Application of microwave and radio frequency energy to control *Sitophilus zeamais* (Coleoptera: Curculionidae) in maize grains

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To my Parents

Sisters

Wife and son

I dedicate this work

with love

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Symbols and abbreviations

$\tan\delta$	Loss angle.	DNA	Deoxyribonucleic acid.
e	Euler`s number = 2.718.	FCC	Federal Communications Commission.
d_p	The electrical field penetration depth.	FO	Fiber optic.
^{137}Cs	Caesium-137	GC	Gas chromatography.
^{60}Co	Cobalt-60	HPLC	High-performance liquid chromatography.
c	The speed of the light in free space $(3 \times 10^8$ m/s).	ICC	International Association for Cereal Science and Technology.
f	Frequency (Hz).	IMC	Initial moisture content (%).
P	Power (W).	ISTA	International seed testing Association.
ΔT	The temperature rise (°C).	kGy	Radiation absorbed dose measurement unit.
E	Electric field (V.m^{-1}).	MW	Microwave.
Δt	Time increment (s).	RF	Radio frequency.
λ	Wavelength (m).	RH	Relative humidity.
$\mathcal{C}_\mathcal{P}$	The specific heat (Jkg^{-1} °C^{-1}).	rpm	Revolutions per minute.
ε'	Dielectric constant.	RVA	Rapid visco analyser.
ε''	Dielectric loss factor.	RVU	Rapid visco unit.
$\varepsilon*$	The relative permittivity.	K	Kelvin , K = [°C] + 273.15
ρ	The density (kgm^{-3}).		