## COMPARATIVE STUDIES OF YEASTS ISOLATED FROM FERMENTED SAPS

OF PALMS IN CEYLON

by

Anandapala Wimalaweera Liyanage

Thesis submitted for the Degree of Master of.

Science of the Vidyodaya Campus of the

University of Ceylon

Department of Chemistry,

Vidyodaya Campus,

University of Ceylon,

Nugegoda,

76815

Ceylon.

76815

April, 1972.

## ABSTRACT

The three types of yeast strains isolated from fermented saps of Coconut, Kithul and Palmyrah belongs to Genera Torulopsis. These have been designated as Cy, Ky and Py for Coconut, Kithul and Palmyrah respectively. Cy, Ky and Py were able to use glucose, raffinose, sucrose, fructose and galactose has sole source of carbon. They yielded alcohol, as estimated by the Micro-diffusion technique (Conway, 1952). These three strains did not grow in maltose and lactose, hence did not produce alcohol. Py grew in 2% (v/v) alcohol, while Cy and Ky did not produce any growth.

The minimum concentration of glucose necessary to obtain maximum growth of Cy and Py in 72 hours were 2% (w/v), while with Ky it was 1.50% (w/v). Experiments with the vitamin requirments indicated that for maximum growth under these conditions biotin and thiamine were essential.

Cy, Ky and Py were found to grow in male of the eighteen amino acids tested as sole source of nitrogen. They assimilated D - isomer of alanine under aerobic conditions and L - isomer of alanine under anaerobic conditions. Of the possible pathways of nitrogen assimilation investigations have been carried out only in deamination and transamination mechanisms. For this purpose, experiments were carried out with cell-free extracts of Cy, Ky and Py. D - amino acid oxidase activity in the extracts was demonstrated by the formation of keto-acids from the corresponding amino acids according to the colorimetric methods of Goodwin and Williams (1952). Transaminase activity was however established by the formation of glutamic acid from 2 - oxo glutaric acid and the amino acids by thin layer chromatography (Sentheshanmuganathan, Rodrigo and Kamalanathan, 1969).

## Table of Contents

*			Page
Abstract		***	1
Acknowle	dgemer	nts	3
Chapter	1	- Introduction	4
	1.1	- Palm saps	4
	1.2	- Fermentation Biochemistry	5
	1.3	- A study of the yeasts palm toddies	16
Chapter	2	- Materials and Methods	17
	2.1	- Collection of toddy samples	17
•	2.2	- Preparation of growth media	17
	2.3	- Chemical materials	19
	2.4	- Microbiological methods	20
	2.5	- Analytical methods	23
Chapter	3	- Nature of Yeasts in Toddy	27
	3.1	- Introduction	27
	3.2	- Isolation and Characterization	27
	3.3	- Nutritional requirements	29
	3.4	- Growth factors	36
Chapter	L <sub>+</sub>	- Experiments with cell-free Systems	40
	4.7	- Introduction	40
	4.2	- Assay of D-amino acid oxidase	40
	4.3	- Properties of racid Oxidase	41
	4.4	- Assay of transaminase activity	46
	4.5	- Quantitative estimation of glutamic acid	48
Chapter	5	- Formation of methyl alcohol by these	
		yeasts during alcoholic fermentation	51

	5.1 -	Introduction	***	51		
5	5.2 -	Investigation for th	e presence of			
		methyl alcohol		51		
Chapter (	5 -	Discussion	***	57		
(	5.1 -	Introduction	***	57		
(	5.2 -	Isolation, characterization and nutritional				
		requirements of yeas	ts	57		
(	5.3 -	Mechanism of the assimilation of amino acids				
		by yeasts	***	63		
•	5.4 -	Investigation for the presence of methyl				
· · · · · · · · · · · · · · · · · · ·		alcohol	***	70		
Suggestions for		future work	***	71		
References		***	***	73		