

# PULSED UV LIGHT – RESEARCH ARTICLES



# Section I: Dr. Ali Demirci, Dr. Kathiravan Krishnamurthy

Dr. Ali Demirci

Department of Agricultural and Biological Engineering
The Pennsylvania State University, University Park, PA 16802 USA
(814) 863-1098, Fax: (814) 863-1031, demirci@psu.edu

Dr. Kathiravan Krishnamurthy
Institution for Food Safety and Health
6502 South Archer Road, Bedford Park, IL-60616
(708) 563-8272, Fax: (708) 563-1873, kkrishn2@iit.edu

### **Journal Articles**

Sharma, R. R., A. Demirci. 2003. Inactivation of *E. coli* O157:H7 on alfalfa seeds with pulsed ultraviolet light and response surface modeling. J. Food Science. 68:1448-1453.

Hillegas, S. L. and A. Demirci. 2003. Inactivation of *Clostridium sporogenes* in clover honey by pulsed UV-light treatment. CIGR J. AE Sci. Res. Dev. Manuscript FP 03-009. Vol. V. 7 pp.

Jun, S., J. Irudayaraj, A. Demirci, and D. Geiser. 2003. Pulsed UV-light treatment of corn meal for inactivation of *Aspergillus niger*. Int. J. Food Sci. Technol. 38:883-888.

Krishnamurthy, K., A. Demirci, and J. Irudayaraj. 2004. Inactivation of *Staphylococcus aureus* by pulsed UV-light treatment. J. Food Prot.67:1027-1030.

Ozer, N. P. and A. Demirci. 2006. Inactivation of *Escherichia coli* O157:H7 and *Listeria monocytogenes* inoculated on raw salmon fillets by pulsed-UV light treatment. International Journal of Food Science and Technology. 41 (4): 354-360.

Demirci, A. and K. Krishnamurthy. 2006. Disinfection of water by flow-through Pulsed ultraviolet light sterilization system. Ultrapure Water Journal. 24 (1): 35-40.

Krishnamurthy, K., A. Demirci, and J. Irudayaraj. 2007. Inactivation of *Staphylococcus aureus* in milk using flow-through pulsed UV-light treatment system. Journal of Food Science. 72 (7) M233-M239.

Bialka K. L., A. Demirci. 2007. Decontamination of *Escherichia coli* O157:H7 and *Salmonella* Enterica on blueberries using ozone and pulsed UV-Light. Journal of Food Science 72 (9): M391-M396.

Bialka, K. L., A. Demirci, V.M. Puri. 2008. Modeling the inactivation of *Escherichia coli* O157:H7 and *Salmonella* Enterica on raspberries and strawberries resulting from exposure to ozone or pulsed UV-light. Journal of Food Engineering. 85 (3): 444-449.

Bialka, K.L., P. N. Walker, V. M. Puri, and A. Demirci. 2008. Pulsed UV-light penetration of characterization and the inactivation of *Escherichia coli* K12 in solid model systems. Transactions of the ASABE. 51(1): 195-204.

Bialka, K. L., and A. Demirci. 2008. Efficacy of Pulsed UV-Light for the Decontamination of Escherichia coli O157:H7 and Salmonella spp. on Raspberries and Strawberries. Journal of Food Science. 73(5):M201-M207.

Krishnamurthy, K., A. Demirci, and J. Irudayaraj. 2008. Inactivation of *Staphylococcus aureus* in milk and milk foam by pulsed UV-light treatment and surface response modeling. Transactions of the ASABE. 51(6): 2083-2090.

Demirci, A. and L. Panico. 2008. Pulsed ultraviolet light. Food Science and Technology International. 14:443-446.

Krishnamurthy, K., J. C. Tewari, J. Irudayaraj, and A. Demirci. 2008. Microscopic and spectroscopic evaluation of inactivation of *Staphylococcus aureus* by pulsed UV light and infrared heating. Food Bioprocess Technol. In-Print. DOI 10.1007/s11947-008-0084-8.

#### **Book Chapters**

Krishnamurthy, K., J. Irudayaraj, S. Jun, A. Demirci and W. Yang. 2008. UV pasteurization of food materials. In *Food Processing Operations and Modeling*, 2<sup>nd</sup> edition, Jun, S. and J. Irudayaraj, Eds., CRC Press.

Demirci, A. and K. Krishnamurthy. 2008. Pulsed ultraviolet light. In *Nonthermal Processing Technologies for Food*. H. Zhang, G. Barbosa-Cánovas, V.M. Balasubramaniam, P. Dunne, D. Farkas, and J. Yuan, Eds. Blackwell Publishing. Ames, IA. In-press.

# **Conference Articles**

Demirci, A., and J. Irudayaraj. 2003. Applications of pulsed UV-light processing for ISS and planetary outposts. 33<sup>rd</sup> International Conference for Environmental Systems. SAE Paper No. 03ICES-53. Vancouver, Canada. 5 pp.

Hillegas, S. L., and A. Demirci. 2003. Inactivation of *Clostridium sporogenes* in clover honey by pulsed UV-light treatment. ASAE 96<sup>th</sup> Annual International Meeting. Paper No. 03-7017. Las Vegas, NV. 6 pp.

Krishnamurty, K., A. Demirci, J. Irudayaraj. 2003. Inactivation of *Staphylococcus aureus* using pulsed UV treatment. Northeast Agricultural and Biological Engineering Conference. Paper No. 03-037. Storrs, CT. 12 pp.

Krishnamurthy, K., A. Demirci, and J. Irudayaraj. 2004. Milk pasteurization by pulsed UV-light treatment. IBE Paper No. P12. Proceedings of Annual International Meeting of the Institute of Biological Engineering. Fayetteville, AR. 9 pp.

Ozer, N. P. and A. Demirci. 2004. Inactivation of *Escherichia coli* O157:H7 and *Listeria monocytogenes* inoculated on raw salmon by pulsed-UV treatment. IBE Paper No. P6. Proceedings of Annual International Meeting of The Institute of Biological Engineering. Fayetteville, AR. 8 pp.

Krishnamurthy, K., A. Demirci, and J. Irudayaraj. 2004. Pulsed UV-light inactivation of *Staphylococcus aureus* in milk. ASAE Paper No. NABEC 04-0008. American Society of Agricultural Engineers. St. Joseph, MI. 10 pp.

Ozer, N. P. and A. Demirci. 2004. Efficacy of pulsed-UV light treatment inactivating *Escherichia coli* O157:H7 and *Listeria monocytogenes* on raw salmon. ASAE Paper No. 046020. American Society of Agricultural Engineers. St. Joseph, MI. 12 pp.

Krishnamurthy, K., A. Demirci, and J. Irudayaraj. 2004. Milk pasteurization by pulsed UV-light treatment. ASAE Paper No. 046048. American Society of Agricultural Engineers. St. Joseph, MI. 12 pp.

Krishnamurthy, K., A. Demirci, and J. Irudayaraj. 2005. *Staphylococcus aureus* inactivation using pulsed UV-light for continuous milk treatment. ASAE Paper No. 05-6151. American Society of Agricultural Engineers. St. Joseph, MI. 11 pp.

Demirci, A. and K. Krishnamurthy. 2005. Disinfection of water by flow\_through Pulsed-ultraviolet light sterilization system. Ultrapure Water Conference. Portland, OR, 12 pp.

Demirci, A. 2005. Pulsed UV light as an merging food processing technology. COST Action 924 Working Group Meeting for The Use of UV as a Postharvest Treatment: Status and Prospects, Antalya, Turkey. 8 pp.

Krishnamurthy, K., A. Demirci, S. J. Jun, and J. Irudayaraj. 2006. *Staphylococcus aureus* inactivation using pulsed UV-light for continuous milk treatment. ASABE Paper No. NABEC 06-P019. American Society of Agricultural Engineers. St. Joseph, MI. 12 pp.

Bialka, K.L. A. Demirci, P. Walker, and V. M Puri. 2007. Pulsed UV-light penetration characterization and the inactivation *of Escherichia coli* K12 in model systems. ASABE Paper No. 76025. 21 pp.

Bialka, K.L. and A. Demirci. 2007. Pulsed Ultraviolet-Light Decontamination of Small Fruits. ASABE Paper No. 076107. American Society of Agricultural Engineers. St. Joseph, MI. 12 pp.

Krishnamurthy, K, J. C. Tewari, J. M. Irudayaraj, and A. Demirci. 2007. Investigation of *Staphylococcus aureus* Inactivation by Pulsed UV-light and Infrared Heating Using Micro-spectrometry and Transmission Electron Microscopy. ASABE Paper No. 076027. American Society of Agricultural Engineers. St. Joseph, Ml. 12 pp.

Keklik, N.M., A. Demirci, and V.M. Puri. 2008. Decontamination of unpackaged and vacuum-packaged boneless chicken breast with pulsed UV-light. ASABE Paper No. 083564. American Society of Agricultural Engineers. St. Joseph, MI. 15 pp.

Bialka, K.L. and A. Demirci. 2008. Decontamination of blueberries using gaseous ozone, aqueous ozone, and pulsed UV-light. ASABE Paper No. 084551. American Society of Agricultural Engineers. St. Joseph, MI. 16 pp.

Keklik, N.M., A. Demirci, and V.M. Puri. 2009. Decontamination of chicken frankfurters with pulsed UV-light. ASABE Paper No. 095973. American Society of Agricultural Engineers. St. Joseph, MI. 14 pp.

Keklik, N.M., A. Demirci, P.H. Patterson, and V.M. Puri. 2009. Decontamination of shell-eggs with pulsed UV-light. ASABE Paper No. 095974. American Society of Agricultural Engineers. St. Joseph, MI. 10 pp.

# Section II: Dr. Carmen Moraru

Assistant Professor in the Department of Food Science, Cornell University Department of Food Science, 119C Stocking Hall, Ithaca NY 14853 USA (607) 255-8121

# Research Papers

Uesugi A. and Moraru C.I. 2009. Reduction of *Listeria* on ready-to-eat sausages after exposure to a combination of Pulsed Light and nisin. Journal of Food Protection 72(2):347-353

Sauer A. and Moraru C.I 2009. Inactivation of *E. coli* ATCC 25922 and *E. coli* O157:H7 in apple juice and apple cider using Pulsed Light treatment. *In press.* Journal of Food Protection

Uesugi A., Woodling S.E. and Moraru C.I. 2007. Inactivation kinetics and factors of variability in the Pulsed Light treatment of *Listeria innocua* cells. Journal of Food Protection 70(11):2518-2525

Woodling S.E. and Moraru C.I. 2007. Effect of spectral range in surface inactivation of *Listeria innocua* using broad spectrum Pulsed Light. Journal of Food Protection 70(4):906-916

Woodling S.E. and Moraru C.I. 2005. Influence of surface topography on the effectiveness of Pulsed Light treatment for the inactivation of *Listeria innocua* on stainless steel surfaces. Journal of Food Science 70(7):345-351

#### **Book chapters**

Moraru C.I. and Uesugi A. 2009. Pulsed Light Treatment: Principles and Applications. In: Ultraviolet Light in Food Technology: Principles and Applications, by Koutchma T., Forney L. and Moraru C.I. p. 235-265.

#### **Proceedings**

Moraru C. I., Uesugi A. R., Woodling S. E. and Sauer A. 2007. Microbial inactivation in foods using Pulsed Light: Factors of influence and potential applications. Proceedings of the 2007 World Congress on Ozone and Ultraviolet Technologies. Available electronically. P. 2738-2754

Woodling S.E. and Moraru C.I. 2005. Pulsed Light inactivation of *Listeria innocua* on solid surfaces – substrate and spectral range effects. Proceedings of the 9<sup>th</sup> Conference of Food Engineering

#### **Published abstracts**

Hsu L., Sauer A. and Moraru C.I. 2008. Effect of spatial distribution of fluence on the in-depth inactivation of *E. coli* by Pulsed Light in liquid substrates. Book of abstracts of the Annual Meeting of IFT, New Orleans, July 2008

Uesugi A. R., Hsu L., and Moraru C. I. 2008. A closer look at Pulsed Light treatment: *Listeria innocua* and *Escherichia coli* survivors' growth and resistance behavior in the plateau region of inactivation curves. Book of abstracts of the Annual Meeting of IFT, New Orleans, July 2008

Wihodo M. and Moraru C. I. 2008. Use of Pulsed Light curing to enhance the physical properties of protein films. Book of abstracts of the Annual Meeting of IFT, New Orleans, July 2008

Sauer A. and Moraru C.I. 2007. Inactivation of *E. coli* in apple cider and juice using Pulsed Light treatment. Book of abstracts of the Annual Meeting of the Institute of Food Technologists, Chicago, IL, July 2007

Uesugi, A. R. and Moraru C. I. 2007. Reduction of *L. innocua* on cooked sausages after exposure to a combination of Pulsed Light and Nisin. Book of abstracts of the Annual Meeting of the Institute of Food Technologists, Chicago, IL, July 2007

Uesugi, A.R., Woodling S.E. and Moraru C.I. 2006. Inactivation kinetics of *Listeria innocua* by Pulsed Light treatment as described by the Weibull model. Book of abstracts of the Annual Meeting of the Institute of Food Technologists, Orlando FL, June 2006

Wang D.M. and Moraru C.I. 2006. Microbial inactivation on the surface of ready-to-eat meats using Pulsed Light treatment. Book of abstracts of the Annual Meeting of the Institute of Food Technologists, Orlando FL, June 2006 (undergraduate research paper)

Moraru, C. I. 2006. Pulsed light as a bactericidal treatment for the food industry: What does it do and where does it fit best? Abstracts of Papers, 231st ACS National Meeting, Atlanta, GA, United States, March 26-30, 2006

Woodling S.E. and Moraru C.I. 2005. Influence of spectral range and sublethal injury in Pulsed Light treatment of *Listeria innocua* on stainless steel surfaces. Book of abstracts of the Annual Meeting of the Institute of Food Technologists, New Orleans, July 2005

Woodling S.E. and Moraru C.I. 2004. Effectiveness of Pulsed Light treatment for microbial decontamination of stainless steel food contact surfaces. Book of abstracts of the Annual Meeting of the Institute of Food Technologists, Las Vegas, July 2004



www.xenoncorp.com

37 Upton Drive

Telephone: +1 978-661-9033

USA

Wilmington, MA 01887-1018 Toll Free (USA): +1 800-936-6695

Fax: +1 978-661-9055

@2015 XENON Corporation. All rights reserved. Information furnished within this document is believed to be accurate and reliable, however, no responsibility is assumed by XENON Corporation for its use, or for any infringements of patents or other rights of third parties that may result from its use. No license is granted by implication or otherwise under any patent or patent rights of XENON Corporation. SteriPulse, XENON and the XENON logo are trademarks of XENON Corporation.

Xenon document 992-0013 (1) - ECO 3491 1/6/2016