# INDEX

1.0.0 INTRODUCTION .................................................. 1

2.0.0 REVIEW OF LITERATURE .......................................... 10

   2.1.0 Spreadability of Butter ...................................... 11
   2.2.0 Objective Measurements ....................................... 14
   2.3.0 Relationship between structure and Rheological behaviour .......... 24
   2.4.0 Factors affecting butter spreadability ....................... 25
   2.5.0 Fractionation of butterfat .................................... 41
   2.6.0 Modification of butterfat ..................................... 44
   2.7.0 Low calorie butter and spread ................................ 48
   2.8.0 Dry butter .................................................. 51

3.0.0 SCOPE AND PLAN OF WORK ....................................... 56

4.0.0 EXPERIMENTAL .................................................. 60

   4.1.0 Collection of buffalo cream from NDRI farm ................... 61
   4.2.0 Collection of buffalo cream from different regions during different seasons ................. 61
   4.3.0 Method of butter making and packing .......................... 62
   4.4.0 Preparation of butter from buffalo cream with low melting triglycerides ................. 66
   4.5.0 Preparation of butter from buffalo cream with surface active agents ....................... 67
   4.6.0 Preparation of low fat butter with different levels of fat powder ......................... 68
   4.7.0 Production of spray dried butter powder ...................... 70
   4.8.0 Preparation of recombined butter from spray dried butter powder .................... 72
   4.9.0 Analytical methods .......................................... 73
4.9.1 Determination of spread-
ability score of butter 73
4.9.2 Determination of penetra-
tion value of butter 73
4.9.3 Determination of yield-
stress and viscosity of butter 74
4.9.4 Determination of "oiling off" of butter 76
4.9.5 Preparation of butterfat sample 77
4.9.6 Determination of refract-
ive index 77
4.9.7 Determination of melting point 78
4.9.8 Determination of iodine value ("Wijs' Method") 79
4.9.9 Determination of Reichert-
Meissl and Polenske value* 80
4.9.10 Determination of saponifi-
cation value 82
4.9.11 Determination of shortchain and longchain triglycerides of butter fat by thin layer chromatography. 83
4.9.12 Determination of fatty-
acid composition of butterfat by gas liquid chromatography. 84
4.9.13 Determination of fat of butterpowder 85
4.9.14 Determination of free fat of butterpowder 86
4.9.15 Determination of moisture of butterpowder 86
4.9.16 Determination of bulk-
density of butterpowder. 87

5.0.0 RESULTS AND DISCUSSION 89

5.1.0 Effect of different regions and seasons on the physico-chemical properties of butter made from buffalo cream. 89
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2.0</td>
<td>Use of low melting triglycerides on different physico-chemical properties of butter made from buffalo cream.</td>
<td>123</td>
</tr>
<tr>
<td>5.3.0</td>
<td>Use of surface active agents on different physico-chemical properties of butter made from buffalo cream.</td>
<td>140</td>
</tr>
<tr>
<td>5.4.0</td>
<td>Use of different levels of fat content on physico-chemical properties of butter made from buffalo cream.</td>
<td>146</td>
</tr>
<tr>
<td>5.5.0</td>
<td>Standardization of method of preparation of spray dried butter powder from buffalo milk and studies on the physical properties of recombined butter.</td>
<td>155</td>
</tr>
<tr>
<td>6.0.0</td>
<td>SUMMARY</td>
<td>159</td>
</tr>
<tr>
<td></td>
<td>BIBLIOGRAPHY</td>
<td>1-xx</td>
</tr>
<tr>
<td></td>
<td>APPENDIX</td>
<td>I-xx</td>
</tr>
</tbody>
</table>