

# THE WAVE



*The newsletter publication of the International Microwave Power Institute*

**January/February 2013**



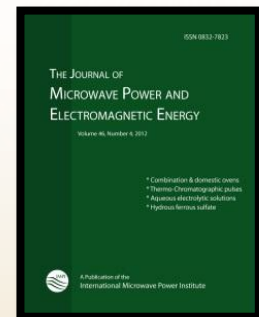
## Letter from the President *by Bob Schiffmann*

It's a serious flu season here in the Northeast and I urge all of you who haven't done so to get your flu shots. I neglected to get mine earlier this year and came down with the flu, spending 3 days in bed just before Christmas. Now, that I would like to get a flu shot, I can't because I have a cold. Take it from me, the flu this year is serious and it's no fun.

There are so many fascinating things going on in the world of microwaves and IMPI presents as many of as we can, through the Journal (JMPEE) and this Newsletter. For example, in JMPEE's final issue of 2012 (volume 46 # 4) there are 2 papers discussing heating of materials by the magnetic field component of the electromagnetic field. In the first, by IMPI Corresponding Board Member Satoshi Horikoshi and colleagues, is a description of the heating of saline solutions by the magnetic field; the second, written by IMPI's first Executive Director Wayne Tinga, and IMPI member Ken Eke, describes combination microwave ovens that depend upon magnetic field heating. I've had the opportunity to work with these ovens a number of times and the results are astonishing. For years we've been teaching that foods heated in microwave ovens use only the electric field component and that magnetic fields heat only materials such as ferrites, but the cooking results and the heating uniformity from this combination oven that

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**JMPEE Volume 46 (2012)  
Released!**



Volume 46 (2012) of the **Journal of Microwave Power and Electromagnetic Energy** was released online in December under the leadership of Editor-In-chief, Dr. Juan Aguilar. IMPI members may access their complimentary copy of the Journal [HERE](#).

Members wishing to purchase a print copy of the Journal are able to do so at the reduced rate of \$100 for domestic orders and \$125 for international orders. These will ship by the end of February. Please contact Molly Poisant ([molly.poisant@impi.org](mailto:molly.poisant@impi.org)) to reserve your copy, by February 1st.

The Wave will begin publishing periodic updates on the Journal in this section throughout 2013.

## Ask the Expert: YOUR Questions, Answered.

Answer provided by:

William K. Shaw, Jr., PhD, Director Risk, Innovations and Management Division, USDA/FSIS/OPPD

### QUESTION:

What are best practices for validating cooking instructions [testing and confirming the heating requirements] of NRTE products?

### ANSWER:

To validate cooking instructions, establishments should demonstrate that:

- The cooking instructions provided can repeatedly achieve the desired safe minimum internal, or “endpoint” temperature and, if applicable, rest time, and
- The minimum internal temperature and, if applicable, rest time achieved by the instructions will ensure that the product is thoroughly cooked to destroy potential pathogens throughout the product.

To demonstrate that the cooking instructions can repeatedly achieve the desired safe minimum internal temperature, and if applicable, rest time, the establishment should determine the temperature of the product after it is cooked following the instructions on the label. If instructions have not already been developed, the establishment can collect data during cooking to determine the length of time it takes to reach the desired endpoint temperature. An example of how to collect this data can be found in the study performed by Luchansky, et al (2011)<sup>1</sup>. In this study, researchers cooked steaks using a gas grill with two calibrated, stainless steel thermocouples inserted into the geometric center of opposing sides of each steak to measure the internal temperature of the product during cooking. The temperature of the steaks was continuously monitored with a thermocouple data logger at 5-second intervals. The researchers removed the steaks from the grill when both thermocouples within the product reached the desired endpoint temperature. Time was recorded at this point.

Since microwaves may not cook food as evenly as conventional methods, it is particularly important to ensure that the safe minimum internal temperature is achieved in all parts of the product. FSIS recommends that establishments perform a cold spot determination to assess where cold spots in the product may occur during microwave cooking in order to identify potential locations for temperature measurement. Establishments may need to provide additional instructions to ensure even heating. For example, establishments may need to provide instructions to cover or arrange

product so that thick parts face the outside of the dish and thin parts face the center. In addition, establishments should validate cooking instructions using a number of ovens that span the range of wattages commonly used by consumers to account for variability.

Establishments can gather data such as that described above anywhere consumer cooking equipment is available. In some cases, such data may already be available in the published literature and can be used as scientific supporting documentation for the cooking instructions used. Establishments may utilize cooking instructions reported in the literature on the labels of their products provided that the actual product being produced and labeled is similar to the product for which the instructions were developed.

In addition to identifying scientific or technical support demonstrating that the cooking instructions can repeatedly achieve the desired endpoint temperature, an establishment should also provide supporting documentation that demonstrates the expected level of bacterial pathogen reduction achieved when the desired endpoint temperature is reached. Such scientific supporting documentation should demonstrate that the safe minimum internal temperature and, if applicable, rest time in the instructions has been validated to ensure that potential pathogens are destroyed throughout the product. The required or recommended level of pathogen reduction will depend on the product in question. For example, for a Not Ready-to-Eat poultry product, the cooking instructions should be designed to achieve at least a 7-log<sub>10</sub> reduction in *Salmonella*. Therefore, an establishment could develop cooking instructions designed to achieve a desired endpoint temperature of 165°F citing [FSIS Time-Temperature Tables for Cooking Ready-to-Eat Poultry Products](#) as support that at least a 7-log<sub>10</sub> reduction in *Salmonella* will be achieved.

For more information see the Grocery Manufacturers Associations (GMA's) 2008 [Guidelines for Validation of Consumer Cooking Instructions for Not-Ready-to-Eat \(NRTE\) Products](#). In addition to providing general guidance for validating cooking instructions, the guideline addresses a number of specific considerations for microwave instructions.

**#2) Further, if testing a predetermined number of samples, how many have to reach 160/165°F in order for the product to pass?**

(Continued on page 3)



### Letter from the President *cont.*

uses magnetic field coupling, are truly astonishing. I urge you to read both papers.

Another important document appearing in this Newsletter and in the IMPI blog, is the extended answer provided by Dr. Bill Shaw, Director, Risk, Innovations, and Management Division of the FSIS, to an “Ask the Expert” question regarding validation of cooking instructions for not ready-to-eat foods (NRTE). Dr. Shaw will be part of the Food Track sessions at IMPI 47 in June, where we are planning two sessions on microwavable food safety.

IMPI, like other scientific societies, is in the information transfer business, and our publications, short courses and annual symposia serve that purpose. The IMPI Executive Committee and I are doing our best to meet these goals but we need your assistance. Please pass on to Molly Poisant or me your ideas and comments on what you would like to see done and what we can do better.

The final date for submissions to IMPI 47 is rapidly approaching and I urge all of you who wish to be presenters to please submit your papers to the IMPI office as quickly as possible. We have an excellent Technical Program Committee that will carefully review all submissions with the aim of providing an outstanding symposium in Providence Rhode Island this June. I hope to see you there.

*Best wishes,*

*Bob*





## Ask the Expert (continued from page 2)

### Follow up question for the USDA:

What percentage of the actual product must reach 165 to be considered “safe”?

It is not as simple as providing a percentage of times when the actual product must reach the desired endpoint temperature. Rather, when not all product temperatures are at or above the target temperature, FSIS recommends a statistical analysis of the data points. A statistical analysis will provide the degree of confidence that the cooking instructions, when followed, will result in a temperature at or above the target temperature.

As recommended in GMA’s 2008 Guidelines for Validation of Consumer Cooking Instructions for Not-Ready-to-Eat (NRTE) Products, one statistical approach is to calculate the z-value for the data. The Z-value formula is:

$$Z =$$

$$(\text{average temperature} - \text{target temperature}) / \text{standard deviation}^1$$

The calculated Z-value is used to determine the probability that a random temperature value would be less than the target temperature by comparing it with Z-values from a statistical table. For example, using a Z-value table such as the one provided in GMA’s guidance, a Z-value equal to or greater than 2.33 means that 99% of the time, when the product is cooked using the instructions, the temperature will be at or above the target temperature. This also means that 1% of the time (or about 1 in 100 times) the temperature will be below the target. From a public health perspective, establishments should try to achieve a Z-value greater than 2.33 to have a high degree of confidence that when followed, the cooking instructions will result in a temperature at or above the target temperature.

If instructions were not available prior to the study, and the study was used to determine the time it takes to reach the endpoint temperature, and then the establishment should use the worst-case scenario result from all of the replicates as the cooking instructions. This means that if there was variability in the length of time it took to reach the endpoint temperature, the cooking instructions

should be developed using the longest amount of time needed to achieve the desired endpoint temperature.

<sup>1</sup> Luchansky, J.B., Porto-Fett, A.C.S., Shoyer, B.A., Call, J.E., Schlosser, W., Shaw, W., Bauer, N., Latimer, H. 2011b. *Journal of Food Protection*. 75(1): 62-70.

<sup>1</sup> *Average temperature: Average calculated from all data for products cooked using the instructions being tested.*

*Target temperature: Temperature the instructions are designed to achieve.*

*Standard deviation: A calculation representing the variability or spread in the data for products cooked using the instructions being tested.*

To submit your question to our experts, please email us at [info@IMPI.org](mailto:info@IMPI.org) with “Ask the Expert” in the subject line.

## POSTSCRIPT from previously published article:

### “There was No Ban on Microwave Ovens in the USSR”

Original article published:  
The WAVE, December 2012

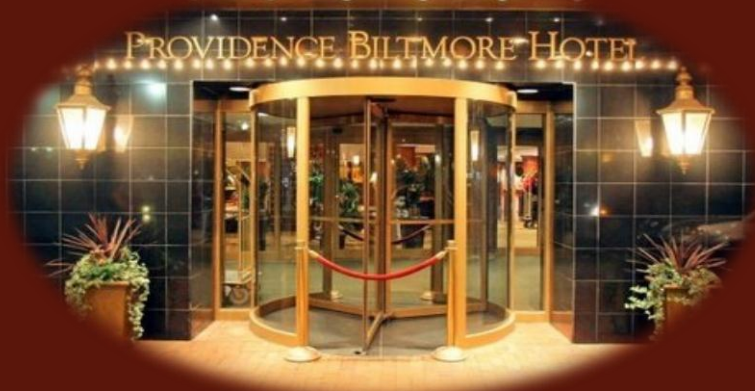
By John Osepchuk

A late study of Internet sources supports the conclusions of this paper. A considerable number of anti-microwave websites state that the Soviets banned the use (my underlining) of microwave ovens in 1976 and removed the ban in 1987 under perestroika and Gorbachev. This is clearly false since per the Soviet ad, reproduced above, ovens were being sold ~ 1980 and indeed we (Raytheon) purchased two in ~ 1982. (Note that a ban against use and not just sale in principle is unrealistic). Pro-microwave websites, at most, say that ovens “may have been banned” in the USSR but these sites more often cast doubt on or deny the rumor; in particular, Brian Dunning of skeptoid.com. (Dec.2007) debunks not only the rumor but also states that the origin of the rumor (as well as the recirculated claim that microwaved water kills potted plants) is a “William P. Kopp” of Oregon.

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## INTERACTIVEIMPI Direct links to Microwave News on the Web

- Click [here](#) to read about a rapid method for detecting carbon nanotubes in soil and how it uses low power microwave heating
- Visit [this site](#) to learn about the dangers of heating food in plastic.
- Click [this link](#) to learn how microwaves are being used to treat thyroid nodules
- Read [this article](#) on how microwaves kill mold



## Upcoming Events

**JUNE 2013**

### **IMPI 47 PLANNING IS UNDERWAY!**

The 47<sup>th</sup> Annual Microwave Power Symposium (IMPI 47) will be held June 25-27, 2013 at the Biltmore Hotel in Providence, Rhode Island, USA. Under the leadership of Technical Program Chair, Dr. Vadim Yakovlev of Worcester Polytechnic Institute, the Program will feature a combination of oral and poster presentations over the 3 days. The Call for Papers was released last week; there are many changes in the submission, review and publication process, so please review the document in detail well in advance of the January 21, 2013 submission deadline.

In addition to the Technical Program, IMPI 47 will also feature a Food-focused track to be led by Amy Lawson and Bob Schiffmann. The program will include presentations in all areas of food science and technology related to microwave and RF product and process technology including ingredients, devices and more. In addition, the organizers are considering special sessions, panel discussions and roundtables covering topics such as product testing; validation of product performance; techniques in designing microwave ovens; industrial RF and microwave processing systems – their design and application; advances in food-service microwave ovens and their applications; food safety and regulatory issues.

Registration is open at [www.impi.org](http://www.impi.org). The Biltmore Hotel is offering IMPI 47 attendees a special group rate of \$119 if you book prior to June 1<sup>st</sup>. There are a limited number of rooms at this rate so please make your reservations as soon as possible. Call 1-401-271-0700 and ask for the IMPI 47 Symposium rate. We look forward to seeing you in Providence next June!



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**Postscript** continued from page 3

The latter was associated with various entities, including the “Atlantic Raising Educational Center” and “Forensic Research” in Portland, Oregon. Kopp is the author of a website, Omega News, which in April 2006, alleged that “humans, animals and plants located within a 500 meter radius of the equipment in operation suffer a long-term cumulative loss of vital energies”(referring to an operating microwave oven.). This and many other false allegations fill the Internet along with the false rumor regarding a Soviet ban of microwave ovens.

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