



Automobile Industry



Pharmaceutical Industry



Rubber & Plastic Industry



Chemical Industry



Food Industry



Oil & Gas Industry

• Aerospace Industry

• Steel Industry

• Agro Industry

• Paper and Packaging Industries



KERONE





About KERONE

ENGINEERING



EXCELLENCE



KERONE is one of the most admired and valuable company for customer satisfaction.

KERONE is pioneer in application and implementation engineering.



KERONE is possessing experience of 40+ years in engineering excellence.

KERONE has reported annual revenue of \$8 to \$10 Million , increasing year-on-year.



KERONE is having immense expertise in manufacturing and implementing various types of heaters and dryers.

KERONE is possessing employee strength of more than 140 experts continuously putting efforts for happy industrial heating solutions.



Our Vision and Mission



Vision

- Turn into world leader in providing specialized, top-notch quality and ecological industrial heating, cooling and drying solution across the globe.
- To attain global recognition as best of quality and environment friendly engineering solution company.

Mission

- To enhance the value of customer operation through our customer need centric engineering solution.
- We are committed to provide our customers, unique and best in class products in Industrial heating, drying and cooling segment, with strategic tie-up for the technical know-how with renowned leader in the industry specific segment.
- We are company that believes in strong ethics and timely commitment helps to build long term relationship.



Value Propositions

40+ Years Of Rich Experience

Sound Infrastructure

Adherence to Standards

Timely Delivery

Highly Customized Product

Cost Effective Solutions

Team of Experts Delivering Quality

Great After Sale Support



Member of AIMCAL



Member of ICT



IRQAO Certified for quality



Member of A.M.P.E.R.E. (Europe).



Recognized and Rated by CRISIL

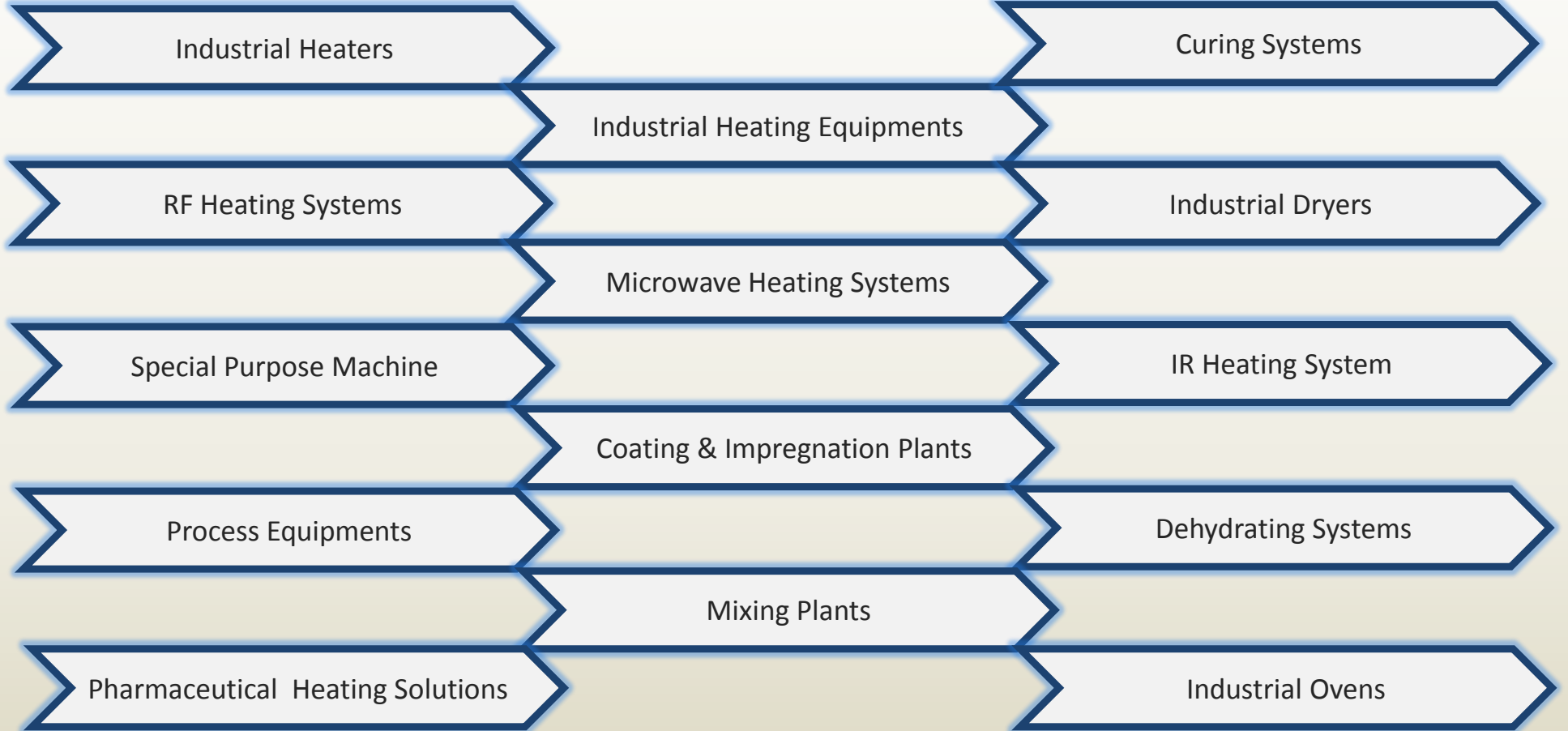


CRISIL Verified

In Association with SVCH-Technologii, Moscow (Russia)



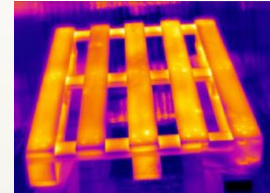
Product Categories





Key Concept and Applications of Electromagnetic

"Electromagnetic energy, a concrete alternative for the phytosanitary treatment of wood packaging materials and agro-food products"



Application Industries			
Agro-food	Packaging	Pharmaceutical	Laboratory

Application Processes		
Disinfestations	Sterilization	Drying



How? And What ? Of Microwave

How?

Key Principle:

Exploitation of heat effects of electromagnetic energy for eradicating all pests by attaining their Lethal Temperatures(LT).

What ?

Successful response to the increasing demand for **pest control methods** ensuring:

- Efficacy
- Safety
- Environmental sustainability



Microwave System for the Agro-Food

Microwave is a non invasive method using microwaves for disinfestations and drying of food products



It represents an innovative and eco-friendly solution replacing chemical products and fumigants

Microwave System for the Agro-Food contd...

Microwave System is a physical method that can be used to disinfest all products of vegetable origin infested by pests:

Cereals(rice included);

Seeds like pine-nuts;

Legumes(bean, chickpeas, lentils);

Dry fruits(dates, currants).

Thanks to the heat effects deriving from the interaction between electromagnetic energy and polar molecules (in particular water), it is possible to achieve lethality of pests by overheating immediately when temperature achieves their Lethal Temperature (LT).

Mortality tests, conducted over the years, on various species of pests, in all life stages (eggs, pupae, larvae, adults) showed that LTs range from 55 to 60 °C.



Food safety and Food security

Over the last decades, attention towards

Food safety has significantly increased due to the introduction of more and more stringent regulations for reducing the risk of

- ✓ Chemical
- ✓ Biological
- ✓ Microbiological Contamination of Food



The implementation of MISYA for Agro food

- ✓ Fosters good food safety practices
- ✓ Meets the requirement of organic farming
- ✓ Helps the reduction of post-harvest losses (PHL)

Post-harvest Losses (PHL)

PH Quantitative Loss

For example, FAO estimates for cereal grains alone in Sub-Saharan Africa:

➤ 14 million tonnes/annual

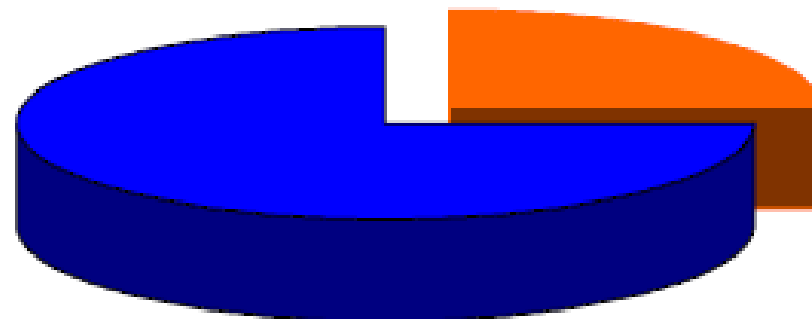
➤ More than 4 billion USD

If we consider the overall production in terms of percentages, PHL can range from 10 – 45%

PH Qualitative Loss

Loss of quality (nutritional value)

Loss of market opportunities



Biological Infestations of Agro-food Products

The main cause of losses

Post Harvest phase
and in Storage is
represented by

Biological Infestations
which begin on field.

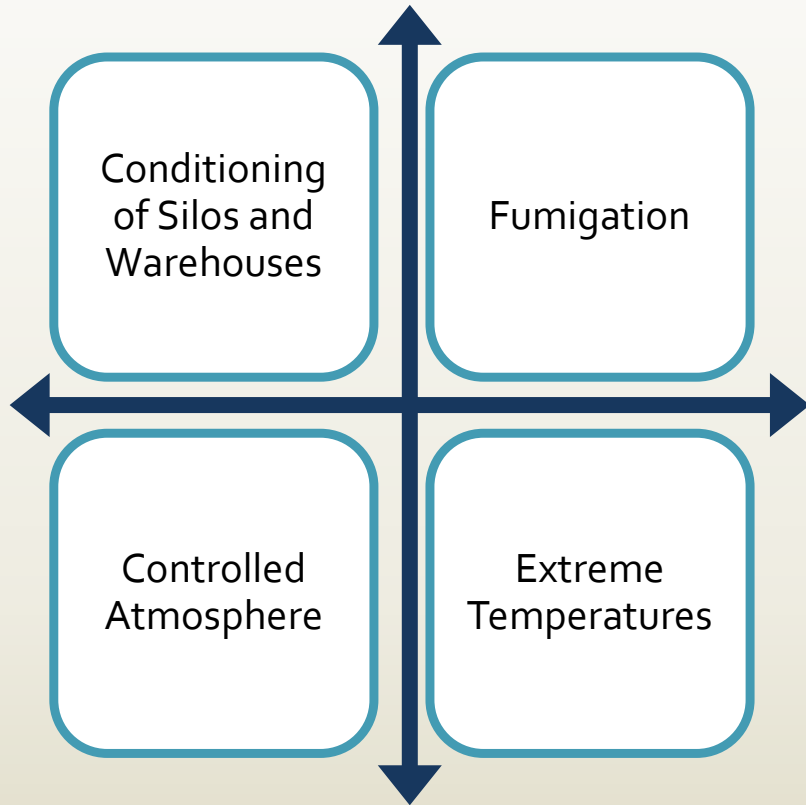
Biological Infestations
can:

Significantly depreciate a lot of
products in a very short time

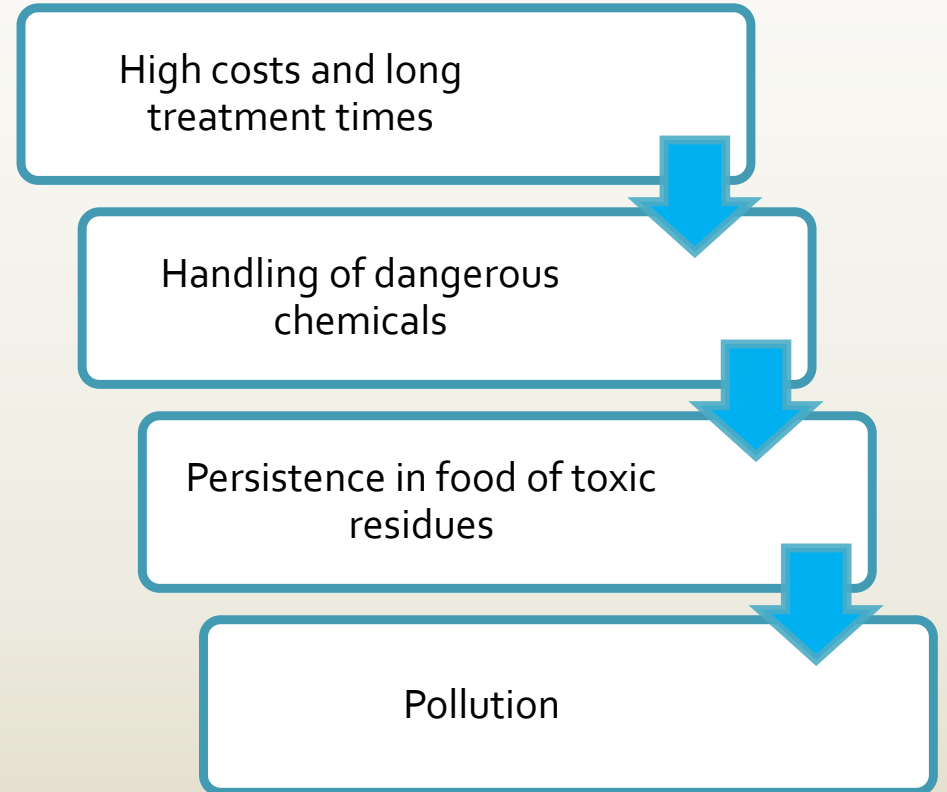




Conventional Disinfestations Methods



Disadvantages of Conventional Methods



Research Projects



is the out come of tests and studies conducted in Emitechs' premises whose results have been confirmed by several ambitious Research Projects

Risa. Le: microwave based method for the pest control of legumes

"Improvement of conservability of durum and soft grain through application of electromagnetic fields at hyper-frequencies"






"Innovative microwave technologies and processes for disinfestations and improvement of cereals quality and shelf-life."

Main Common Objectives

Individuation of an effective pest-control method ensuring the preservation of nutritional and organoleptic properties

Planning and realization of industrial microwave systems

Research Projects: Common Objectives

-  Individuation of pests species and determination of their lethal temperatures.
-  Definition of treatment schedules for pest control in legumes and cereals.
-  Project and realization of electromagnetic energy prototypes.
-  Verification of efficacy (mortality of pests in all life stages, eggs included).
-  Study of treatment effects on quality: nutritional value, organoleptic characteristics, physical aspect, etc.

Focus on legumes

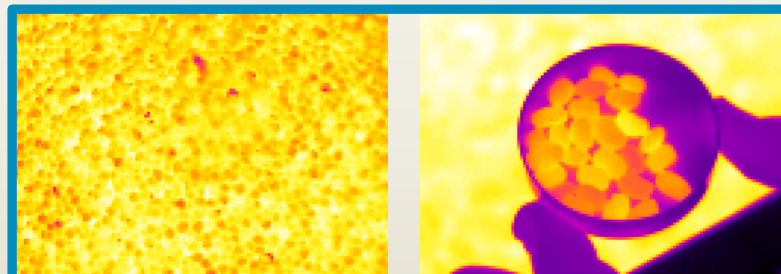
Tests conducted on samples of beans

Sample No	Sample -g-	Weight -kw-	Power -sec-	Exposure -° C-	Temperature % Mortality	
					Eggs	Adults
1	500	1	60"	462-487	43.5	20
2	500	1	90"	57-62.9	100	100
3	500	1	120"	61.7-7-70.9	100	100

Microwave Power: 12kW
 Achieved Temperature: ~60°C
 Capacity: ~600kg/h



The lethal effect on eggs was verified immediately after the treatment and again after an incubation of 45 days.



Uniform Distribution of Temperature

Focus on legumes

Colorimetric Test

SAMPLE	L*		a*		b*	
	MW treated	Control sample	MW treated	Control sample	Mw treated	Control sample
Epidermis of dry legume	53,14	53,99	6,03	6,36	12,34	13,63
Epidermis of rehydrated legume	52,91	52,86	3,17	3,71	17,91	18,46
Epidermis of cooked legume	50,92	50,59	3,33	2,57	15,66	16,28
Re-hydratation water	30,80	37,87	0,19	0,23	0,10	-0,17
Cooking water	36,77	36,75	0,19	0,19	0,73	0,88

- * L= Lightness of The Colour
- * a = Redness Vs Greenness
- * b = Yellowness Vs. Blueness

Focus on legumes

Average Germination For Different Legumes

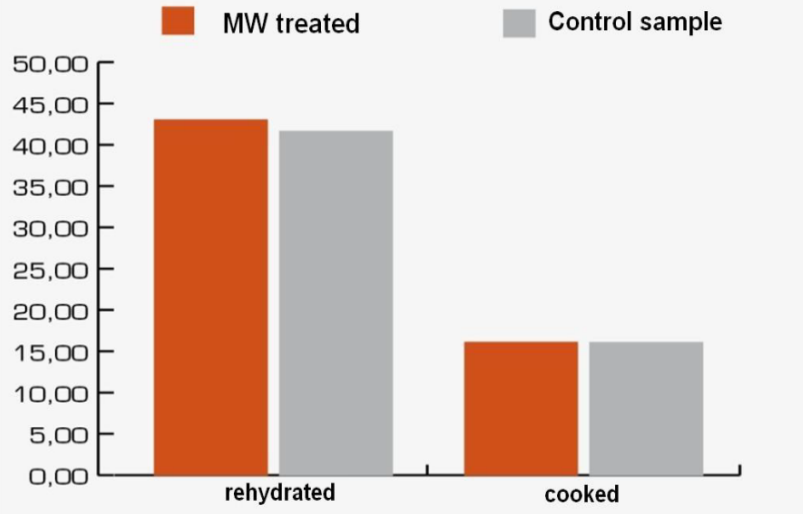
Legumes	Control Sample	Mw Treated
Chickpea	62%	60%
Grass Pea	60%	68%
Lentil	80%	100%
Bean	48%	52%

Germinability improvement in treated legumes is due to the destruction of pre-existing eggs and larvae which, on the contrary, in the case of the untreated seeds, can complete their development even in the cultivation soil.



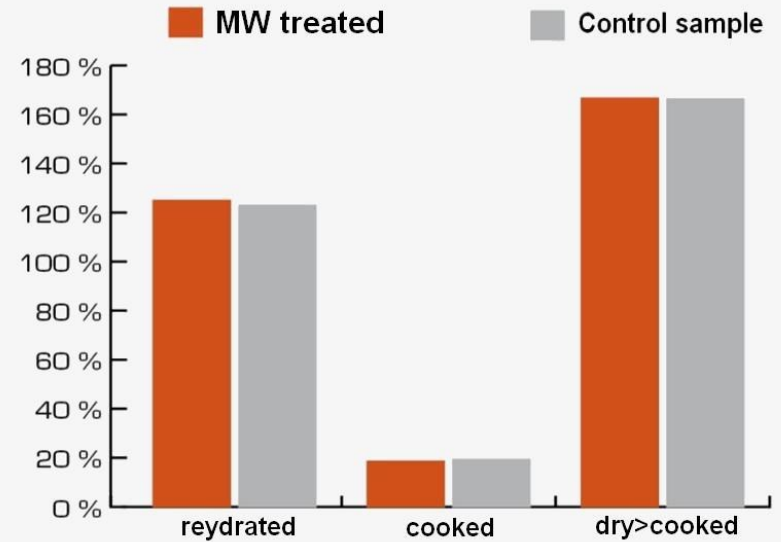
Focus on legumes

Tests on The Tegument Hardness of Legumes Subject to Rehydration and Cooking



Results do not show any significant difference.

Tests on Weight Increase of Legume Samples Subject to Rehydration, Cooking and in The Passage From Dry to Cooked



Results do not show any significant difference.

Focus on Cereals

Results of Tests Carried Out on Rice and Grain Treated By MW

SAMPLE	Moisture content	Colour			ΔC	Nitrogenous matter	UNI ISO 7301: 2004	Mass of 1000 grains
	%	L	a	b			Broken seeds	
						g/100g	%	g
Grain (control sample)	10,24	56,76	7,29	22,58	0	12,5	2,37± 0,48	47,277
Grain T(out)=57°C	8,88	57,63	7,09	22,26	0,94	12,4	2.10±0,55	49,673
Grain T(out)=68°C	8,96	56,50	7,75	24,30	1,79	12,8	1,57±0,55	47,358
Rice (control sample)	12,92	81,44	0,49	15,30	0	6,15	13,9±0,99	31,119
Rice T(out)=56°C	11,55	81,31	0,36	15,60	0,35	6,18	13,7±3,04	31,156
Rice T(out)=62°C	11,52	81,60	0,90	15,45	0,47	6,11	11,2±1,20	31,266



Focus on Cereals

Grain Germinability Analysis

Sample	Germinability %
Grain (control sample)	96.25
Grain T(out)=57°C	97.75
Grain T(out)=68°C	93.75



Grain seeds germinated after A 7-day incubation

Germination of seeds, irradiated by different power levels, was evaluated by putting 30 seeds on a filter paper What manno.3, in Petri dishes, saturated with 5, 5ml of distilled water. Petri dishes were kept at 25°C for 7 days in a growth chamber to prevent the filter paper from drying. On the seventh day, germinated seeds were counted and the germination percentage was calculated.

Focus on Cereals

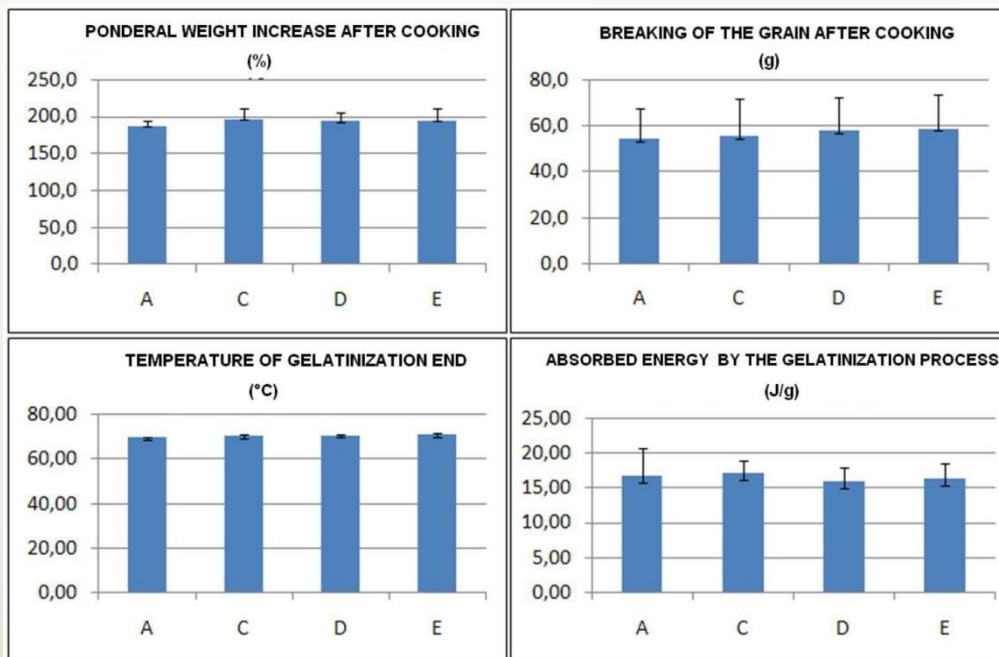
Disinfestations Effectiveness Tests on Rice, Roma Cultivar

SAMPLE	time (day)	dead insects	alive insects	dead larvae	alive larvae
Rice (control sample)	1	5	185	33	51
	45	29,3 ± 5,5	341,3 ± 40,5	139,3 ± 22,7	139,3 ± 22,7
Rice T(out)=56°C	1	231	1	78	0
	45	215,3 ± 12,4	0,0 ± 0,0	59,3 ± 32,8	0,0 ± 0,0
Rice T(out)=62°C	1	272	0	102	0
	45	357,3 ± 93,8	0 ± 0,0	152,0 ± 89,9	0 ± 0,0

Results show the achievement of 100% mortality on adults, larvae and eggs.

Focus on Cereals

Tests On Rice Cultivar Roma After Cooking Focus On Cereals



SAMPLE CODE	FINAL TEMPERATURE (°C)	ARTIFICIAL COOLING
A	24	No
C	60	No
D	*40	Yes
E	*<10	Yes

***Samples subject to cooling with CO₂, immediately after the microwave treatment.**

Microwave Industrial Systems

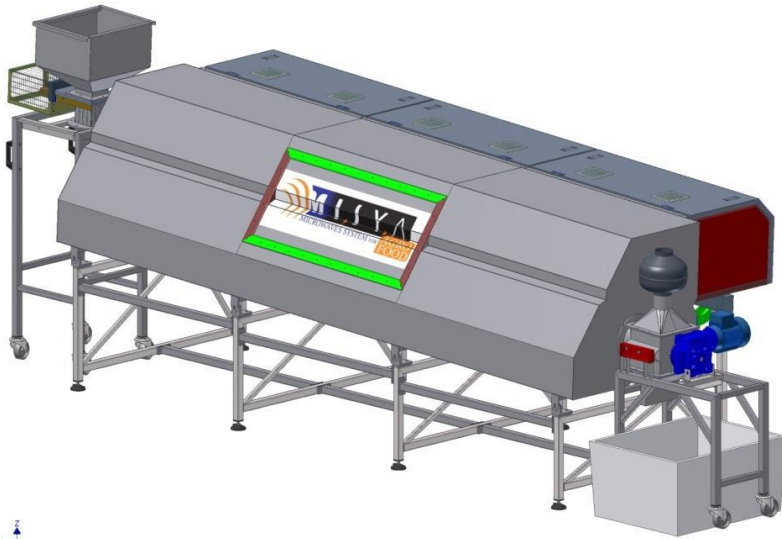


Technical Characteristics

Shielded structure:	Stainless steel shielded structure with welded elements
Conveyance system:	Helicoidal
Management system	PLC with PID regulation
Total MW power installed:	From 6kW to 36kW
Absorbed electrical power:	From 12kW to 65kW
Max Productive capacity:	From 0,3t/h to 2t/h

Microwave Industrial Systems

Rotating Tube System



For no-stop treatments of sensitive products
such as pine nuts

Technical Characteristics

Shielded structure:	Stainless steel shielded structure with welded elements
Conveyance system:	Rotating tube
Management system	PLC with PID regulation
Total MW power installed:	From 6kW to 36kW
Absorbed electrical power:	From 12kW to 65kW
Max Productive capacity:	From 0.3t/h to 2t/h

Microwave Industrial Systems



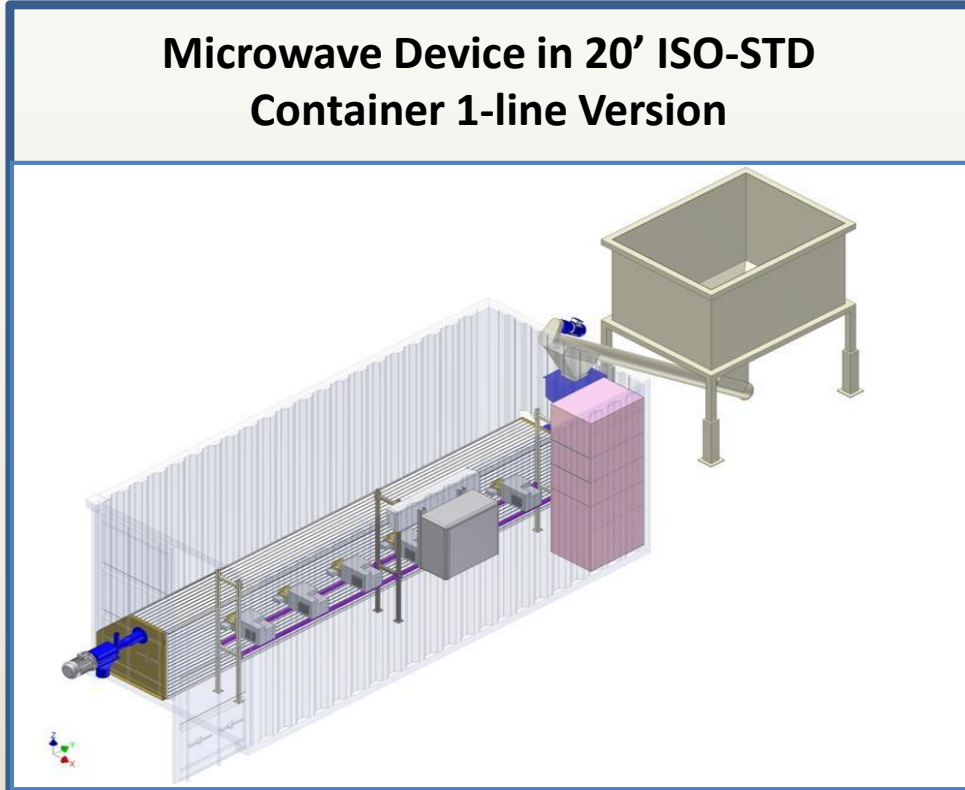
For No-stop Treatments of Dates and Figs

Technical Characteristics

Shielded structure:	Stainless steel connected elements, loading and unloading units
Conveyance system:	Conveyor belt
Management system	Software
Total MW power installed:	48kW
Productive capacity	~2,5t/h
Output Temperature	~60°C

Microwave Industrial Systems

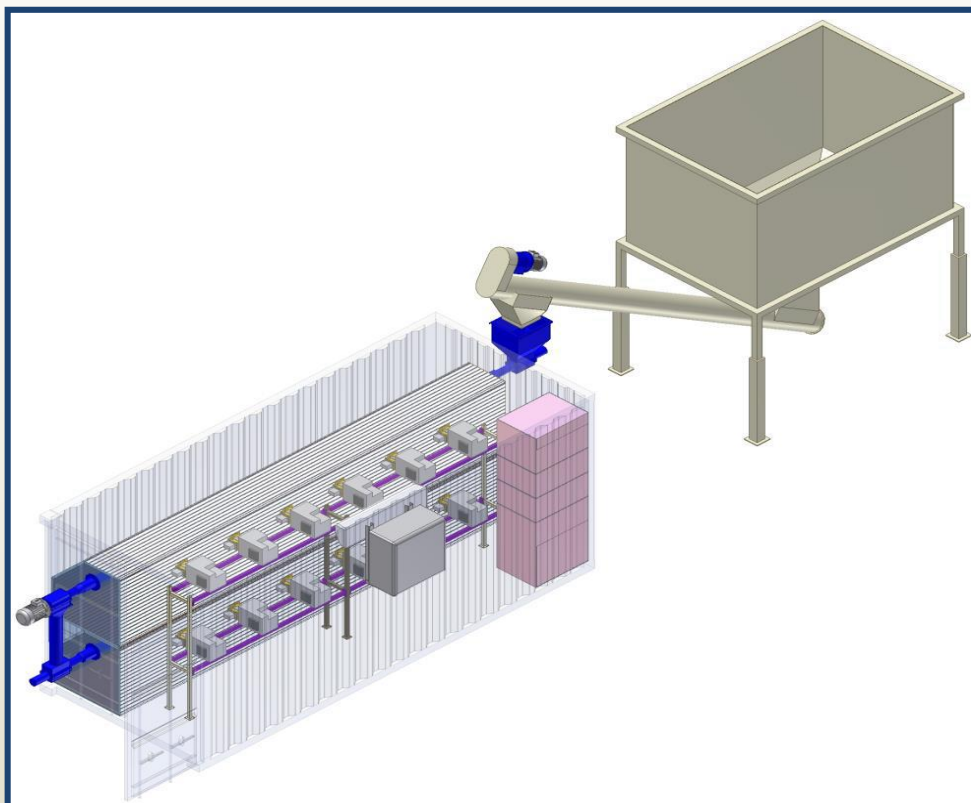
Microwave Device in 20' ISO-STD Container 1-line Version



Technical Characteristics

Shielded Structure	20' ISO-STD Container for easy transport ability and rapid installation
Conveyance System:	Helicoidal
Management System	PLC with PID regulation
Total MW Power Installed:	From 6kW to 36kW
Absorbed Electrical Power	From 14kW to 67kW
Max Productive Capacity:	From 0.3t/h to 2t/h

Microwave Industrial Systems

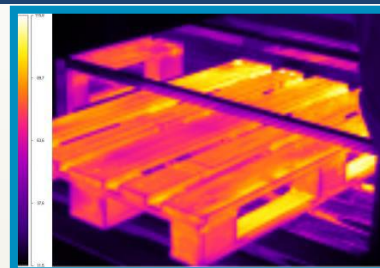


Technical Characteristics

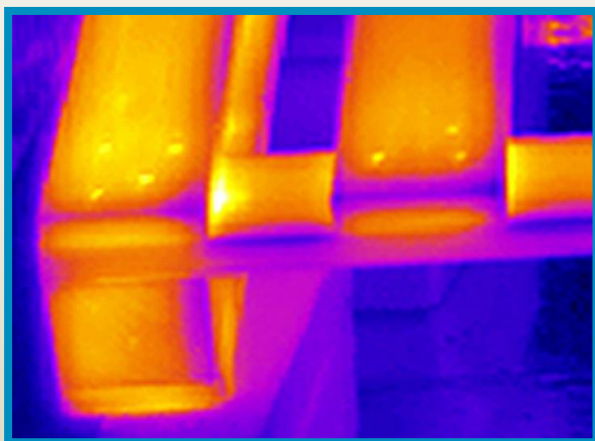
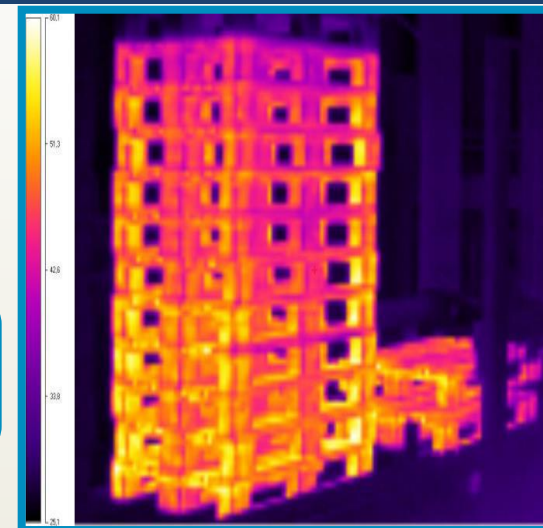
Shielded structure	20'ISO-STD Container for easy transportability and rapid installation
Conveyance system:	Helicoidal
Management system	PLC with PID regulation
Total MW power installed:	From 36kW to 72kW
Absorbed electrical power	From kW67 to 135kW
Max Productive capacity:	From 2t/h to 4t/h

Packaging

An innovative eco-friendly technology for pest-control in wood packaging materials



Packaging is a phytosanitary treatment using microwaves which implies several advantages not only in terms of effectiveness and functionality, but also of eco-compatibility.



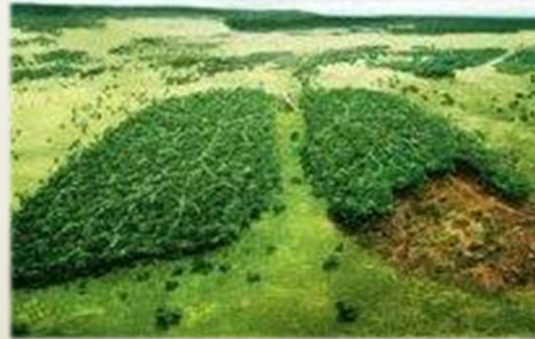
Packaging has a lower environmental impact than the methods currently in use like for example fumigation through methyl bromide (dangerous gas for the ozone layer depletion and for its high toxicity).



Packaging

Wood packaging materials, particularly pallets, which are in use in most of the international and intercontinental deliveries, could act as a pathway for the introduction and spread of noxious pests, representing a threat to living trees.

The international standard FAO-ISPM No. 15, which describes the officially approved phytosanitary measures for pest control in wood packaging materials has been recently reviewed. Today it also includes the microwave pest-control method (Dielectric Heating – “DH”), proposed and submitted by EMitech.



Packaging – Brief history

Until April 2013 ISPM-15 (FAO2002) indicated two globally approved phytosanitary measures:

Methyl Bromide Fumigation MB (the use of this substance provokes damages to the ozone stratum)–which has been banned

Heat Treatment HT (56°C for 30 continuous minutes)



Heat treatment using DIELECTRIC HEATING (“DH”) Is the new phytosanitary measure for pest-control of Wood Packaging Material proposed by Emitech to CPM (Commission on Phytosanitary Measures) and which has been recently included in ISPM15.

DH treatment: Approval Process



In 2004, Emitech submits the MW method to the Italian Ministry of Agriculture and Forestry Policies who recommends it to the IPPC Secretariat (*International Plant Protection Convention*), within FAO.



Successively, Emitech is invited to present all theoretical aspects of the MW method, in Rome, at the FAO Headquarters during a meeting of IFQRG (*International Forestry Quarantine Research Group*).



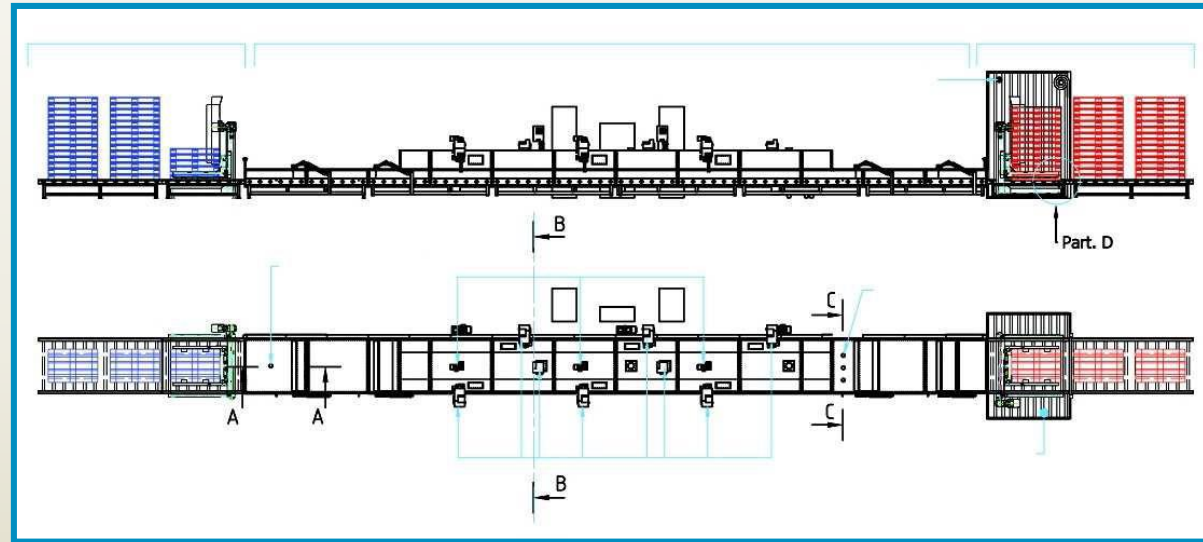
Emitech takes part to the annual IFQRG meetings. Some professors of the Penn State University (US) repeat the tests carried out by Emitech and obtain the same scientific outcomes. An international Work-group forms.



April-2013: The MW method, proposed by EMitech, is officially adopted by FAO–CPM (*Commission on Phytosanitary Measures*) and is included in the review of ISPM15.



Packaging - DH Tunnel





Advantages – Microwave Pest Control Method



Full efficacy: 100% mortality rates on pests in all life stages (eggs, larvae, pupae and adults).



No significant change in quality: physical characteristics in wood and nutritional characteristics in food



Absence of polluting effects harmful to operator sand the environment



Plant origin products free from exotic pest scan be exported without any phytosanitary concern in response to the on going FAO-IPPC needs



No toxic residues in the end products



Energy saving



Industries we are serving



Pharmaceutical



Tyre and Rubber



Foods and Beverages



Textile



Wood and Paper



Ceramic and Printing



Paints and Chemicals



Refineries



Foundries



Glass and Plastic



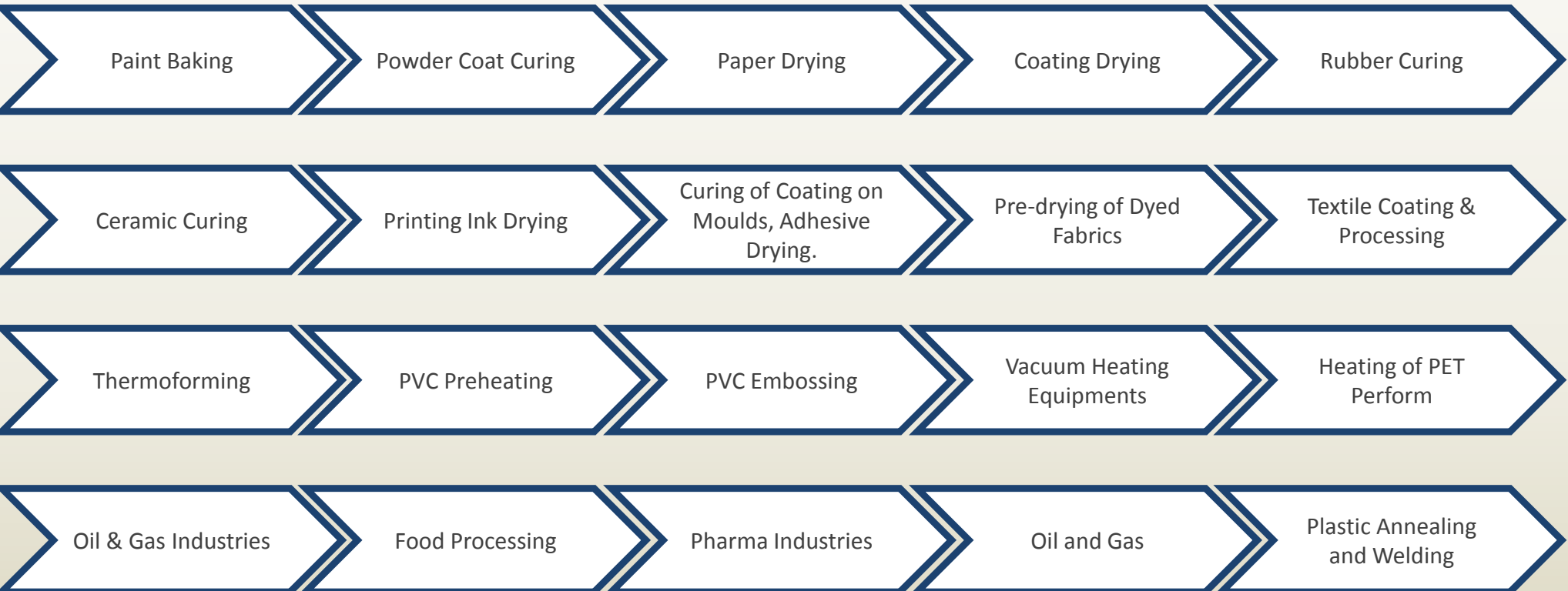
Automobile



Electronics

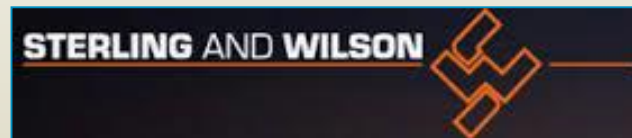
Industries we are serving cont...

Below are the few of industries/ Industrial applications we are serving :





Trusted Partner of following consultants



Our Clients



Serving Across Continents





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