COMPLIMENTS OF
CALIFORNIA
SEA GRANT COLLEGE PROGRAM

CUIMR-X-83-011 C2

Effect of Temperature and Storage Time on the Probability of Growth of Nonproteolytic *Clostridium botulinum* Types B, E, and F Spore Pools in a Model Broth and in Rockfish Fillets

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By

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B. S. (University of California, Davis) 1983

Thesis

Submitted in partial satisfaction of the requirements
for the degree of

MASTER OF SCIENCE

in

Food Science

in the

GRADUATE DIVISION

of the

UNIVERSITY OF CALIFORNIA

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ACKNOWLEDGMENT

This work is a result of research sponsored by NOAA, National Sea Grant College Program, Department of Commerce under grant number NA80AA-D-00120, project number R/F 83, through the California Sea Grant College Program and in part by the California State Resources Agency. The U. S. Government is authorized to reproduce and distribute for governmental purposes. I would like to express my gratitude to Sea Grant College Program for awarding a graduate studies traineeship which has supported me through the Master of Science Program here at the University of California, Davis.

I am truly grateful to Dr. Constantin Genigeorgis for providing the monetary support, for his help and guidance on the research project, and finally for his encouragement and his inspiration as an optimist. I would also like to thank Dr. Seppo Lindroth for all his help, support, and scientific training during his stay in the U. S., Dr. Ericka Barrett for her academic and non-academic advice and guidance in the preparation of this thesis, and also Dr. Robert Price for his input and help in the finalizing of this thesis.

A great many thanks and recognition also go to my fellow graduate students Genaro W. Garcia, Hussnie O. Mohammed, and David A. Baker for their scientific, statistical, and laboratory assistance and for their continual confidence and support.

ABSTRACT

The quantitative effect of temperature and time of storage on the growth of C. botulinum growth in brain heart infusion-cysteine broth and in rockfish fillets was examined. In the model broth system, experiments were of factorial design involving three serologically different spore pools consisting of 13 nonproteolytic types B, E, and F spores as inocula, nine inocula levels, nine incubation temperatures (4 - 47 C), and anaerobic incubation for up to 60 days. In the fish system, an inoculum of 10^0 to 10^4 nonproteolytic C. botulinum spores was placed between two fresh rockfish fillets. The fillets were placed in barrier bags, sealed under vacuum, 100% CO_2, or 70% CO_2 + 30% air, and stored at 1 to 30 C from 1 to 21 days. Decimal reduction data combined with regression analysis were used to derive equations which predict the probability (P) of C. botulinum growth under different conditions of storage. In general, there was close agreement between the observed and predicted P values demonstrating the reliability of the model approach.