CONTENTS

1. INTRODUCTION 1

2. STATUS OF CANNING INDUSTRY 5
   2.1. Canning Industry in India – The Past. 5
   2.2. Major Products Exported. 6
   2.3. International Trade on Canned Seafoods 8
   2.4. Status of Canning Industry in India 8
   2.5. Major markets for Canned Fish 10
   2.6. Prospects of reviving the Indian seafood Canning Industry 10

3. REVIEW OF LITREATURE 13
   3.1. Evolution of containers for canned foods 13
       3.1.1. Glass Containers 14
       3.1.2. Tin Containers 16
       3.1.3. Tin-Free Steel Cans 18
       3.1.4. Retort pouches 20
       3.1.5. Studies on Aluminium Containers 22
           3.1.5.1. Impact Extruded Containers 24
           3.1.5.2. Drawn cans 24
           3.1.5.3. Three-piece cans 25
           3.1.5.4. Application Fields of Aluminium Containers 25
3. 2. Methods of fish preservation

3. 2. 1. Chilling

3. 2. 2. Freezing

3. 2. 3. Vacuum packaging

3. 2. 4. Fish curing

3. 2. 4.1. Drying

3. 2. 4. 2. Smoking

3. 2. 4. 3. Salting

3. 2. 5. Irradiation

3. 2. 6. High pressure Processing

3. 2. 7. Canning

3. 3. Different Sizes of Cans Used Commercially

3. 4. Canning Studies in Fishes

3. 4. 1. Prawns

3. 4. 2. Mackerel

3. 4. 3. Sardines

3. 4. 4. Tuna

3. 4.5. Other fishes

3. 5. Heat Penetration and thermal Process Evaluation

3. 5. 1. Evaluation of the thermal process

3. 5. 2. Mathematical methods

4. 5. 3. Order of death of bacteria and commercial processes
3. 5. 4. Mechanism of heat transfer and process evaluation

3. 5. 4. 1. Conduction heat transfer
3. 5. 4. 2. Convection heat transfer

3. 6. Studies on the Reduction in Process Times

3. 7. Studies on Microbial Spoilage and Sterility Tests

3. 7. 1. Post process contamination
3. 7. 2. Under processing
3. 7. 3. Commercial Sterility

3. 8. Storage Studies and Changes in Chemical Parameters

3. 9. Optimization of Thermal Processes

3. 10. Studies on Texture Properties

4. MATERIALS AND METHODS

4. 1. Machineries and Accessories

4. 1. 1. Pilot scale retorting unit
4. 1. 2. Ellab CTF 9008 Precision Thermometer and Fo- value computer
4. 1. 3. Can punch
4. 1. 4. Packing glands and accessories
4. 1. 5. Standard thermocouple probes
4.1. 6. Food Texture Analyzer
4.1.7. Inductively Coupled Plasma-Atomic Emission Spectrometer (ICP-AES)

4.2. Materials

4.2.1. Aluminium cans
4.2.2. Fishes
4.2.3. Oil
4.2.4. Salt
4.2.5. Other ingredients
4.2.6. Fish Curry

4.3. Methods

4.3.1. Determination of moisture
4.3.2. Determination of ash content
4.3.3. Estimation of crude fat
4.3.4. Determination of crude protein
4.3.5. Tests for Lacquer
4.3.6. Air pressure test
4.3.7. Resistance to sulphur staining and impermeability
4.3.8. Test for suitability of can for food contact applications
4.3.9. Cut out analysis
4.3.10. Determination of vacuum
4.3.11. Canning of tuna in oil
4.3.12. Canning of tuna in brine
4. 3. 13. Canning of tuna in curry 81
4. 3. 14. Canning of Mackerel in oil 82
4. 3. 15. Canning of mackerel in brine 82
4. 3. 16. Canning of mackerel in curry 83
4. 3. 17. Determination of cold spot 85
4. 3. 18. Heat penetration studies 85
4. 3. 19. Sterility test 86
4. 3. 20. Shelf life studies 86
4. 3. 21. Texture profile analysis 86
4. 3. 22. Estimation of TBA value 87
4. 3. 23. Determination of Ph 87
4. 3. 24. Sensory evaluation 87
4. 3. 25. Estimation of aluminium content in canned fish 88
4.3. 26. Transport worthiness Tests 88

5. RESULTS AND DISCUSSION 97

5. 1. Proximate Composition of Fishes 97
5. 2. Physical Tests for Aluminium Cans 98
5. 3. Determination of Cold Spot 101
5. 4. Heat Penetration Studies of Tuna in Different Media 102
5. 5. Heat penetration studies of Mackerel in different media 130
5. 6. Results of Sterility Test 158
5. 7. Vacuum in processed cans 158
5.8. Changes in TBA Value 159
5.9. Changes in pH 166
5.10. Sensory scores 171
5.11. Texture Studies 176
5.12. Aluminium in canned fish 187
5.13. Results Transport worthiness tests 188

6. SUMMARY AND CONCLUSIONS 189

7. REFERENCES 196