrocolloids* (2014). Vol. 39, 251-263
- 9) Sunny George Gwanpua, Sandy Van Buggenhout, Bert E. Verlinden, Stefanie Christiaens, **Avi Shpigelman**, Victor Vicent, Zahra Jamsazzadeh Kermani, Bart M. Nicolai, Marc Hendrickx, Annemie Geeraerd; **Pectin modifications and the role of pectin-degrading enzymes during postharvest softening of Jonagold apples.** *Food Chemistry* (2014), Vol. 158, 283-291.
- 10) **Avi Shpigelman**, Yanai Shoham, Gal Israeli-Lev, Yoav D. Livney;  **$\beta$ -lactoglobulin-Naringenin complexes: Nano-Vehicles for the delivery of a hydrophobic Nutraceutical** *Food Hydrocolloids* (2014). Vol. 40, 214-224
- 11) Zahra Jamsazzadeh Kermani, **Avi Shpigelman**, Sandy Van Buggenhout, Mohsen Ramezani, Ann M Van Loey, Marc E. Hendrickx; **The impact of extraction with a chelating agent under acidic condition on the cell wall polymers of mango peel.** *Food Chemistry* (2014), Vol. 161, 199-207
- 12) Zahra Jamsazzadeh Kermani, **Avi Shpigelman**, Ken Houben, Belinda ten Geuzendam, Ann M Van Loey, Marc E. Hendrickx; **Study of mango endogenous pectinases as a potential tool to engineer mango purée consistency.** *Food Chemistry* (2014), Vol. 172, 272-282.
- 13) Daniel M. Njoroge, Peter K. Kinyanjui, Anselimo O. Makokha, Stefanie Christiaens, **Avi Shpigelman**, Daniel N. Sila, Marc E. Hendrickx; **Extraction and characterization of pectic polysaccharides from easy-**

- and hard-to-cook common beans (*Phaseolus vulgaris*)**. *Food Research International* (2014). Vol. 64, 314-322
- 14) **Avi Shpigelman**, Clare Kyomugasho, Stefanie Christiaens, Ann M Van Loey, Marc E. Hendrickx; **The effect of high pressure homogenization on pectin: Importance of pectin source and pH**. *Food Hydrocolloids* (2015). Vol. 43, 189-198
- 15) Ashwin K Sankaran, Jaap Nijssse, Lucy Bialek, **Avi Shpigelman**, Marc E. Hendrickx, Ann M. van Loey; **Enhanced electrostatic interactions in tomato cell suspensions**. *Food Hydrocolloids* (2015). Vol. 43, 442-450
- 16) Zahra Jamsazzadeh Kermani, **Avi Shpigelman**, Huong T. T. Pham, Ann M Van Loey, Marc E. Hendrickx; **Functional properties of citric acid extracted mango peel pectin as related to its chemical structure**. *Food Hydrocolloids* (2015). Vol. 44, 424-434
- 17) Clare Kyomugasho, Stefanie Christiaens, **Avi Shpigelman**, Ann M Van Loey, Marc E. Hendrickx; **FT-IR spectroscopy, a reliable method for routine analysis of the degree of methylesterification of pectin in different fruit- and vegetable-based matrices**. *Food Chemistry* (2015), Vol. 176, 82-90.
- 18) Xiaohong Mei, **Avi Shpigelman**, Tina Verrijssen, Clare Kyomugasho, Yun-Bo Luo, Ann M van Loey, Kunlun Huang, Marc E. Hendrickx; **Recombinant kiwi pectin methylesterase inhibitor: Purification and characterization of the interaction with plant pectin methylesterase during thermal and high-pressure processing** *Innovative food science and emerging technologies* (2015) Vol 29, 295-301.
- 19) Daniel M. Njoroge, Peter K. Kinyanjui, Stefanie Christiaens, **Avi Shpigelman**, Anselimo. O. Makokha, Daniel N. Sila and Marc E. Hendrickx; **Effect of storage conditions on pectic polysaccharides in common beans (*Phaseolus vulgaris*) in relation to the hard-to-cook defect** *Food Research International* (2015) Vol. 76, part 1, 105-113
- 20) Zahra Jamsazzadeh Kermani, **Avi Shpigelman**, Tom Melanie M. Bernaerts, Ann M. Van Loey, Marc E. Hendrickx; **The effect of exogenous enzymes and mechanical treatment on mango purée: Effect on the molecular properties of pectic substances** *Food Hydrocolloids* (2015). Vol. 50, 193-202
- 21) Ashwin K Sankaran, Jaap Nijssse, Lucy Bialek, **Avi Shpigelman**, Marc E. Hendrickx, Ann M. van Loey. **Effect of enzymes on serum and particle properties of carrot cell suspensions**. *Food biophysics* (2015), Vol. 10, 428-438.
- 22) Hoang Hai Nguyen, Avi Shpigelman, Sandy Van Buggenhout, Katlijn Moelants, Helena Haest, Olivier Buysschaert, Marc Hendrickx, Ann Van Loey; **The evolution of mango pieces texture and composition during processing and storage in mango juice**. *European Food Research and Technology* (2016), Vol. 242, 703-712
- 23) Zahra Jamsazzadeh Kermani, **Avi Shpigelman**, Tom Melanie M. Bernaerts, Ann M. Van Loey, Marc E. Hendrickx ; **The effect of exogenous enzymes and mechanical treatment on mango puree: microscopic, mesoscopic, and macroscopic evaluation** *Innovative Food Science and Emerging Technologies* (2016) Vol. 33, 438-449
- 24) Yifat Choen, Sofia Ish-Shalom, Elena Segal, Olga Nudelman, **Avi Shpigelman**, Yoav D. Livney; **The bioavailability of vitamin D3, a model hydrophobic nutraceutical, in casein micelles, as model protein nanoparticles: Human clinical trial results**. *Journal of functional foods* (2017) Vol. 30, 321-325.
- 25) Shuyi Li, Xiaopeng Li, **Avi Shpigelman**, Jose M. Lorenzo, Domenico Montesano, Francisco Jose Barba; **Direct and indirect measurements of enhanced phenolic bioavailability from litchi pericarp procyanidins by *Lactobacillus casei-01*** *Food and Function* (2017) Vol 8, 2760-2770
- 26) Ofir Benjamin, Maya Davidovich-Pinhas, **Avi Shpigelman**, Giora Rytwo; **Utilization of polysaccharides to modify salt release and texture of a fresh semi hard model cheese**, *Food Hydrocolloids* (2018). Vol. 75, 95-106

- 27) Sion Sharabi, Zoya Okun, **Avi Shpigelman**; **Ultra High Pressure Homogenization of milk - Shelf life stability of riboflavin, vitamin C and antioxidative properties**, *Innovative Food Science and Emerging Technologies* (2018) Vol. 47, 161-169

### Review papers:

#### **Published papers**

- 1) Eugénie D. Ngouémazong, Stefanie Christiaens, **Avi Shpigelman**, Ann Van Loey and Marc Hendrickx **The Emulsifying and Emulsion-Stabilizing Properties of Pectin: A Review** *Comprehensive Reviews in Food Science and Food Safety* (2015), Vol 14, 705-718
- 2) Mahesha M. Poojary, Predrag Putnik, Danijela Bursać Kovačević, Francisco J. Barba, Jose Manuel Lorenzo, Daniel A. Dias, **Avi Shpigelman**; **Stability and extraction of bioactive sulfur compounds from Allium genus processed by traditional and innovative technologies** *Journal of Food Composition and Analysis* (2017) Vol. 61, 28-39.
- 3) Predrag Putnik, Danijela Bursać Kovačević, Anet Režek Jambrak, Francisco J. Barba, Giancarlo Cravotto, Arianna Binello, Jose Manuel Lorenzo, **Avi Shpigelman**; **Innovative “green” strategies for the valorisation of citrus wastes and by-products – A review** *Molecules* (2017), Vol 22, 680
- 4) Predrag Putnik; Francisco J. Barba; Jose Manuel Lorenzo; Domagoj Gabrić; **Avi Shpigelman**; Giancarlo Cravotto, Danijela Bursać Kovačević; **An integrated approach to mandarin processing: food safety and nutritional quality, consumer preference and nutrient bioaccessibility**, *Comprehensive Reviews in Food Science and Food Safety* (2017), Vol 16, 1345-1358
- 5) José Manuel Lorenzo, Mirian Pateiro, Rubén Domínguez, Francisco J. Barba, Predrag Putnik, Danijela Bursać Kovačević, **Avi Shpigelman**, Daniel Granato, and Daniel Franco; **Berries extracts as natural antioxidants in meat products: A review** *Food Research International* (2017, 10.1016/j.foodres.2017.12.005)
- 6) Shlomit David, Carmit Shani Levi, Lulu Fahoum, Yael Unger, Esther Meyron-Holtz, **Avi Shpigelman**, Uri Lesmes; **Revisiting the carrageenan controversy: do we really understand the digestive fate and safety of carrageenan in our foods?** *Food and Function* (2018, 10.1039/C7FO01721A)

### Books and /or chapters in books

#### Refereed papers in conference proceedings

#### Patents

- Y. D. Livney and **A. Shpigelman**, Denatured lactoglobulin and polyphenol coassemblies. (US patent 9,005,664 14/04/2015)

### CONFERENCES

#### Plenary, keynote or invited talks

(Speaker name underlined)

- 1) Avi Shpigelman, Yoav D. Livney, *Food Nanotechnology: Delivering Health, Inspired by Nature*. (*Invited lecture Strauss Group*), Petah Tikva, Israel, December 2009

- 2) **Avi Shpigelman**, Gal Israeli and Yoav D. Livney. Heat-Induced  $\beta$ -Lactoglobulin-Based Nanoparticles as Novel Protective Carriers for EGCG in Clear Beverages. *The 4th European Workshop on Food Engineering and Technology*. Faculty of Agriculture, University of Belgrade, Belgrade, Serbia. May 2010. (plenary)
- 3) **Avi Shpigelman**, Clare Kyomugasho, Stefanie Christiaens, Ann M Van Loey, Marc E. Hendrickx. Novel insights into the effects of thermal and high pressure processes on the degradation and solution behavior of pectin. **ICEF12 12th International Congress on Engineering and Food** Québec City, Canada, June 14-18, 2015 (Invited)
- 4) **Zoya Okun, Avi Shpigelman**, Who said that pressure isn't healthy? High pressure processing of food – advantages, limitations and current questions. *Food In The New Era*, Tel –Aviv, Israel. June 2015 (Hebrew). (Invited)
- 5) **Avi Shpigelman**, The process-structure-function relation of food systems, **2016 Food processing for preserving bioactive and nutritional compounds workshop**, Copenhagen, Denmark 16-17 June 2016. (Invited)
- 6) **Avi Shpigelman**, Who said that pressure isn't healthy? *Novelty in the food sector, Technology meets health*, Tel –Hai, Israel. 27<sup>th</sup>, June, 2017 (Hebrew). (Invited)
- 7) Eden Nagar and **Avi Shpigelman**, Bioaccessibility of polyphenols – Limitations and possibilities **Functional Foods and Chronic Diseases in Health: Science and Practice** (FFC's 22<sup>nd</sup> International Conference), Boston, MA, USA 22-23 September 2017 (Invited)

#### **Contributed talks**

- 1) **Avi Shpigelman**, Irina Portnaya, Ilya Kusner, Ory Ramon & Yoav D. Livney, Saccharide-Structure Effect on Protein Behavior in Aqueous Media, Using PNIPA as a Model for Protein **UKPCF2007: International Conference on Polymer Colloids**, Warwick University, England, Sept. 2007 (contributed)
- 2) **Avi Shpigelman**, Irina Portnaya, Ilya Kusner, Ory Ramon & , **Yoav D. Livney**, Saccharide-Structure Effect on PNIPA Behavior in Aqueous Media, **19th Polymer Networks Group Meeting** Cyprus, 22-26 June 2008 (contributed)
- 3) **Avi Shpigelman**, Gal Israeli, **Yoav D. Livney**, Heat Induced  $\beta$ -lactoglobulin based nanoparticles as novel protective carriers for EGCG in clear beverages. **3rd International Symposium on Delivery of Functionality in Complex Food Systems**, Wageningen, the Netherlands, October 2009 (contributed)
- 4) **Avi Shpigelman**, Gal Israeli, Yifat Haviv and Yoav D. Livney. Heat-Induced  $\beta$ -Lactoglobulin-Based Nanoparticles as Novel Protective Carriers for EGCG in Clear Beverages. *Food In The New Era*, Tel –Aviv, Israel. June 2010. (contributed)
- 5) **Ashwin K Sankaran**, Jaap Nijse, Lucy Bialek, **Avi Shpigelman**, Marc E. Hendrickx , Ann M. van Loey. Pectins, the versatile polysaccharide in plant based foods. **12<sup>th</sup> International Hydrocolloids Conference** Taipei, Taiwan, 5-9 May 2014. (contributed)
- 6) **Avi Shpigelman** The effect of high pressure homogenization on pectin – Novel information regarding the importance of source dependent variation of pectin structure on the outcomes of processing, **1st EPNOE Junior Scientists Meeting**, Wageningen, The Netherlands, 19-20 January 2015 (contributed)
- 7) **Zahra Jamsazzadeh Kermani, Avi Shpigelman**, Tom Melanie M. Bernaerts, Ann M. Van Loey, Marc E. Hendrickx Mechanical and enzymatic functionalization of pectin in situ in mango derived products. **1st EPNOE Junior Scientists Meeting**, Wageningen, The Netherlands, 19-20 January 2015 (contributed)
- 8) **Avi Shpigelman**, Clare Kyomugasho, Stefanie Christiaens, Ann M Van Loey, Marc E. Hendrickx Ultra high-pressure homogenization – Insights into the effect of UHPH on structure of pectin, **2015 International non-thermal processing workshop**, Athens, Greece 12-13 November 2015. (Contributed)
- 9) **Zoya Okun, Avi Shpigelman**, The Effects of Hyperbaric Storage on Phenolics Transformations Compared to Refrigeration, **IFT16**, Chicago, USA 16-19 July 2016 (Contributed).
- 10) Sion Sharabi, Zoya Okun, **Avi Shpigelman** The effect of high pressure homogenization on vitamins stability and anti-oxidative properties of milk during shelf life, **31st EFFoST International Conference**, Sitges, Spain, 13-16 November 2017 (Contributed).

11) Libi Chirug, Zoya Okun, **Avi Shpigelman** Iron mediated pectin quercetin interactions, 31st EFFoST International Conference, Sitges, Spain, 13-16 November 2017 (Contributed).

**Participation in organizing conferences**

- 1) 30th EFFoST International Conference 2016, Vienna, Austria, 28/11/2016-01/12/2016, scientific committee, session chair.
- 2) Institute of food technologists, IFT 2017, Las Vegas, USA, 25/06/2017-28/06/2017, session proposal reviewer
- 3) 31th EFFoST International Conference 2017, Sitges, Spain, 13-16 November 2017, session chair.
- 4) Afula convention on beneficial expressions of insects, Afula, Israel, 6 March 2018, Scientific committee member