

CONTENTS

	Page
INTRODUCTION	1
REVIEW OF LITERATURE	3
- Effect of lye treatment and acidification on pickling	3
- Anaerobic conditions during pickling process	4
- Green olives fermentation	5
1. Salt concentration during pickling and its effect	5
2. Microflora and the appearance of microorgan- isms.....	9
Yeasts	16
- Starters and inoculation in pickling	18
A. Starter microorganisms	18
B. Factors affecting inoculation	20
- Spoilage of pickled green olives and microorgan- isms responsible for softening	24
- Effect of preservatives on pickling	28
1. Effect of sorbate	28
2. Effect of acetic acid	32
3. Inhibitory products of lactic acid bacteria (as preservatives)	34
- Antibiotics produced by lactic acid bacteria	35
- Chemical changes during pickling and storage.....	36
1. Changes in total acidity and pH value	36
2. Changes in sugar content	39
3. Changes in nitrogen and amino acids.....	41
4. Changes in ether extract.....	43
5. Changes in pectic substances	44
6. Changes in bitter substances	47
7. Changes in ascorbic acid	49

8.	changes in salt concentration	50
9.	Changes in moisture content	50
MATERIALS AND METHODS		52
I.	Processing of green olives	52
1.	Control	53
2.	Sorbate treatment	53
3.	Acetic acid treatment	53
4.	Starter treatment	53
5.	Starter and sorbate 0.1% treatment	53
6.	Sorbate 0.1% and acetic acid to pH4 treatment...	54
7.	Sorbate 0.1%, acetic to pH4 and starter treatment	54
8.	Whey treatment	54
II.	Methods of analysis	55
1.	The microbiological estimations	55
A.	Total bacterial plate count	55
B.	Lactic acid bacteria count	55
C.	Yeasts count	56
D.	Lipolytic microorganisms count	57
E.	Estimation of pectin decomposing bacteria	57
F.	Cellulose decomposing microorganisms...	58
G.	Estimation of coliform group.....	59
2.	Isolation and identification of yeasts.....	59
1.	Morphological properties.....	60
1.A	Characteristics of vegetative reproduction	60
1.B	Ascospore formation	61
1.C	Shape and size of the cell.....	62
1.D	Shape of ascospores.....	62
2.	Physiological properties.....	63
2.A	Pellicle, ring and sediment formation.....	63
2.B	Sugar fermentation.....	63
2.C	Sugar assimilation.....	64
2.D	Assimilation of nitrate.....	64

2.E	Production of the carotenoid pigments.....	65
2.F	Cellulose decomposition	65
2.G	Starch hydrolysis.....	65
2.H	Pectin decomposition	65
3.	Identification of lactic acid bacteria.	66
1.	Catalase production.....	66
2.	Fermentation of sugars.....	66
3.	Growth at 45°C and 10°C.....	67
4.	Production of ammonia from arginine	67
5.	Production of CO ₂ from glucose....	68
-	Chemical estimations:	
1.	Determination of pH.....	68
2.	Determination of total titratable acidity (TTA)	68
3.	Total volatile acids (TVA).....	68
4.	Determination of lactic acid.....	69
5.	Determination of soluble acids.....	70
6.	Determination of total sugars.....	70
7.	Determination of reducing sugars.....	71
8.	Determination of total crude protein.....	71
9.	Determination of true-protein.....	71
10	Determination of ether extract.....	71
11	Determination of pectin.....	41
	Preparation of the sample	71
	Development of the colour.....	73
12	Determination of tannins.....	73
13	Determination of vitamin C.....	73
14	Salt concentration.....	73
15	Determination of moisture.....	73
-	Organoleptic tests.....	74

RESULTS AND DISCUSSION

Microbiological Studies

I.	Microbial counts.....	75
1.	Total bacterial count.....	75
2.	Lactic acid bacteria count	81
3.	Yeasts count	87

4.	Lipolytic microorganisms.....	93
5.	Pectinolytic bacteria counts.....	98
6.	Cellulose decomposing bacteria.....	104
7.	Coliform count	108
II.	Identification of special microorganisms	111
1.	Yeasts.....	111
2.	Lactic acid bacteria.....	118
	Chemical changes during fermentation and storage of green olives in brines and fruits.	124
1.	Changes in pH values.....	124
2.	Changes in total titratable acidity.....	133
3.	Changes in the percentage of lactic acid.....	138
4.	Changes in total volatile acids.....	143
5.	Changes in soluble acids in the fruits.....	147
6.	Changes in total sugars in the fruits.....	152
7.	Changes in reducing sugars in the fruits....	158
8.	Changes in total crude-protein.....	164
9.	Changes in true-protein.....	169
10	Changes in ether extract in the fruits.....	173
11	Changes in pectin in the fruits.....	178
12	changes in pectin in the brine.....	182
13	Changes in tannins in the fruits.....	185
14	Changes in tannins in the brine.....	189
15	Changes in vitamin C in the fruits.....	190
16	Changes in vitamin C in the brine.....	194
17	Changes in NaCl in the brine.....	197
18	Changes in NaCl in the fruits.....	200
19	Changes in the moisture of the fruits.....	201
	Organoleptic evaluation of olive fruits after pick- ling and storage	205
1.	After pickling.....	205
2.	At the end of the storage period.....	210
	SUMMARY	212
	REFERENCES	225
	ARABIC SUMMARY.....	