CONTRACT RESEARCH PROJECT REPORT

QUARTERMASTER FOOD AND CONTAINER INSTITUTE
FOR THE ARMED FORCES, CHICAGO

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Report No. 1 (Progress)
Period: 7 June 1955-
7 August 1955
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Title of Contract: Combined Use of Heat and Radiation Treatment for Sterilization of Foods

SUMMARY

Studies have been initiated to determine the combined effects of irradiation and heat on canned meat. For this purpose a steam autoclave has been modified to accommodate the O. F. Ecklund thermocouple apparatus and to permit close control of time-temperature relationships within No. 1 picnic cans of meat during autoclaving.

At present, runs are being made that are designed to determine the F_0, or effective heating time at 250°F, required to sterilize No. 1 picnic cans of ground beef after irradiation at various levels with gamma rays from cobalt-60. The cans are first packed with autoclaved ground beef and are then sterilized by further heating with 17 psig steam for 1 hour. Following this, Clostridium botulinum 213-B spores are injected into the meat. The cans are then immediately sealed with a commercial-type closing machine, plunged into water at 20°C for 10 minutes, marked,

and further chilled in ice water to about 4°C. They are next irradiated at various levels, autoclaved to develop the desired F_0 values, cooled quickly to 37°C and then incubated at this temperature. Development of gas in the cans is observed, and representative cans are checked for the presence of botulinus toxin by animal inoculation tests.

Although four runs have been made, the incubation of cans has not progressed sufficiently for reporting at this time.

Studies on the effect of chemicals in the medium on the lethal effect of gamma rays for C. botulinum spores are continuing. Studies of the simultaneous application of heat and irradiation are also in progress. Detailed data will be presented in Progress Report No. 2.