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Quantum-leap in Food-processing
Innovative, sustainable and ecological technology in food processing
"Made in Germany" - Thuringia

IRD-TECHNOLOGY

MADE IN GERMANY

Index

Quality improvement by infrared light

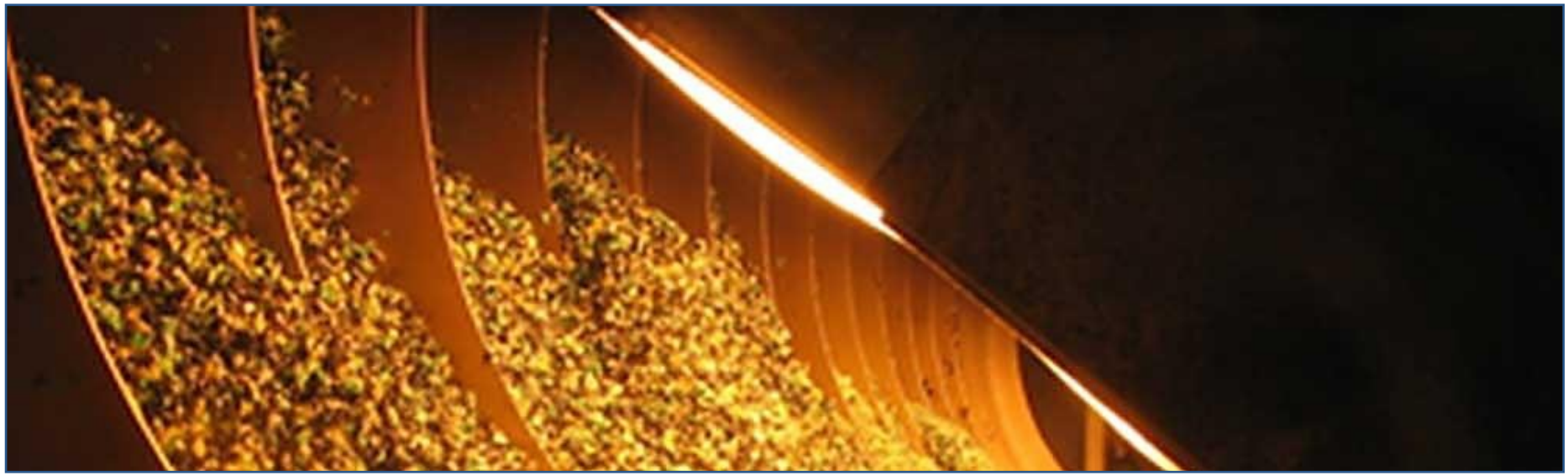
Light is extremely diverse:

Sunlight drives the biosphere.
Light allows us to see objects and a great variety of colors. Light even affects our feelings.
Light reveals the distances and dimensions in the universe, shows how stars and galaxies are moving and of which elements they are consisting.
Light gave the physicists revolutionary concepts such as quantum physics or the Wave-particle duality.
Light Transmits information and processes materials.

With the help of sunlight plants transform carbon dioxide and water into carbohydrates, which serve as food for humans and animals. And light does a whole lot more!

Rolf Heilmann: Licht „Die faszinierende Geschichte eines Phänomens“

By using infrared light we have succeeded to drastically reduce microbial germs and even partially dissolve and evaporate pollutants from food bulk goods, such as tea, dried herbs and vegetables, nuts and seeds. As I was able to present you before, this is a quantum leap in terms of food safety and an absolute novelty in food technology!



FoodSafe-IRD
FS-IRD

- ★ Germ reduction
- ★ Decontaminating
- ★ Drying
- ★ Stock protection
- ★ Disinfest
- ★ Opening flavors
- ★ Roasting
- ★ Toasting

Machine Examples

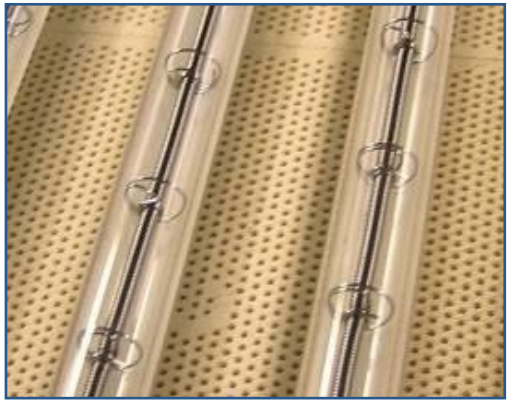
Operation mode

Cleaning mode

IRD-Technology Example of use

FoodSafety-IRD - Your advantages

Easy cleaning



★ Good access to all components allows for easy and fast cleaning.

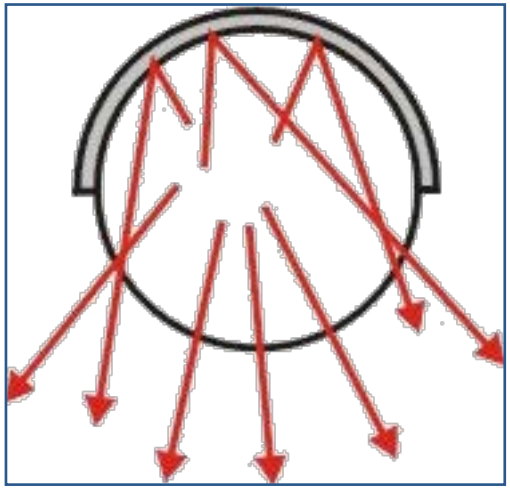
Low maintenance costs

★ Low wear-and-tear on parts ensures low maintenance- and spare-parts costs.

Automated

★ High level of Automation reduces personnel costs.
★ Easy-to-operate machine.
★ User-friendly control panel.

IRD-module



★ Our own infrared module developed specifically for dusty environments with air-shield results in long life of the infrared lamps.
★ Built-in reflectors provide excellent energy efficiency in the infrared lamps.

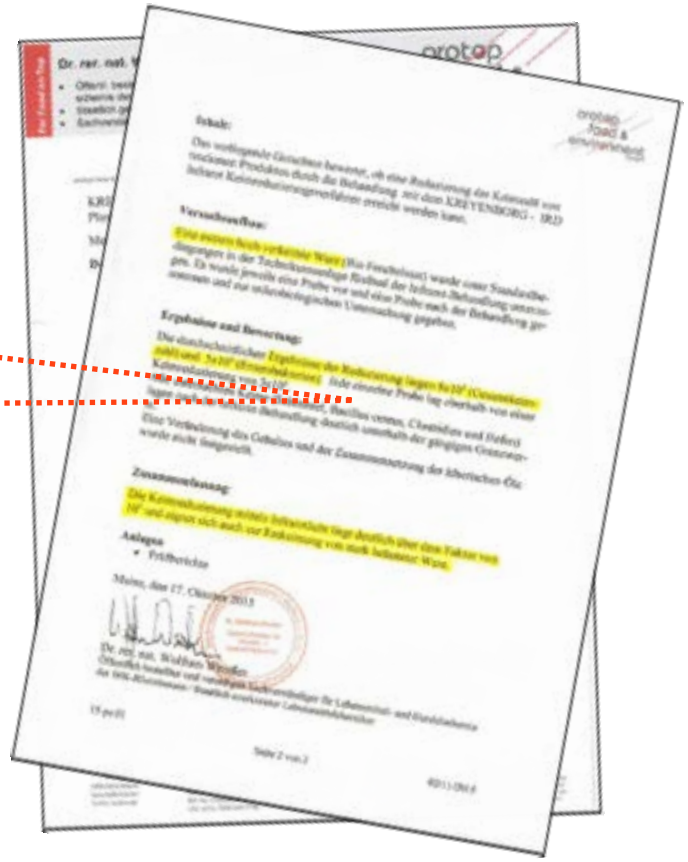
No ionizing radiation

The good news:
Ionizing radiation = describes any radiation of particles or electromagnetic radiation, that is capable of removing electrons from atoms or molecules and thereby producing positively charged ions or molecules.

Certificate-Validation procedures

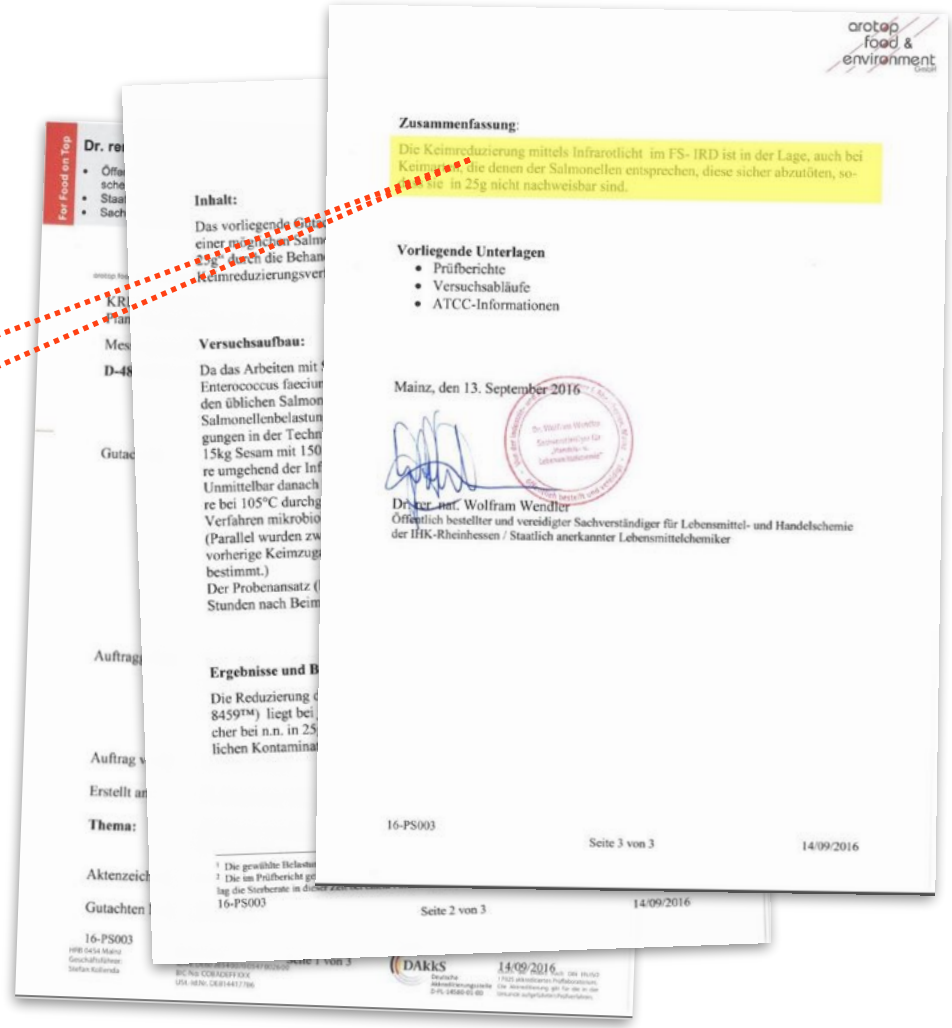
Germ reduction higher than the factor of 10^5

The germ reduction by means of infrared light is significantly higher than the factor of 10^5 and is also suitable for disinfecting heavily loaded goods.



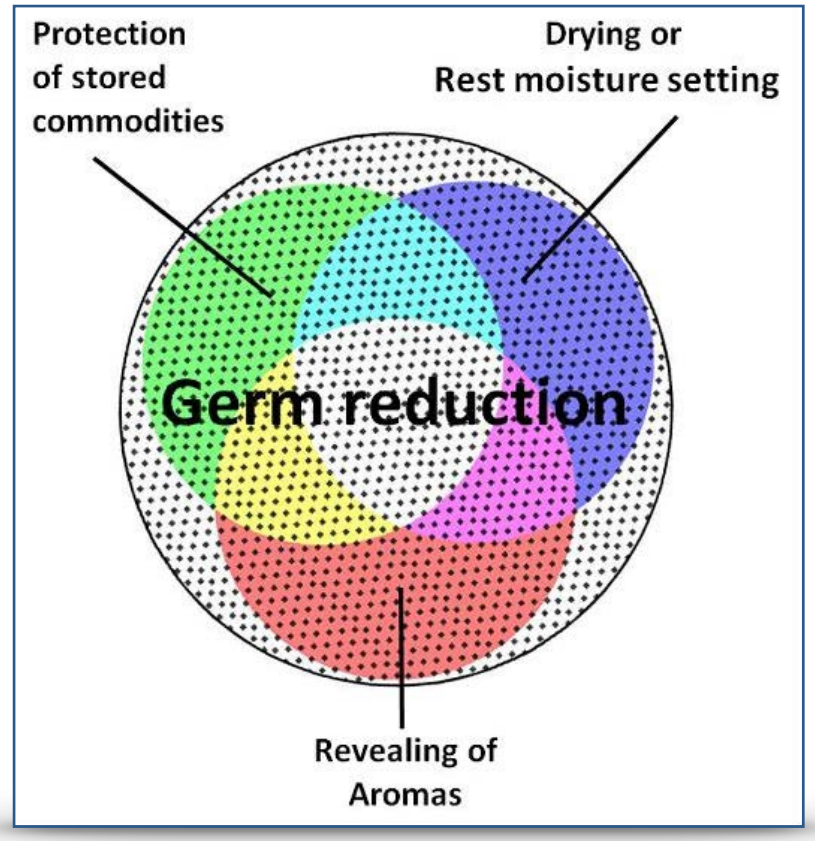
Safe germ killing by Salmonella (absent in 25g)

The germ reduction with infrared light at FS IRD is able even with seed types which correspond to those of Salmonella, this certainly kill so that they are not detectable in 25g



Multifunctional mode of action

Only one work step – several features :



Germ reduction – Examples

Parsley

Vanilla

Pumpkin seeds

Onion-Garlic-mixure

Rose flowers

Cornflowers

Germ reduction

Product shapes and sizes

★ For the first time, food in bulk form such as tea, leaves, herbs, dried vegetables and dried mushrooms, nuts, pits, seeds, grain, cereals, spices and cut-, chopped- and powdered food can be treated by means of infrared light in such a way that the microbiological load is drastically reduced and even contaminants are partially dissolved and evaporated.

Mushroom

Validated disinfection

★ Validated to reduce microbiological infestation up to > 6-log (validated). This corresponds to a millions-fold germ reduction.

Protection of sensors

★ Maximum protection of the sensory properties of the product.

No steam

★ No steam is required; no condensation on the product.

Chilli

No chemicals

★ Germ reduction without any addition of chemicals.

Finished mixtures

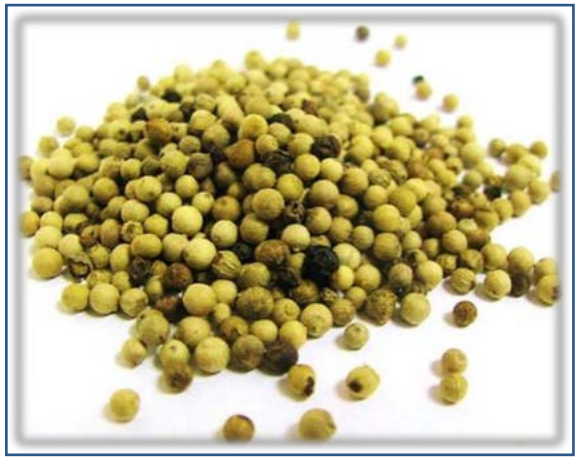
★ With salt and sugar added, finished mixtures are free-flowing and treatable.

Residual moisture setting

★ The product can be treated by a water-spraying system.
★ The product can be cooled if necessary and offers maximum protection.
★ It allows - in addition to germ reduction - an accurate and optimal residual moisture setting of the end product. This is a unique advantage in the germ reduction process.

Storage protection

★ Due to the heating of the product, it is safe-storage protected at the same time.



Pepper

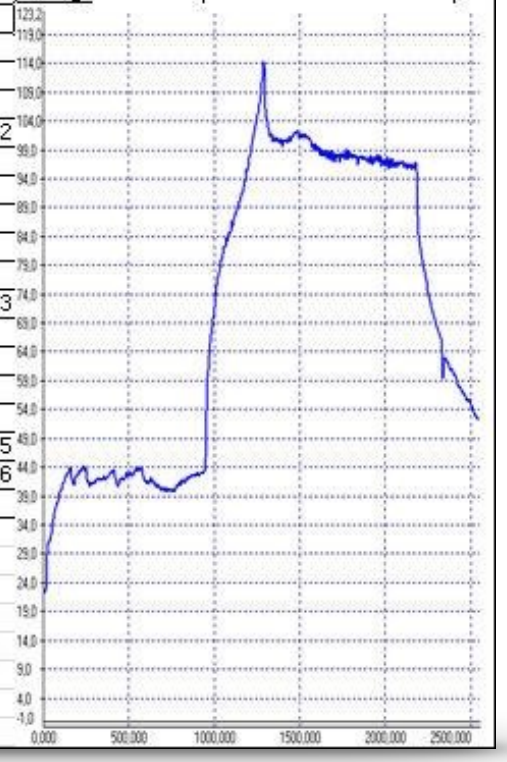
Fruit tea

Germreducing

1	60				39					
2	120				43			20 sek Wasser		
3	180		2	40	43			20 sek Wasser		
4	240				40		Agglomerate bis 1cm			
5	300		2	45	41					
6	360				43		20S H2O			
7	420				40					
8	480				43					
9	540				45	30s H2(	30 sek			
10	600		2	30	41	24,15	fließt gut			
11					39					
					40					
					42					
					43					
					45	21,22				
					70					
					80					
					86					
					92					
					100					
					110	5,53				
					100					
					102					
					102					
					100					
					97	1,95				
					96	1,56				
					70					

g

gglomerate



Melisse Blätter

Gesamtkeimzahl	**8.800.000**	**->**	**390.000 KBE/g**
E-Coli	**210**	**->**	**< 10 KBE/g**
Schimmel	**42.000**	**->**	**30 KBE/g**
Enteros	**300.000**	**->**	**1.100 KBE/g**
Bac. cerreus	**4.900**	**->**	**< 10 KBE/g**
Sulf.red. Clostr.	**23**	**->**	**< 3 KBE/g**

Roasting

Principle

★ In contrast to conventional convective treatments, this new procedure is not controlled by means of the temperature of the heat transfer medium, but rather by very fast and precise control of product temperature. Focused infrared light penetrates below the surface of the product particles and is thereby converted into heat in the interior. In a very short time and with maximum protection of the product the desired degree of roasting is achieved.

Perfect roast

★ Absolutely uniform roasting is produced through the continuous mixing of roasting material.

Gentle movement

★ The product is mixed and conveyed gently, continuously and with at low speed. Even moderately fragile products, such as cashews and peanuts, are treated without damage.

Different degrees of roasting

★ Various roasting levels, and thus taste and color variations, can be realized by simply setting the temperature and residence time.

Coffee

Nuts

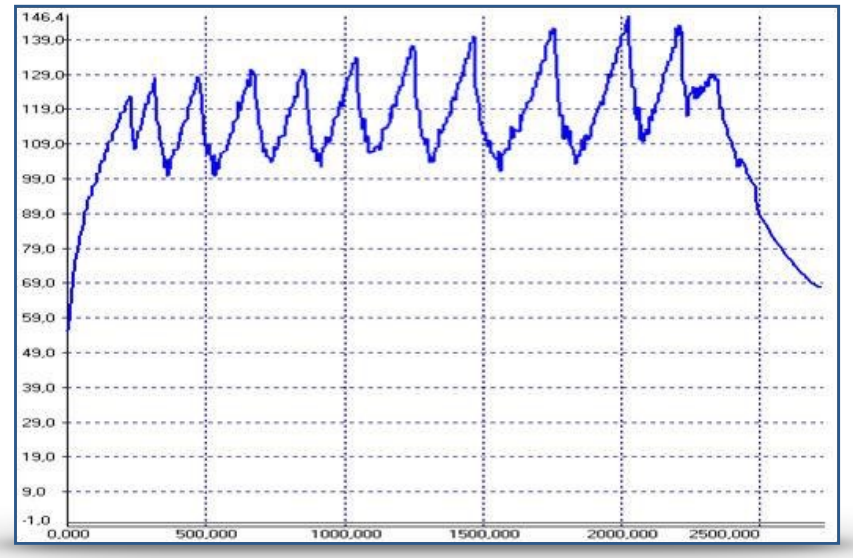
Decontamination

Sample

IR- Trocknungstest			Nr:	IRDK116	Datum	04.12.2013	
Versuchsablauf							
Produkt			Süßholzwurzel nat FS,				
			RW_Muster IRX	113			
						IRD aufheizen 120°C	
						mit Wasserkühlung dort	
Ziel des Versuches:			Reduktion OTA- Gehalt			30min halten	
Startzeit	12.06	Uhr		Menge Charg	3 kg	RF fast 105	

Zeit	Zeit	Tromm	Strahler		Temp.	RF	SG	Bemerkung
min	sek	%	Anz.	%	°C	%	g/l	
		20	5	100	50	9,05	210	
3					100			
4	15sek Wasser				123		T runter auf 110°C	
5	60sek Wasser				125		riecht kräftig	
7					105			Anhaftungen am Mantel >>Schalen schwarz
8	60sek Wasser				126		fließt gut, keine Agglomerate oder	
9					100		Anbackungen	
11	1min Wasser				130			
14	1min Wasser							
17	1min Wasser							
18					103	7,68	Meßwert nach einsprühen	
21	1min Wasser					4,13	vor einsprühen	
24	1min Wasser				135			
30	80sek Wasser				140			
31					100	9,05	nach Einsprühen	
34	1min Wasser				142			
37	1min Wasser				140			
38			4	65	125		nicht antistatisch!!!	
39	Strahler aus				128	2,71		

Ochratoxin A
reduced 40 %



Disinsectisation Stock protection

Examples Grain beetles

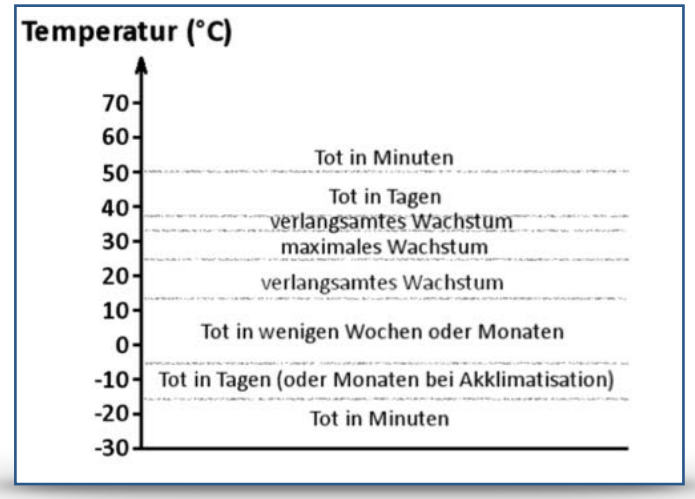
Grain beetles. The granary weevil attacks grains, including wheat, rye, oats, barley, maize (corn), millet, rice, pasta, buckwheat, flour, bran, grist, almonds, peanuts, peas, beans, soy.

Grinding products.

★ It doesn't grow in ground products.

Development

★ From egg to pupa the granary weevil evolves in the cereal grain that it consumes almost completely. After about 5 weeks at 25°C, the young beetles hatch. Mating takes place within a few days. The females lay an egg per day for about 200 days. Development from egg to beetle takes 29 to 34 days at 27°C. Lifespan: 6 months at 29°C and 75% relative humidity; 2.5 years at approximately 10°C. Cold stasis occurs at 5°C, heat rigidity at 38.4°C. Death from freezing occurs below -10°C; death from excess heat occurs above 40°C.



Grain moisture

★ The beetle does not propagate in wheat with a grain moisture less than 9%.

from: Reichmuth, Ch. (1997) Vorratsschädlinge im Getreide, Mann Verlag Reichmuth, 23th February 2011

Our test facility

in Rohr in Thuringia