

HF/MICROWAVE CONTROLLER – AN ALTERNATIVE METHOD FOR PEST CONTROL OF CEREAL SEEDS DURING STORAGE IN INDIAN ENVIRONMENT

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Abstract

A major problem in storage of seed is the infestations of insect pests. Chemical pesticides have been used with their inherent side effects. The main objective of this research paper is to develop a sophisticated microwave controller as a source of radiations and study the impact of radiation on viability of stored seeds. The modified design of microwave source ensured the controlled radiations with 52.26% efficiency against the theoretical efficiency of 62%. The power radiated is calibrated in terms of radiation time in seconds so as to suit the instrument for general use. The experimental work carried out is with the object to find out the effect of micro radiation on different seed parameters and compare them with the result published with synthetic methods. A series of experiments are conducted to test seed storability for different durations of microwave radiations. The sample seeds selected for testing are wheat and sorghum. Germination, moisture and insect damage parameters are measure for testing storability of seeds.

The seed tests have been carried out in Seed Testing Laboratory, Maharashtra State, Pune 5, as per Seed Act (966).The sample of wheat and sorghum are used for storage viability test. The experimental results obtained shows that wheat and sorghum can be stored without loss of germination below IMSCS standards. Insect infestations for wheat is zero but for sorghum it is 6.5% for control seed and it varies from 1.75% to 2.00% for 30 sec and 15 sec radiation duration. Hence the proposed scheme based on microwaves radiations seems to be scalable solution to avoid large scale use of chemical pesticides for the next generation application.

Keywords: Radio Frequency, Microwave, Insects, Germination, Insect damage, and Seed