DESIGN OF A HIGH POWER MICROWAVE APPLICATOR FOR THE CONTROL ON INSECTS IN STORED PRODUCT

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Summary:

Recent tests of infested, freely flowing, hard red wheat, in a 28GHz microwave applicator indicate that a bounding energy input of 56.8 J/g will produce a mortality of 99% for the least vulnerable species and age level of each of the three major grain pests tested, i.e. hard red wheat, *Triticum aestivum* (L.), infested with pupae, young larvae and eggs of the rice weevil *Sitophilus oryzae* (L), the red flour beetle *Tribolium castaneum* (Herbst), and the lesser grain borer *Rhizopertha dominica* (F.). Amongst these species, the LGB was determined to be the least vulnerable.

Species	**Age**	**Uload J/g**	**Remarks**
Rice weevil	pupae	17.643	Most vulnerable
	young larvae	26.295	
	egg	42.890	
Red flour beetle	pupae	33.050	
	young larvae	54.858	
	egg	48.454	
LGB	pupae	27.426	
	young larvae	36.532	
	egg	56.832	Least vulnerable, bounding case

A 200kW 28GHz full scale prototype unit has been developed to establish a bounding energy input to produce a mortality of 99% for the least vulnerable specie with a throughput rate of ~24 tonne/h.