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In this issue

In this issue Peter Püschner of PÜSCHNER GmbH & Co KG PÜSCHNER Microwaves, Germany, highlights recent developments on microwave vacuum drying of fruit and vegetables.

The 1st Global Congress on Microwave Energy Applications is within weeks of taking place in Japan. I hope that members of AMPERE made arrangements to participate and contribute to its proceedings. For details see the Events section of this issue.

AMPERE's 12th International Conference in 2009 at Karlsruhe Germany

As was announced in the previous issue of this Newsletter

the 12th International AMPERE conference on Microwave and High Frequency Heating will be staged at Karlsruhe.

Dr Lambert Feher and his team at Karlsruhe will soon be drafting the organization and other details of this conference and announcements will be made in the next issue of this Newsletter due out in September. The Committee of Management of AMPERE will be liaising closely with Dr Feher regarding this conference and a meeting is scheduled in Japan in early August during the GCMEA event.

Ricky Metaxas, Editor

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ADVANCED MICROWAVE VACUUM DRYING OF FRUITS & VEGETABLES



By Peter Püschner

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Microwaves
Germany

Drying is the oldest method of preserving food and accounts for majority of processes in food industry. There are many known methods of drying food; microwave vacuum drying

is identified due to numerous benefits it produces.

The use of vacuum has shown further improvement in quality of food products (Yonsawatdigul & Gunasekaran, 1996). Vacuum reduces thermal stress and shows better colour and texture of dried products over ones that are air-dried. Reduction of drying times in microwaves is beneficial for the colour, porosity (Krokida & Maroulis, 1999), the aroma (Raghavan & Koller, 1995), the shrinkage and improved rehydration (Khraisheh et al, 2004). The



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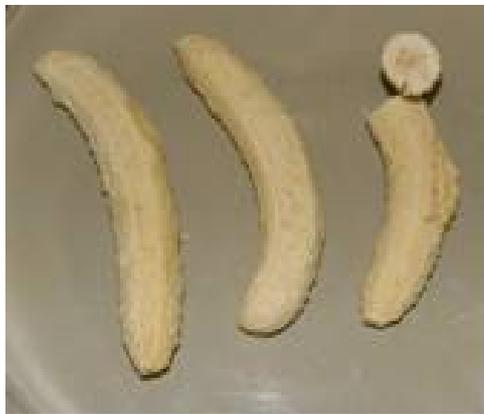


Figure 6. Complete bananas after microwave vacuum drying

Summary

The article shows the potential of microwave vacuum drying for future high value dried fruits and vegetables. All examples were dried within 20-30min down to below 4% residual moisture content. Results from the lab using the **μWaveVacxx50** can be up-scaled into production scale.

In summary, the following advantages of microwave drying are drawn as compared to conventional drying methods.

- low temperature drying provides gentle treatment

for the product due to low vacuum pressure.

- a temperature gradient directed towards the surface, i.e. temperatures inside are higher than on the outside, giving rise to a pressure gradient which drives the evaporating liquid to the surface
- consequently, the superficial layer does not dry out completely and the surfaces remain permeable
- the liquid evaporating inside the product is emitted through the pore structure of the solid material's macro-capillary system, resulting in a high drying velocity
- the heating of water and most organic solvents occurs selectively - due to the greater dielectric losses of water as compared to the product to be dried
- swift and thorough drying of moist products with low thermal conductivity
- short processing times, i.e. suitable for automated manufacturing



ADVANCED MICROWAVE VACUUM DRYING OF FRUITS & VEGETABLES

Useful References in connection with the above article can be found in:

- Khraisheh, M.A.M., McMinn, W.A.M. and Magee, T.R.A. (2004) Quality and structural changes in starchy foods during microwave and convective drying. Food Research International, 37, 497-503.
- Krokida, M.K. & Maroulis, Z.B. (1999) Effect of microwave drying on some quality properties of dehydrated products. Drying Technology, 17(3), 449-466.
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- Yonsawatdigul, J & Gunasekaran, S (1996) Microwave-vacuum drying of cranberries: Part II. Quality evaluation. Journal of Food Processing and Preservation, 20, 145-156.

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IMPI's 42nd Symposium

June 26-28, 2008

Chateau Sonesta, New Orleans,
LA, USA

for further details visit

<http://www.impi.org/Meeting/index.html>

7th International Workshop "Strong Microwaves: Sources and Applications"

July 27 - August 2, 2008,
Nizhny Novgorod, Russia

All inquiries should be
addressed to the Scientific
Secretary of the Workshop:

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GCMEA 2008 MAJIC

**1st Global Congress on
Microwave Energy
Applications**

**Otsu Prince Hotel. Lake Biwa,
Otsu, Japan**

August 4-8 2008

Organised by the Japan Society
of Electromagnetic Wave
Applications

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Kokushikan University

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<http://www.jemea.org/majic2008/>

61st Annual GASEOUS ELECTRONICS 08

14-17 October 2008

Dallas Addison Marritt Quorum

by the Gallerias Dallas Texas

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www.utdallas.edu/gec

MEP 2008

**A colloquium on
Modelling for
Electromagnetic
Processing**

Hannover Oct 27-28 2008

is organized by the Institute for
Electrothermal Processes of
Hannover and the University of
Latvia.

For details contact:

Bernard Nacke



AMPERE SUBSCRIPTION RATES

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