EVALUATION OF SEED VIGOR AND MALTING QUALITY OF MICROWAVE IRRADIATED BARLEY SEED

A Thesis
Submitted to the Graduate Faculty
of the
North Dakota State University
of Agriculture and Applied Science

by

Miguel Eduardo Rivadeneira

In Partial Fulfillment of the Requirements
for the Degree of
MASTER OF SCIENCE

Major Department: AGRONOMY

January, 1986
Fargo, North Dakota

ABSTRACT

Several barley (Hordeum vulgare L.) cultivars, grown in Fargo and Casselton, ND, in 1984, were exposed to various levels of microwave radiation to investigate their effect on seed dormancy, seed and seedling vigor, malt quality parameters and interactions with cold and room storage systems. Radiation of seeds to seven temperature levels ranging from 49 to 127°C, at a power setting of 200 watts and a frequency of 2450 MHz, was not effective in eliminating seed dormancy, enhancing seed vigor or improving quality of the resulting malt. Seed germination and percent of strong seedlings were the most important tests for detecting the effects of radiation on barley seed. Accelerated aging, seedling growth rate, malt extract yield and malt recovery values indicated that treatments of barley seed at or below 71°C do not reduce seed vigor. Alpha- and beta-amylase activity tests indicated that the 60°C treatment reduced enzymatic activity and malt quality. The effects of storage system were not significant.