

DEVELOPMENT OF READY-TO-SERVE
(RTS) FRUIT DRINKS WITHOUT ADDING
PRESERVATIVES

By

K.A Nisansala Kulasooriya.

M.Sc.

2015

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Thesis submitted to the University of Sri Jayewardenepura for the
award of the Master of Science in Food Science and Technology
on 23rd July 2015.

DECLARATION

“The work described in this thesis was carried out me under the supervision Dr.K.H Sarananda, Head- Food Research Unit, Department of Agriculture and Dr. Indira Wickramasinghe, Senior Lecturer, Department of Food Science & Technology, Faculty of Applied Science of the University of Sri Jayawardenapura & a report on this has not been submitted in whole or in part to any university or any other institution for another degree/diploma.”

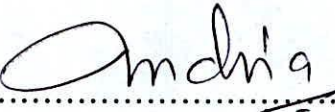
.....Nisansala.....

K.A Nisansala Kulasooriya

Date: 10.08.2015

Declaration

We certify that the above statement made by the candidate is true and that this thesis is suitable for submission to the University for the purpose of evaluation


.....

Dr. Indira Wickramasinghe.

10-08-2015

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Dr. K.H Sarananda.

10-08-2015

TABLE OF CONTENTS

	Page
List of Tables	viii
List of figures	ix
Acknowledgement	x
Abstract	xi
CHAPTER 1 : INTRODUCTION	1
CHAPTER 2 : LITERATURE REVIEW	3
2.1 Fruit drinks	3
2.2 Nutritional quality of fruit drinks	3
2.3 Ready To Serve Fruit Drinks (RTS)	6
2.4 Micro-organism and fruit juice	7
2.5 Preservation of fruit juice	9
2.6 Side effects of artificial preservatives	11
2.7 Organic acid and ester as natural preservatives	
2.7.1 Introduction	13
2.7.2 General mechanism of antimicrobial	
action by acidification of the external medium	
CHAPTER 3 : MATERIALS AND METHODOLOGY	17
3.3 Methods	18
3.3.1 Analysing Market samples	18
3.3.2.1 Measurement of Brix values	18
3.3.2.2 Measurement of pH value	18

3.3.2.3 Measurement of titratable acidity	18
3.3.3 Collection of fruits	19
3.3.4 Selection of fruits	19
3.3.5 Peeling, slicing or halving	19
3.3.6 Extraction of fruit juice	19
3.3.7 Preparation of RTS	19
3.3.7.1 The basic method of preparing the Ready To Serve fruit juice	20
3.3.8 The process flow diagram	21
3.3.9 Total plate count	22
3.3.10 Yeast and Mold count	22
3.3.11 Coliform test	23
3.3.12 Sensory evaluation for selected drinks	23
CHAPTER 4 : RESULTS AND DISCUSSION	19
4.1 Analysing of Market samples	24
4.2 Extraction of juice	25
4.3 Preparation of RTS	26
4.4 Total plate count	27
4.5 Yeast and Mold count	27
4.6 Coliform count	28
4.7 Sensory evaluation of selected drinks	29
4.7.1 Sensory evaluation of Pineapple juice	29
4.7.1.1 Calculation of mean separation value	36
4.7.1.2 Paired wise comparison between samples	38

4.7.2 Sensory evaluation of Mixed fruit RTS	41
4.7.2.1 Calculation of mean separation value	48
CHAPTER 5 : CONCLUSION	52
REFERENCES	53
APPENDICES	55

List of tables

Table. 2.1 : SLS requirements ; Chemical requirements for RTS	7
Table. 2.2 : SLS requirements ; microbiological requirements for RTS	7
Table. 4.1: The physiological parameters of juice.	24
Table. 4.2: Selected acid sugar values.	24
Table. 4.3: The physiochemical parameters of juice obtained from pineapple.	25
Table. 4.4 : The physiochemical parameters of mixed fruit juice	25
Table. 4.5 : Properties of final pineapple RTS	26
Table. 4.6 : Properties of final Mixed fruit RTS	26
Table. 4.7 : Monthly Total plate count of pineapple RTS	27
Table. 4.8 : Monthly total plate count of mixed fruit RTS	27
Table 4.9 : Yeast and mold Pineapple RTS	27
Table 4.10: Monthly yeast and mold count of mixed fruit RTS	28
Table 4.11: Coliform count Pineapple RTS	28
Table 4.12: Coliform count of mixed fruit RTS	28
Table 4.13 – SLS requirements of Microbiological quality for RTS fruit drinks.	29
Table 4.14: Pineapple Colour – Sensory evaluation	29
Table 4.15: Pineapple smell - Sensory evaluation	31
Table 4.16: Pineapple Taste – Sensory evaluation	32
Table 4.17: Pineapple Mouthfeel – Sensory evaluation	33
Table 4.18: Pineapple Overall acceptability – Sensory evaluation	35

Table 4.19: Pineapple paired wise comparison for Colour	37
Table 4.20: Pineapple paired wise comparison for smell	38
Table 4.21: Pineapple paired wise comparison for taste	39
Table 4.22: Pineapple paired wise comparison for mouthfeel	39
Table 4.23: Pineapple paired wise comparison for overall acceptability	40
Table 4.24: Mixed fruit Colour – Sensory evaluation	
Table 4.25: Mixed fruit smell - Sensory evaluation	
Table 4.26: Mixed fruit Taste – Sensory evaluation	
Table 4.27: Mixed fruit Mouthfeel – Sensory evaluation	
Table 4.28: Mixed fruit Overall acceptability – Sensory evaluation	
Table 4.29: Mixed fruit paired wise comparison for Colour	
Table 4.30: Mixed fruit paired wise comparison for smell	
Table 4.31: Mixed fruit paired wise comparison for taste	
Table 4.32: Mixed fruit paired wise comparison for mouthfeel	
Table 4.33: Mixed fruit paired wise comparison for overall acceptability	

List of Figures

	Page
Figure 2.1: The weak-acid theory of microbial inhibition by cytoplasmic acidification.	16
Figure. 3.1 : Process flow of RTS	21

ACKNOWLEDGEMENTS

Firstly, I would like to express my sincere appreciation and gratitude to my supervisor, Dr K.H Sarananda, Head- Food Research Unit, Department of Agriculture for his guidance during my research. Her support and inspiring suggestions have been precious for the development of this thesis content.

I would also like to express my special appreciation to Dr. Indira Wickramasinghe, Senior Lecturer, Department of Food Science and Technology, Faculty of Applied Sciences, University of Sri Jayawardenepura for her guidance during my research.

And I wish to express my special appreciation and heartfelt thanks to Dr R.A.U.J.Marapana, Senior Lecturer, Department of Food Science & Technology, Faculty of Applied Sciences of the University of Sri Jayawardenapura, who have been a tremendous support in microbiology testing.

I wish to express my sincere thanks to all the lecturer and the staff members of Department of Food Science and Technology, Faculty of Applied Sciences, University of Sri Jayawardenepura for all the support provided throughout the two years as a post-graduate student.

I am very grateful to my family, friends and my colleagues who always stood by me and gave the necessary encouragement and support whenever required.

ABSTRACT.

Microbial safety of commercially available RTS is achieved by adding higher levels of preservatives than recommended. Chemical preservatives at higher intake results in health problems. Hence this study was carried out to find out to produce RTS without adding chemical preservatives.

For level of acidity was selected and to protect their sensory properties the same Brit/Acid ratio was maintained. Both pineapple and mix fruit juices prepared using higher levels of acids were sensory evaluated for their suitability of consumption. Brit/Acid ratio 14.8/0.32 was a final to be significantly acceptable for both juices.

Microbial studies showed all the treatments were free of microbial growth even without added chemical preservatives. No microbial growth was observed in commercial Brit/Acid ratio. Hence higher acid level added treatments can commercially be recommended to produce RTS without significant changing of sensory properties. Hence preservatives added for the preservations of RTS can be eliminated by increasing acid level through maintaining Brit/Acid ratio.

CHAPTER 1

INTRODUCTION

There is a trend of mankind shifting from artificial and synthetic life style in to a nature close life style. Therefor food patterns also shifting from artificial foods to natural foods. When considering beverage industry, a market demand exists globally and locally, for natural based beverages. Hence the manufacturing of RTS beverages using natural fruits are worthwhile.

Sri Lanka is a country which produce about 855,000 metric tons of fruits annually. This comprises of over 50 fruit varieties grown in different agro-climatic regions. These fruits are very high in nutritional quality due to our agricultural rich lands all over the country [Esham *et al* 2006].

Ready to serve fruit drinks have become popular due to its appeal to consumers who are seeking health benefits in there beverages and also awareness of health problems in traditional nonalcoholic beverages such as coca-cola, pepsi etc. Such as dental erosion and bone fractures [Wyshak.,2000].

Preservation is an important event in RTS drink manufacturing to maintain the quality and nutritional attributes while preventing spoilage. Preservation is aimed at achieving the self-life prolongation of foods. Present tendencies are based on the employment of certain methods which ensure qualitative products, less preserved, with no additives, with nutritional value, but also safe from the microbiological point of view [Gould., (2000)].

Preservatives are defined as substances able to inhibit, stop or delay the growth of microorganisms or any deterioration of aliments due to microorganisms. The

preservation methods used in the self-life extension process include water removal, temperature control, freezing, drying, pH control, and irradiation, vacuum packaging, modified atmosphere packaging, aseptic packaging, acidification, fermentation, heating (pasteurization and sterilization) and chemical preservatives addition. The preservation techniques are aimed to slow down the changes, which cause foods deterioration, due to a large number of physical, chemical, enzymatic or biological reactions [Gould., (2000)].

Using of chemical preservatives are most common method in last decades. The benzoic acid, acetic acid and sorbic acid together with propionate and sulphur dioxide are acid preservatives used in a large scale in foods and soft drinks preservation. The conditions met in many preserved aliments (small values of water activity, low pH, the presence of preservatives, carbon dioxide or ethanol, the lack of oxygen) are not just right environment for the growth of microorganisms. Yeasts and fungi play a major role in the alteration process of the foods preserved at a low pH, with low values of water activity, with or without preservative addition. The yeasts which produce alteration include *Zygosaccharomyces*, as well as *S. cerevisiae*. These species can grow in the presence of large quantities of acids used in food preservation at some pH values lower

Currently consumers preferred to have “No added chemical preservatives” label drinks due to some adverse effects of chemical preservatives such as benzoates and metabisulphites. Though the RTS drinks consume directly from the bottle without dilution, effects of the preservatives can increase.

Objective

- To produce Pineapple and Mixed fruit RTS without added preservatives by increasing the acidity while maintaining the same Sugar/ Acid ratio.

CHAPTER 2

LITERATURE REVIEW

2.1 Fruit drinks

Historically, soft drinks were refreshing beverages that copied or extended fruit juices. Fruit juices typically have around 10–12% naturally occurring sugars with a pleasant balancing acidity that varies from about 1% down to 0.1%. It is therefore not surprising that soft drinks were typically formulated around 10–11% sugar content with about 0.3–0.5% of added acid (usually citric). The simplest form of beverage contained such a mix of these basic nutritional components in water with flavoring, coloring and chemical preservatives added as appropriate with the addition of fruit juice to a level of 5–10%, pleasing effect of both taste and appearance could be achieved. Such products were typically described as ‘fruit juice drinks’, ‘fruit drinks’ or ‘crushes’.

2.2 Nutritional quality of fruit drinks

The nutritional value of soft drinks is sometimes exaggerated by manufacturers who want consumers to perceive their products to be of special benefit. That said, the value of soft drinks must not be understated, because they are an essential vehicle for hydration. Soft drinks are usually absorbed more readily than water (because of their osmolality), can replace lost salts and energy quickly and are rapidly thirst quenching. Their balance of sweetness and acidity, coupled with pleasant flavors, makes them attractive to all ages of consumers.

Products are specially formulated to meet the tastes, nutritional needs and physiological constraints of the whole population, from babies to geriatrics.

The claims that are legally permitted for soft drinks vary from country to country but for the most part are limited to nutritional claims concerning energy, proteins, vitamins and/or minerals. Any form of medicinal claim (i.e. curative or symptomatic relief) will almost always be excluded by corresponding medicines legislation. There is, nevertheless, a growing trend to include natural extracts in many soft drinks (e.g. ginseng or ginkgo) and then rely on the general understanding and folklore that surrounds such ingredients to impart the special values that have been attributed to them. There are three main areas of particular nutritional significance for soft drinks. The first is energy. Some soft drinks are formulated to deliver a rapidly assimilated energy boost to the consumer. All carbohydrates are important sources of energy but soft drinks generally contain soluble sugars, which are easy to administer. However, because high levels of sugars are often intensely sweet and even sickly, with a cloying sensation in the mouth, energy drinks are formulated around glucose syrup.

The second area of nutritional significance is that of the so-called isotonic drinks, which are of equivalent osmolality to body fluids. They promote extremely rapid uptake of body salts and water, and are very important products for sportspeople and others requiring almost instant hydration.

Third, soft drinks have been widely formulated to low-calorie forms and these are now available for those who wish to enjoy such beverages and yet minimize their calorific intake. [Ashurst., (2005)]

Other nutritional benefits that are claimed by some producers include the delivery of essential vitamins and minerals, especially to children.

Nutrients frequently consumed in sub-optimal concentrations by humans are proteins, calcium, iron, vitamin A, thiamin (vitamin B1), riboflavin (vitamin B2) and ascorbic acid (vitamin C). Some of these nutrients occur in higher concentrations in fruit juices than in