# STERILIZATION OF BOTTLED WATER BY GAMMA RADIATION

BY

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THESIS

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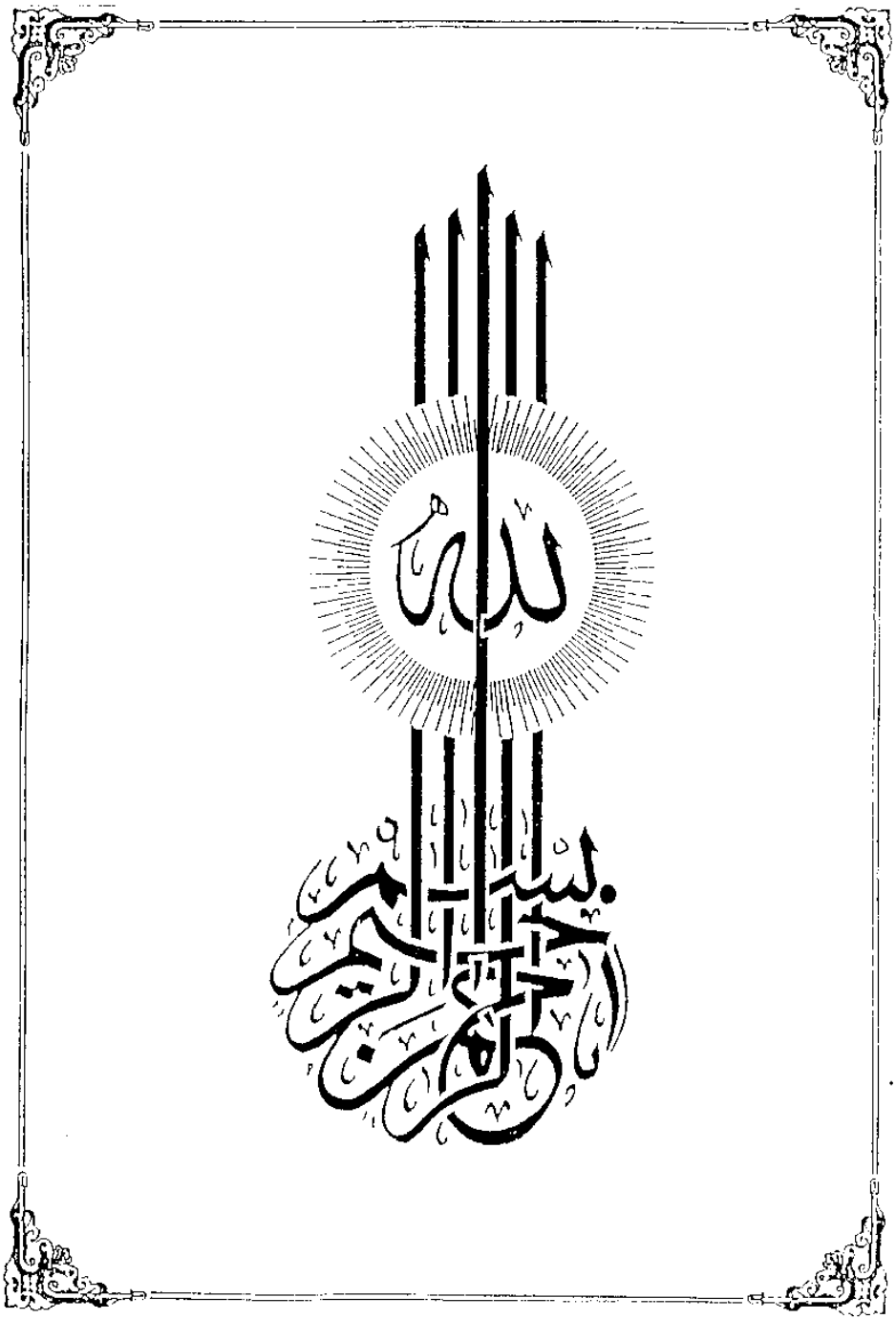

The Candidate Passed Successfully The Examination In The Followin
Courses.

Special Course :

(Soil Microbiology, Microbial Biochemistry, Immunochemistry).

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*DEDICATED*

*TO MY*

MOTHER , HUSBAND

*AND*

MY CHILDREN

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# PREFACE

Water in its pure form occurs rarely in nature. So that, all surface water and most ground water require treatment for one or more of the following reasons :-

1- To remedy pollution, that is the removal of colour, taste, odour, suspended matter, organic matter and bacteria.

2- To remove metals, for example, iron and manganese.

3- To remove dissolved solid for example, Calcium and Magnesium (Softening).

4- To neutralise acidity and correct corrosive activity and plumbosolvency.

One of the most important water treatment from the point of view of hygienic safety is to eliminate pathogenic microorganisms. The indication of microbiological pollution is based on the detection of faecal contamination from man and/or other warm blooded animals.

Organisms used as bacterial indicators of faecal pollution include the coliform group of organisms as a whole, Escherichia coli and coliform organisms, Faecal streptococci and sulfite-reducing clostridia especially Clostridium perfringens and Pseudomonas aeruginosa.

Recently, in Egypt, some companies of drinking bottled water developed and a big advertising campaign concentrating on the sterility, potability and hygienity of this product has been initiated.

Bottled water produced by those companies are periodically analysed by the laboratories of the Egyptian ministry of health to make sure that they comply with the bottled water specification suggested by the World Health Organization (WHO). Egyptian specification

Bottled drinking water is defined as a natural water that has definite physical chemical and microbiological specifications. These specifications are met through physical treatment. Bottled water must be at least as good in bacteriological quality as unbottled potable water and thus the total bacterial count should not exceed 50 cells/ml at 37 °C after 24 hours. It should also be free from, coliform organisms, E. coli, S. faecalis, P. aeruginosa and

C. perfringens (WHO 1984). Several methods are used for bottled water to meet the required specification. Among these methods are filtration by using special kinds of filters, Ultraviolet exposure and ozonation.

The main sources of contamination of bottled water may come from the natural source of water itself, containers, or during the bottling process.

Recently, in many countries gamma radiation was used as physical agent for the preservation of food, It was found that radiosterilization has many advantages, particularly in developing countries with high density of population and less appropriate hygienic conditions.

The aim of the present investigation is to examine the possibility of using gamma-radiation as a physical mean for the microbiological purification of bottled water and the storagability of bottled water purified by this procedure. Furthermore, the effect of gamma-radiation on the physical and chemical properties of the bottled drinking water will also be examined.