APPROVED

MINUTES VISAYAS STATE COLLEGE OF AGRICULTURE ViSCA BOARD
OF TRUSTEES HELD ON APRIL 13, 1982 AT THE
PASUC CONFERENCE ROOM, MEC,
MANILA

APPROVED

MINUTES OF THE 46th (SPECIAL) MEETING OF THE ViSCA BOARD OF TRUSTEES HELD ON APRIL 13, 1982 AT THE PASUC CONFERENCE ROOM, MEC, MANILA

Present:

Hon. Abraham I. Perlas — Presiding Officer
Deputy Minister of Education and Culture
(Represented Minister O. D. Corpuz, Chairman)

DECISIONS/AGREEMENTS MADE BY THE BOARD OF TRUSTEES

Hon. F. A. Bernardo — Vice Chairman
President, Visayas State College of Agriculture
Baybay, Leyte

ITEMS — **PAGE**

Typhoon Damage at ViSCA

During the last typhoon that passed through the Visayas, ViSCA lost fruit trees, suffered roof damages in six buildings,

APPROVED

MINUTES OF THE 46th (SPECIAL) MEETING OF THE ViSCA BOARD OF TRUSTEES HELD ON APRIL 13, 1982 AT THE PASUC CONFERENCE ROOM, MEC, MANILA

Present:

Hon. Abraham I. Felipe — Presiding Officer
Deputy Minister of Education and Culture
(Represented Minister O. D. Corpuz, Chairman)

Hon. F. A. Bernardo — Vice Chairman
President, Visayas State College of Agriculture
Baybay, Leyte

Hon. Jose M. Lawas — Member
Assistant Director General, NEDA
CB Pasay City

Others Present:

Prof. Andres F. Duatin — Secretary
College Secretary, ViSCA

Mr. John S. Imlan — Representative
Executive Assistant
PASUC

I. Preliminaries:

A. Approval of the Proposed Agenda:

The agenda were approved as presented.

B. Report of the College President

1. College Commencement Exercise 1982

"The ViSCA 29th collegiate commencement exercises woro postponed from April 6 to April 18, with Hon. Salvacion Oppus Yniguez, provincial governor of Southern Leyte, as the guest speaker," Pres. Bernardo reported.

2. Typhoon Damage at ViSCA

During the last typhoon that passed through the Visayas, ViSCA lost fruit trees, suffered roof damages in six buildings,

and complete damage of a new bicycle stand, all worth some P120,000.00.

3. Memorandum of Agreement with KKK

"At the request of Cebu leaders, we signed a memorandum of agreement for the College to serve as a training center for various KKK training programs. Expenses for such training programs shall be advanced by ViSCA," Pres. Bernardo informed the Board.

Dr. Lawas inquired what areas of training have been agreed upon by ViSCA and the KKK leaders. "That would depend on perceived needs of the trainees and the commodities in the area," Dr. Bernardo answered.

4. ViSCA to Host the PSYSC 1982 Conference.

"Young scientists from various secondary schools, mostly science high schools in the country, will hold the annual conference of the Philippine Society of Youth Science Clubs, Inc. in ViSCA from April 25 to May 1 this year," Pres. told the Board.

In this connection, Pres. Bernardo requested the Board to allow the College to appropriate P25,000.00 for the said conference for transportation, banquet, snacks, etc.

The Board passed:

Resolution No. 91-A, s. 1982

Approving the recommendation of the College President to allot the amount of P25,000.00 chargeable to College funds, for transportation, banquet, snacks, etc., for the national conference of the Philippine Society of Youth Science Clubs, Inc., to be held at ViSCA from April 25 to May 1, 1982, subject to auditing rules and regulation.

Approved

II. Ratification of the Minutes of the Previous Meeting:

The minutes of the Board meeting held last March 17, 1982 were approved.

B. Matters Arising from the Approved Minutes:

None.

C. For Approval/Ratification/Confirmation

A. Administrative Matters

1. Conferring of Honorary Degrees

a. Minister Manuel S. Alba, Doctor of Development Education, honoris causa. In the previous meeting of the Board, the plan to confer honorary degrees to deserving men was discussed including the legal aspect of implementing the same. It was later confirmed that there are no legal impediments for ViSCA to offer honorary degrees, even a doctorate degree.

For the contributions that Minister Alba has done for the development of ViSCA and its educational programs, the Board passed:

Resolution No. 92, s. 1982

Approving the recommendation of the ViSCA Academic Council (AC) to confer upon Dr. Manuel S. Alba, Minister of Budget, the degree of Doctor of Development Education, honoris causa, to be administered on June 19, 1982, at the Visayas State College of Agriculture, Baybay, Leyte.

Approved

b. Mr. Edilberto A. Hinay, Bachelor of Agricultural Technology honoris causa.

For "The Hinay Oven Complex" and the "Hinay Bahalina Produced from Coconut Water," and five other worthwhile accomplishments and his notable involvements in research, the Academic Council (AC) recommended the awarding of a bachelors honorary degree to Mr. Edilberto A. Hinay.

The Board passed:

Resolution No. 93, s. 1982

Approving the recommendation of the Academic Council (AC) to confer upon Mr. Edilberto A. Hinay, Coconut Project Farm Manager, the degree of Bachelor of Agricultural Technology *honoris causa* to be conferred during the 29th College commencement exercise, Visayas State College of Agriculture (ViSCA) on April 18, 1982, at Baybay, Leyte. (Appendix B)

Approved

B. Academic Matters:

1. Candidates for Graduation, Collegiate, 1982

Pres. Bernardo recommended that the Academic Council (AC) be given complete authority to approve the graduation of the candidates for graduation at the college level provided that the list of graduates shall be submitted later for notation of the Board. The Board passed:

Resolution No. 93-A, 1982

Approving the recommendation of the College President, giving the Academic Council (AC) the complete authority to approve the graduation of the candidates for graduation at the college level for this particular school year only, provided that the list of graduates shall be submitted to the Board in its next meeting for notation.

Approved

Other Matters:

A. Appointment of a Legal Officer on Part Time/Trial Basis

ViSCA's legal officer left with her husband on study leave abroad, leaving the position of the legal officer vacant. The college has some legal matters to be settled every now and then which necessitates the employment of another lawyer.

Atty. Guiraldo Fernandez, the only local lawyer available for employment on part-time contractual basis, was recommended for the

position.

The Board passed

Resolution No. 94, s. 1982

Approving the recommendation to employ Atty. Guiraldo Fernandez as Legal Officer on part-time, trial basis the compensation to be determined by the college, based on usual hiring rates, subject to Civil Service rules and regulations.

Approved

B. Appointment of Personnel

The appointment of personnel included the (1) recruitment of two (2) staff members; (2) reclassification of two staff members, and (3) change of status to permanent of one staff member (Appendix D).

The Board passed the following resolutions:

Confirming the appointment of:

1. Ms. Tessie U. Cabela as Instructor at ₱19,584.00 p.a., effective February 16, 1982;
2. Mr. Nestor L. Pido as Instructor at ₱14,532.00 p.a., effective February 16, 1982. (Appendix D)

Approved

Resolution No. 95-B, s. 1982

Approving the reclassification of the following academic staff members:

1. Oscar L. Colis from Assistant Prof. II to Associate Prof. I; and
2. Rogelio A. Jaime from Assistant Prof. I to Assistant Prof. IV. (Appendix D)

Approved

position.

The Board passed:

Resolution No. 94, s. 1982

Approving the recommendation to employ Atty. Guiraldo Fernandez as Legal Officer on part-time, trial basis to take effect upon approval of his appointment, the compensation to be determined by the College, based on usual hiring rates, subject to Civil Service rules and regulations.

Approved

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Approved

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2. Rogelio A. Jaime from Assistant Prof. I to Associate Prof. I. (Appendix D)

Approved

Resolution No. 95-C, s. 1982

Noting the permanent appointment of Prof. Veronico S. Subere as Assistant Professor at the Dept. of Animal Science and Veterinary Medicine effective April, 1982. (Appendix D)

Approved

There being no other matter to discuss, the presiding officer adjourned the meeting at 1:02 p.m.

Certified True & Correct:

ANDRES F. BUATIN
Secretary

Attested:

ABRAHAM I. FELIPE
Presiding Officer

APPROVED AS CORRECTED:

JUNE 11, 1982

APPENDIX A

BIO-DATA

Dr. MANUEL S. ALBA
Home Address: Iloilo City, Philippines
Birthdate: May 15, 1939

Current Positions

Cabinet Minister for Budget and Management
Member of the National Legislative Assembly (Parliament) and Chairman of its Appropriations and Reorganization Committee
Member of the Executive Committee of Government
Member, National Economic and Development Authority (The Planning Ministry) and Chairman of its Development Budget Coordinating Committee
Member, Board of Directors of Eight (8) Government Owned and Controlled Corporations
Member of Seven (7) Cabinet Committees

Academic Attainment and Experience

Academic Degrees

Ph.D. in Business Administration and Management Science, Northwestern University (Chicago)
Master of Business Administration, University of Minnesota (Marketing and Transportation)
Bachelor of Science in Business Administration, University of the Philippines
Doctor of Technology (honoris causa), Technological University of the Philippines
Award Winner; Outstanding Doctoral Disseration in Marketing, American Marketing Association Doctoral Competition, 1968
Professional License: Certified Public Accountant (CPA, 1958)

Academic Positions

Professor of Business Administration and Marketing, University of the Philippines, College of Business Administration (On Leave)
Chairman, Department of Marketing and Director of Graduate Business Studies, University of the Philippines (1961-1969), and Chief of Business Research
Acting Dean, College of Business Administration, University of the Philippines (1969)
Director, Technology and Development Institute, East West Center Honolulu, Hawaii, USA
Member, Board of Trustee, University of Life
Member, Board of Trustee, Philippine Womens University
Board Member, Fund for Assistance to Private Education

Membership in Professional and Other Associations

National

Member and President (1981), Philippine Economic Society
Member, Philippine Institute of Certified Public Accountants
Member, Philippine Marketing Association
Honorary Member, Philippine Association of Marketing Executives
Member, Philippine Social Science Council (1980-1981)
Member, U.P. Business Research Foundation
Member, SGV Foundation, Inc.
Member, Small Enterprise Resources Development Foundation
Member, UNESCO National Commission

International

Trustee and Founding Member, International Center for Living Aquatic Resource Management (Manila)
Member, American Management Association
Member, American Marketing Association
International Association of Planning Officials
Member, Society for International Development
Advisory Committee, United Nations Center for Regional Development

Honors and Awards

Outstanding Certified Public Accountant
in Government (1981)
in Professional Development (1980)
American Marketing Association, For Outstanding Doctoral Disseration in Marketing (1968)
Honoris Causa Doctorate, Technological University of the Philippines and De La Salle University
Outstanding Alumnus for 1980, University of the Philippines

Publications

Monographs on:

Education, Technology and Development
Economic Development in Pacific Area
Education for National Development

Published Articles (31) on the following topics:

Development Education
Development Administration
Development Planning
Marketing Management
Technology Adaptation
Manpower Planning and Development
Trade and Development
Educational Finance
Small Industry Development
Public Policy and Development
Project Management
Regional Planning and Development
Technology and Science Policy
Business Education and Development
Public Leadership and Development
Institution Building
Entrepreneurship
Communication and Development
Tariff Policy

APPENDIX D

March 26, 1982

Dr. F. A. Bernardo
President, ViSCA
Baybay, Leyte

Dear Sir:

The committee duly appointed to evaluate the achievements of Edilberto A. Hinay for the possible granting of the Bachelor of Agriculture degree honoris causa this coming April 1982 graduation hereby submits the following documents: "The Hinay Oven Complex" and the "Qualitative and Economic Evaluation of Hinay Bahalina Produced from Coconut Water."

The Hinay Oven is not only useful to the rural people but also to research activities in the academic community. The Hinay Bahalina produced from coconut water utilizes waste product and saves coconut inflorescence.

Mr. Edilberto A. Hinay has other accomplishments and involvements worth mentioning:

1. Has made a charcoal kiln that can produce quality charcoal from coconut shells and husks,

2. Has added an accessory to the ViSCA copra dryer for drying other crops such as palay, corn, mungo, chips of root crops, etc.,

3. Has served as lecturer on the topic "Harvesting and Copra Processing" during the farmers' training on "Coconut Hybridization, Replanting and General Cultural Practices" conducted last summer 1980 where he was rated one of the best lecturers by the trainees,

4. Has been chosen "Most Outstanding Farmer of the Year" and was awarded a certificate of merit by the Baybay Jayceerettes on April 11, 1973, and,

5. Co-authored with Dr. Ly Tung in a scientific article entitled "Copra Drying, Comparison Between the Recommended Practice and Farmers' Practice on Splitted-Nut Arrangement Before Drying" published in the Annals of Tropical Research, Vol.1 No.2.

Furthermore, he has attended seminars on "Coconut Hybridization and Replanting Program" conducted at ViSCA from December 15-17, 1978 and "Food Processing and Preservation" conducted by NIST at ViSCA from October 22 to November 20, 1979 and has completed training courses on "Culinary Arts" and "Tailoring" conducted by the National Manpower Youth Council from January 5 to March 13, 1970 and May 11 to June 17, 1970, respectively, at Sogod National Trade School in Sogod Southern Leyte.

The committee hereby favorably recommends the granting of the Bachelor of Agriculture degree honoris causa to Mr. Edilberto A. Hinay on the basis of the notable achievements involving his oven and bahalina production.

Very truly yours,

DR. LY TUNG
Chairman

MR. OSCAR D. MONERA
Member

ENGR. ROQUE DE PEDRO
Member

DR. JOSE SAI TAN
Member

THE HINAY OVEN COMPLEX

One of the outstanding accomplishments of Mr. Edilberto A. Hinay, farm manager of the coconut project of the Regional Coconut Research Center (RCRC) based at the Visayas State College of Agriculture (ViSCA), is the invention of a multipurpose oven using coconut husk charcoal as fuel.

In 1979, when the Regional Coconut Research Center (RCRC) started researches on coconut hybridization to produce hybrids for increased coconut production throughout the country, the problem of drying coconut pollen grains cropped up. The Memert oven, purchased for drying coconut pollen could not be made operational because ViSCA did not have sufficient electrial power to run that equipment.

Such critical problem led to the invention of the Hinay Oven complex. Mr. Edilberto Hinay constructed a multipurpose oven using coconut husk charcoal as fuel. Since then, this oven has been used by RCRC for drying coconut pollen for hybridization purposes. It has been in operation for more than one and a half years. During this developmental stage, the oven has undergone improvements in its drying effeciency. The details of the improved oven are shown in Figures 1 to 7 and as illustrated in Fig. 3, it is composed of three compartments. The first compartment is utilized for baking heavy and light cakes, cookies, and other pastries. It is also used by several thesis students conducting drying studies. The temprature in this compartment ranges from 80 to 140°C. However, for cooking heavy cakes, the addition of live coconut husk charcoal (2-3 pieces) in the fuel container is necessary to attain a temparature range from 100 to 177°C.

The second compartment with temperature that ranges from 50 to 60°C is used for drying leaves for laboratory specimens as well as sterilizing bottles used as jelly jars, gallons for vinegar production, and vials for laboratory use. Mr. Hinay has also found this temperature of 50-63°C sufficient for drying rasped or chipped root crop tubers.

The third compartment with a temperature ranging from 36-41°C is the one utilized to dry coconut pollen grains for the coconut hybridization project of the RCRC . This compartment is also used for drying kitchen utensils and flowerittes for wedding and birthday cakes. This could also serve to artificially hatch eggs since the temperature requirement for egg hatching ranges from 38-39.5°C. However, no experiment has been done yet to test its efficiency for such function.

The Hinay Oven Complex is made up of locally available materials like ordinary wood, marine plywood, clay pot or ferocement furnace for the coconut husk charcoal, and wire screen. The bill of materials is shown in Table 1 with an amount spent for constructing the oven approximately ₱1,000 (1981 price). This amount includes the cost of materials and labor. However, if the oven is constructed by the user himself, the cost of the oven is lowered by ₱375 (Table 1).

Aside from its usefulness in the Regional Coconut Research Center (RCRC), this could be the village housewives' oven for making home-baked products and other pastries.

The operation of this multipurpose oven is simple. It does not have sophisticated gadgets requiring specialized skills as in the case of modern ovens. Furthermore, it is believed to be acceptable to the village user since it does not require electricity in its operation. Rather, it could be operated by using husk charcoal as fuel which is cheap and locally available.

The efficiency of this oven however, depends upon the quality of husk charcoal and the surrounding temperature. Husk charcoal fed as fuel must be of a higher quality to produce quality products. One clay pot could contain from 1,000 to 1,400 g of husk charcoal and burns for approximately 8 hours. While only 45-60 minutes is required to bake cakes, a duration of 36-40 hours or a use of 5 to 6 pots of fuel is necessary to dry pollen grains.

Table 1. The Bill of Materials of Hinay's Oven Complex.

Description	Unit	Quantity	Unit Price	Amount
1. Lumber, 2" x 2" x 12"	pcs.	2	₱ 2.20/bd ft	₱ 22.00
2. Lumber, 1" x 2" x 12"	pcs.	13	2.80/bd ft	72.00
3. Plywood, ¼" x 4' x 8'	pcs.	4	40.00	160.00
4. Plywood, 1" x 4' x 8'	pcs.	¼	100.00	25.00
5. G.I. sheet, 1/8" x 4' x 8'	pcs.	3	31.00	93.00
6. Steel bar, ½" x 20"	pcs.	4	20.00	80.00
7. Screen wire	m	3	25.00	75.00
8. Hinges, 1" x 2"	pcs.	10	2.00	20.00
9. Handle	pcs.	5	1.50	7.50
10. Roller bearing	pcs.	3	8.35	25.00
11. Single row ball bearing	pcs.	1	22.00	22.00
12. Barrel bolt	pcs.	6	2.25	13.50
13. Nail, 2½"	kg	1	8.00	8.00
14. Nail, 1"	kg	½	8.00	4.00
15. Angle bar, 1" x 1"	m	1	3.00	3.00
16. G.I. wire	m	4	.40	1.60
		TOTAL COST OF MATERIALS		₱631.60
		COST OF LABOR		375.00
		TOTAL COST OF OVEN		₱1,006.60

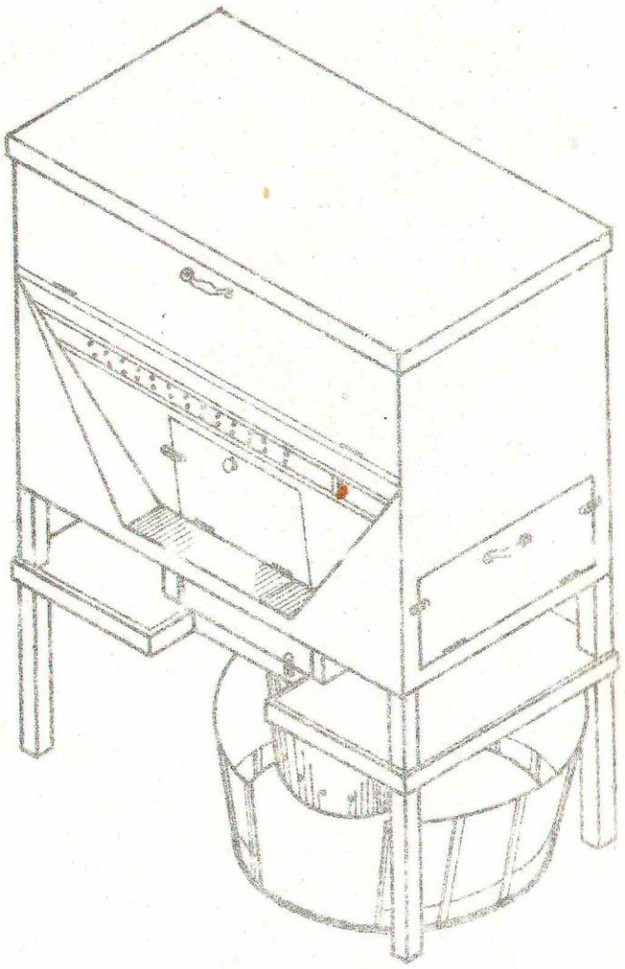


FIG. 1. ISOMETRIC OF THE MACHINE
Scale: 1 : 20 meter

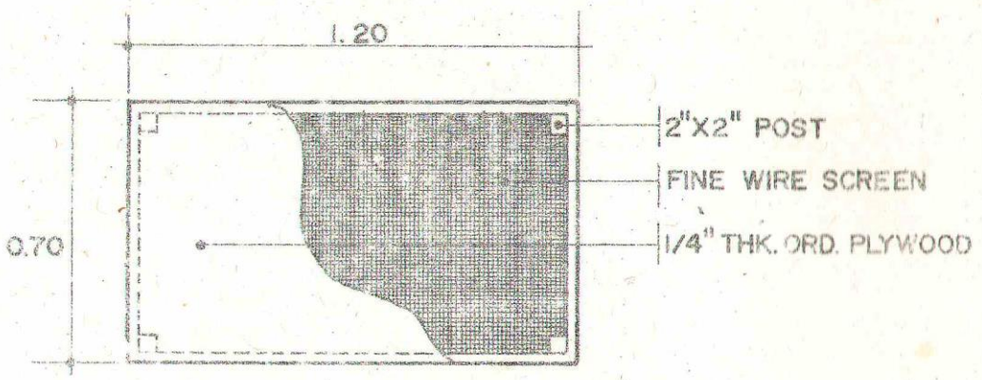


FIG. 2. PLAN VIEW
Scale: 1:20 meter

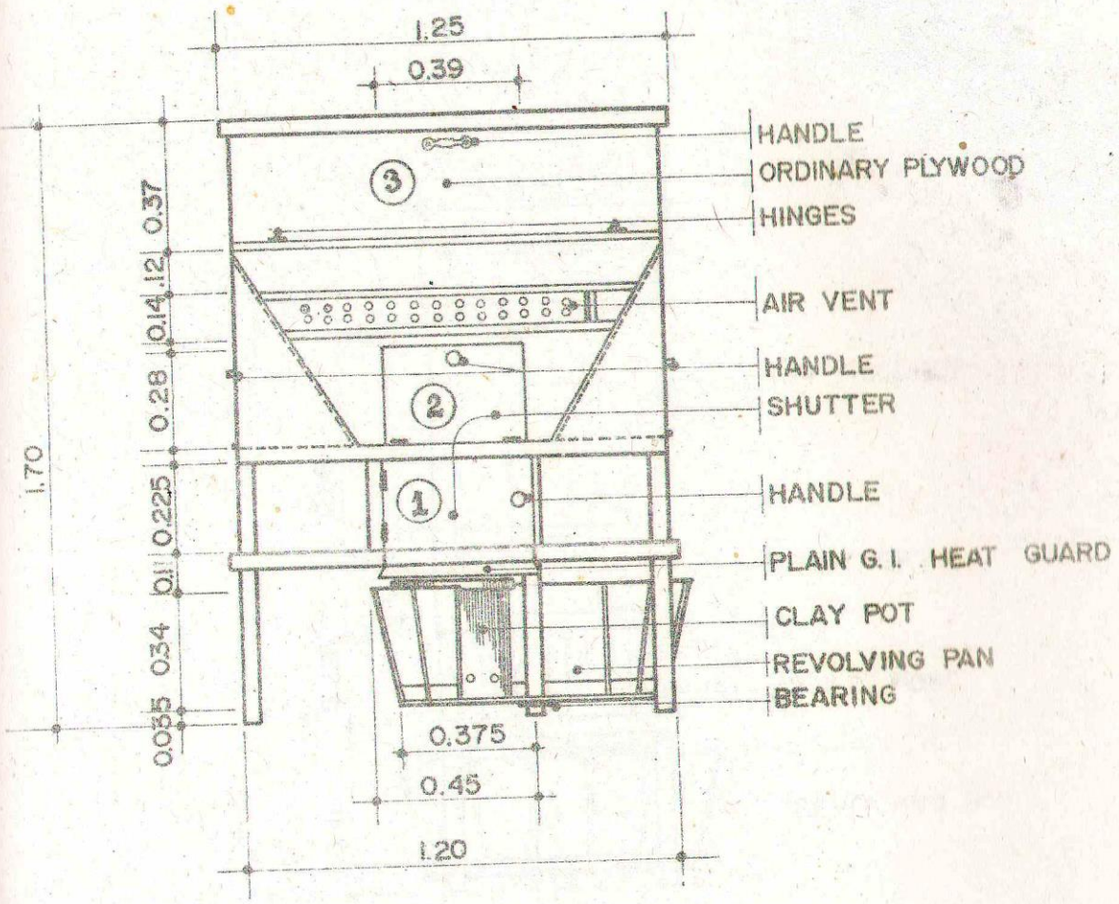


FIG. 3. FRONT ELEVATION
Scale: 1:20 meter

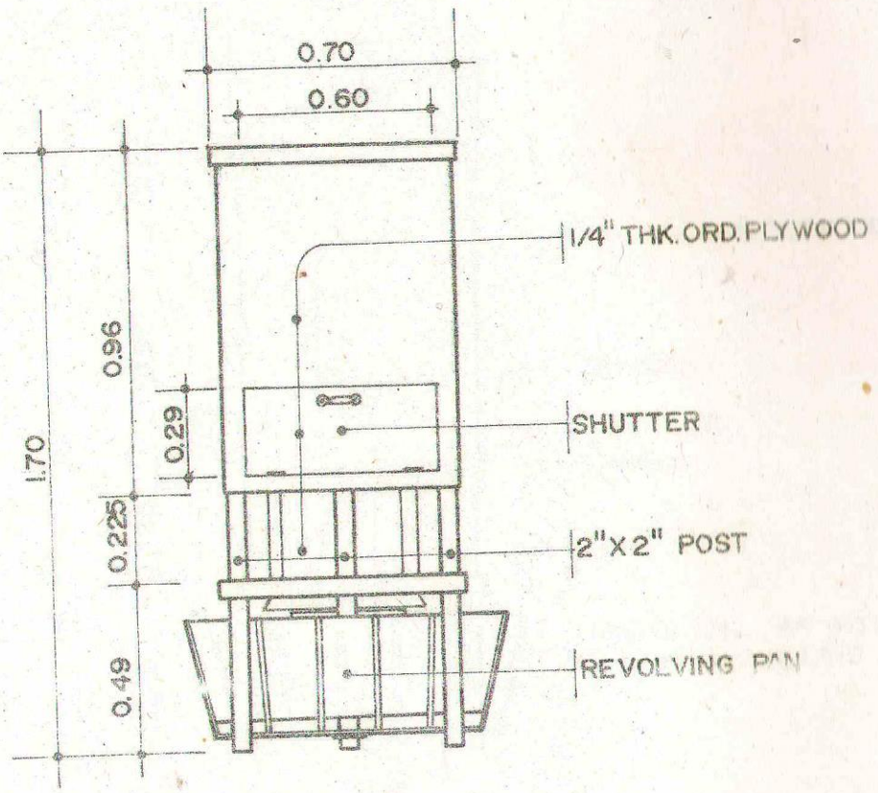


FIG. 4. RIGHT SIDE ELEVATION
Scale: 1:20 meter

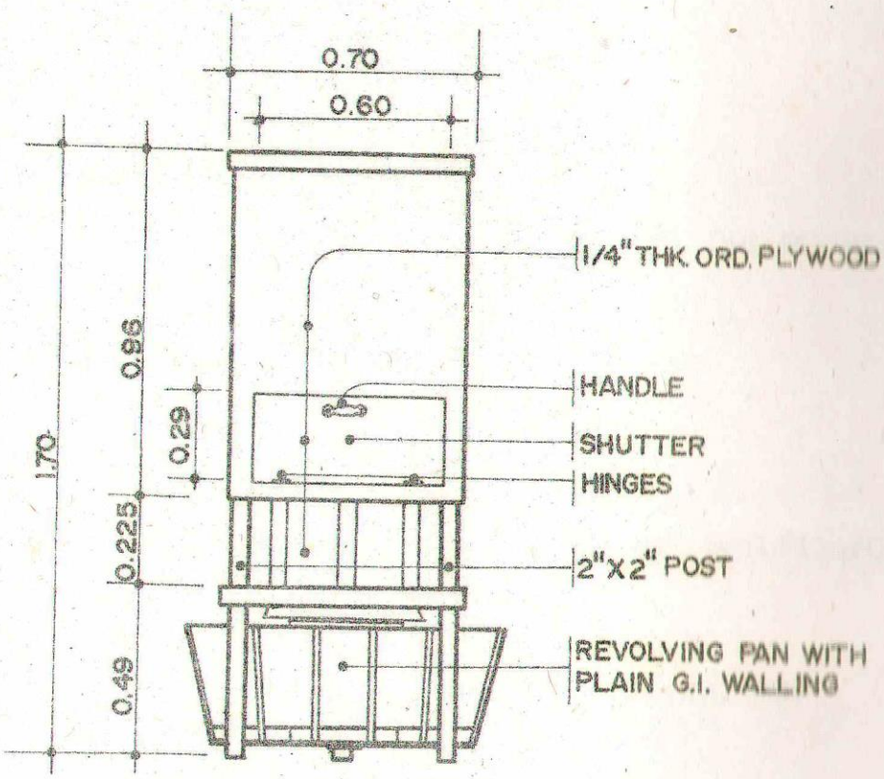


FIG. 5. LEFT SIDE ELEVATION
Scale: 1:20 meter

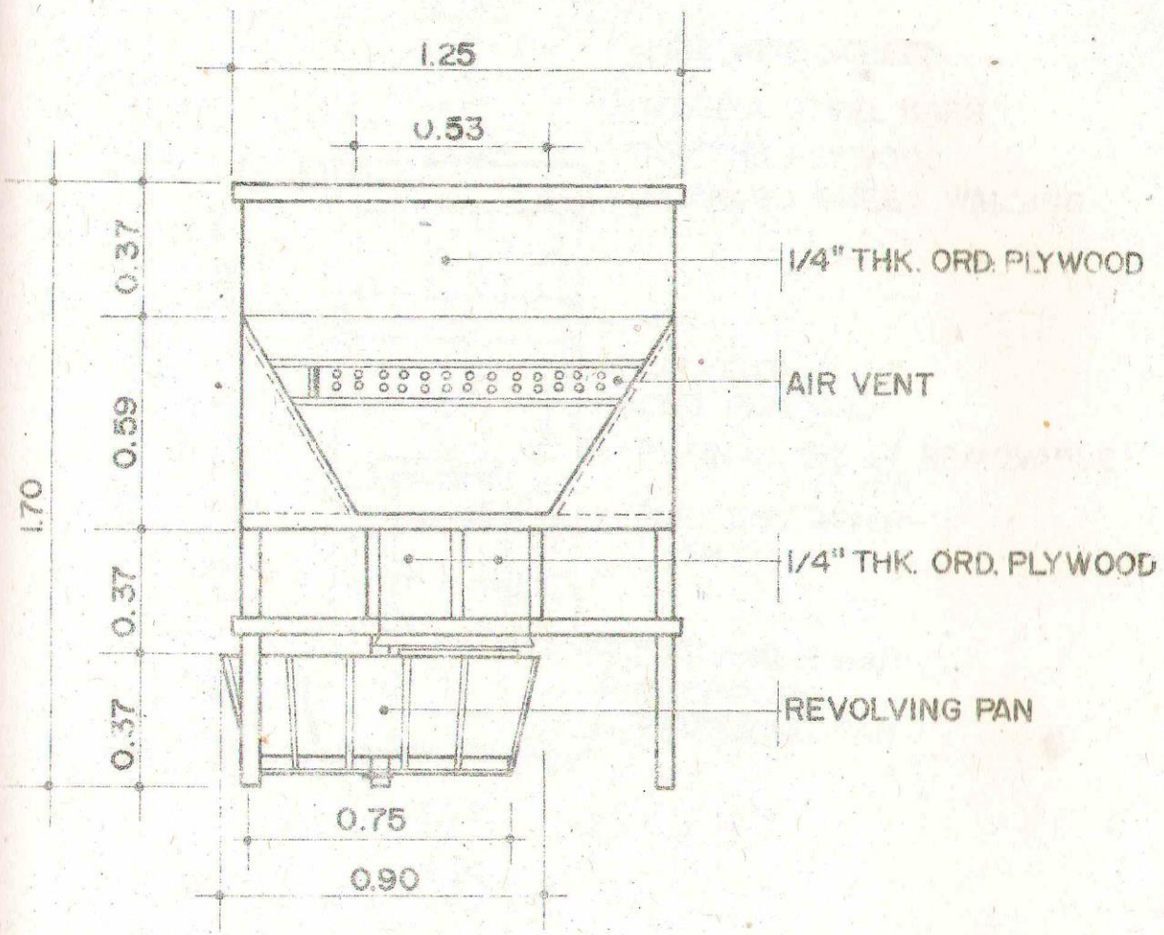


FIG. 6. REAR SIDE ELEVATION
Scale: 1:20 meter

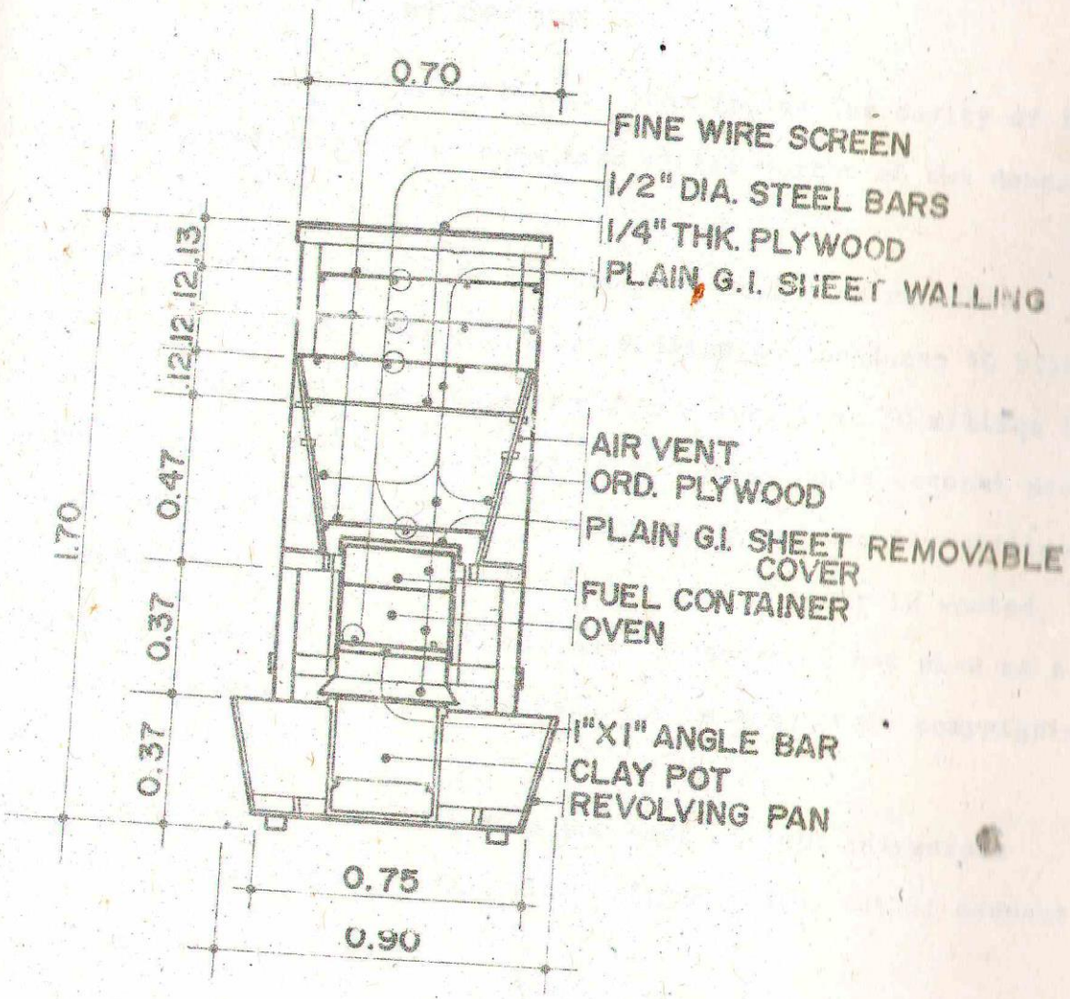


FIG. 7. TYPICAL CROSS SECTION
Scale: 1:20 meter

COMPARATIVE CHEMICAL EVALUATION OF TUBA FROM COCONUT WATER AND FROM COCONUT SAP

INTRODUCTION

Coconut water is the turbid liquid found inside the cavity of fresh coconuts. It constitutes about one-third of the weight of the dehusked nut.

The efficient utilization of the coconut water has remained a problem in the coconut industry. If the Philippines produces 10 billion of the one-kilo nuts per year, this represents more than 30 million tons of coconut water. However, both in small and large scale coconut processing, only a minimal portion of the coconut water is actually utilized, especially for food. Since the bulk of the coconut water is wasted, this represents not only as a lost business opportunity but also as a pollution risk, which the national government is vigorously compaigning against.

There is therefore a need to find new uses of this indigenous resource, one of which is the possibility of making tuba out of coconut water.

OBJECTIVES OF THE STUDY

This study aims to:

1. produce tuba from coconut water, and
2. make a comparative chemical evaluation of the tuba from coconut water and from coconut sap.

REVIEW OF LITERATURE

Fresh tuba is conventionally produced by adding pulverized mangrove bark or "tungog" into coconut or nipa sap. Usually, this is drunk fresh

or after a day. Analysis showed that tuba is nutritious (Table 1).

Table 1. Nutrient, mineral and vitamins content of tuba per 100 ml (Anonymous, 1978).

Protein	9.20g	Iron	0.20mg
Fat	0.30g	Thiamine	0.01mg
Carbohydrates	7.40g	Riboflavin	0.02mg
Ash	30g	Niacin	0.40mg
Calcium	38mg	Ascorbic Acid	8.0mg
Phosphorus	7.0mg		

In Ceylon, a method to preserve fresh coconut sap (Sweet toddy) for at least six months had been developed. The method consists mainly of appropriate heat sterilization for a particular type of bottle container (Mohanadas, 1974).

In the Eastern Visayas region, the "bahalina" is preferred. "Bahalina" is produced by an anaerobic fermentation and aging of tuba with continuous removal of the slimy residue through decantation. Aerobic fermentation and/or the presence of the slimy residue (precipitate) leads to acetic acid production.

The composition of coconut water varies with maturity. However, typical values for coconuts grown in the Philippines have been determined as follows: total solids, 4%; fat, 0.02%; protein (N x 6.25), 2.07%; ash, 0.57%; and reducing sugars, 1% (Hagenmaier, 1980). Aside from these, the coconut water also contains maleic, shikemic and quinic acid, other sugars, amino acids (Anonymous, 1961), nucleic acids (Mondal and Biswas, 1970), growth factors (Serrano et al., 1967) and some electrolytes (Kumar, et al., 1975).

The water from young nuts is sweet and usually drunk fresh. It may also be preserved to a certain length of time (Olaivar, 1978). However, the water from mature nuts is not usually drunk fresh because its flavor is inferior to that from immature nuts. Since the major component of the coconut water is carbohydrates, it can be a promising substrate for alcohol fermentation. Among the alcoholic beverages where coconut water can be used as the raw material is in tuba production.

METHODOLOGY

I. Preparation of Tuba

A. Ingredients

coconut water

brown or white sugar

pulverized bark or tungog

Fleschmann's dry yeast

B. Materials

cheese cloth	measuring spoon
rubber band	sterilized gallon bottles
brown paper	thermometer
cup	kettle

C. Procedure

1. Tuba from coconut water

Coconut water was collected by splitting mature but ungerminated nuts. The coconut water was strained through a cheese cloth to remove foreign particulates. Then one part of brown (or white) sugar was mixed with six parts of coconut water (v/v) in a kettle and the mixture

heated at 65°C for 20-30 minutes.

Three-and-a-half liters of the hot solution were transferred into previously sterilized one-gallon jar. The jar was immediately covered (capped) and the solution was allowed to cool. After cooling, ½ teaspoon of the Fleschmann's dry yeast was added and the jar was covered by folding a piece of brown paper (cartolina or wax paper) over the mouth of the jar and tying it loosely with a rubber band. The mixture was shaken briefly. After an hour, three teaspoonfuls of pulverized bark, or tungog, were added and mixed. The jar was again covered and the mixture allowed to stand overnight.

After 12-24 hours, another three teaspoonfuls of pulverized bark or "tungog" were added and the mixture shaken briefly. The mixture was allowed to ferment for one week, after which the clear solution was decanted carefully into another sterilized gallon-jar. Decantation was repeated weekly during the next two months. After two months, the wine was allowed to age for another month. (For better flavor, the wine may be aged up to six months).

2. Common Tuba

As a control, fresh tuba (with "tungog") was bought from the tuba gatherer and strained through a cheese cloth. Three-and-a-half liters of the fresh tuba were placed in a previously sterilized gallon-jar and covered with a piece of brown paper tied loosely with a rubber band. The fresh tuba was allowed to stand for about 7 days after which it was decanted into another sterilized gallon jar. Decantation was also repeated as in C_1.

II. Analysis

Analysis were conducted at the following intervals. Days 0*, 1, 3, 5, 10, 14, 21, 28, 42, 56, 84. The following parameters were being monitored: (a) total soluble solids by refractometric method; (b) sugars and related substances by the method of Dubois et al., 1956 (Appendix 1); (c) alcohol content by specific gravity method (Appendix 2); (d) titratable acidity by NaOH titration (Appendix 3) and (e) pH by using a pH meter.

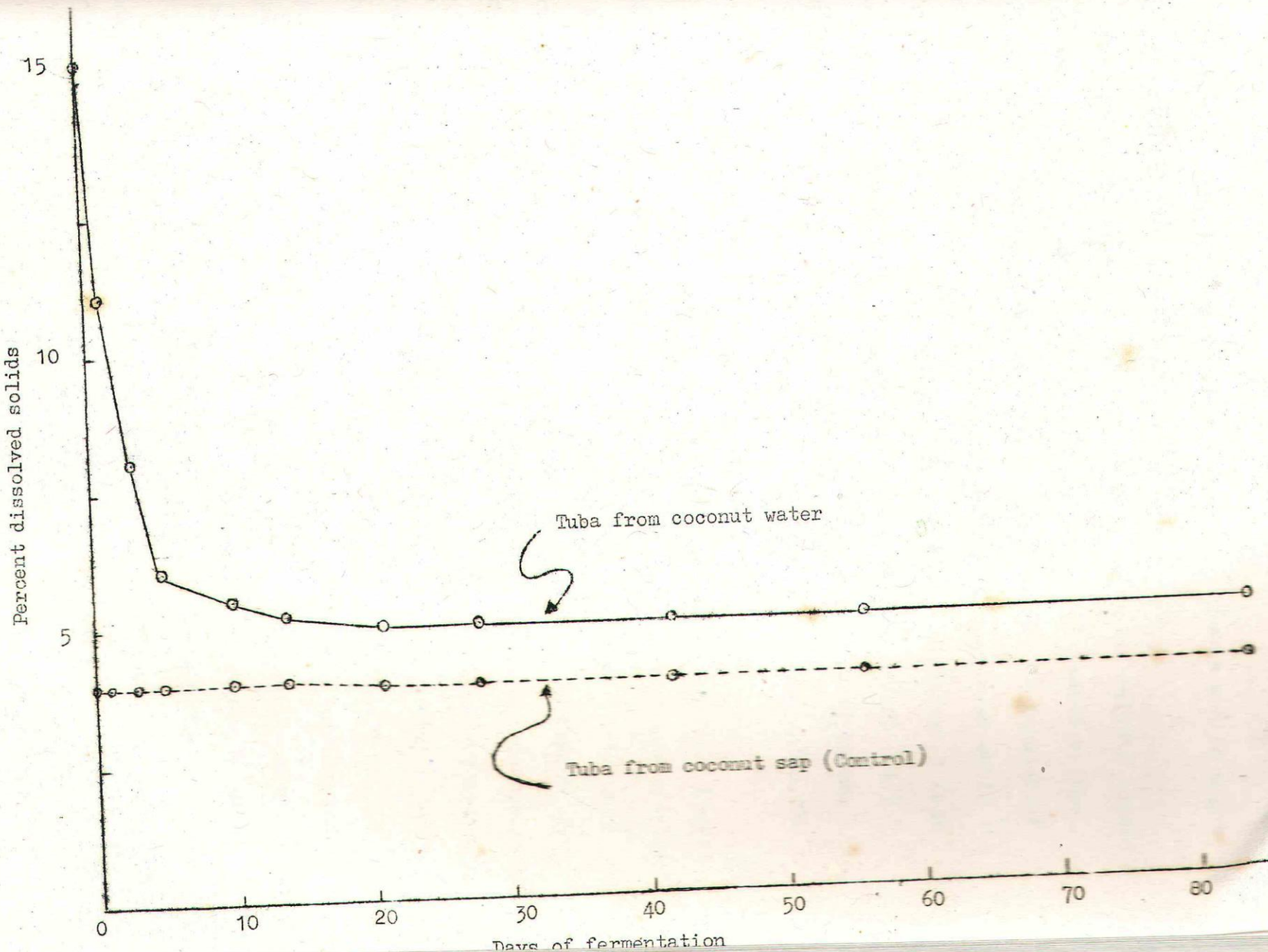
RESULTS AND DISCUSSIONS

Soluble Solids Content

The efficiency of any fermentation process depends, among other factors, on the concentration of fermenetable sugars present in the solution. Since the fermentatable sugars are water-soluble, the concentration of total dissolved solids was determined on the basic assumption that they are composed mostly of fermentable sugars. However, no detailed evaluation of this was made in this study.

The concentration of total dissolved solids of the two types of tuba at various fermentation periods are shown in Figure 1 and Appendix Table 1. The initial concentration in tuba from coconut water was 15.3% which was roughly due to the brown sugar added at 1:6 sugar: coconut water ratio. The results show that there was a rapid decrease in the concentration of soluble solids during the first week of fermentation which leveled-off at about 5% thereafter. This means that alcohol fermentation was essentially

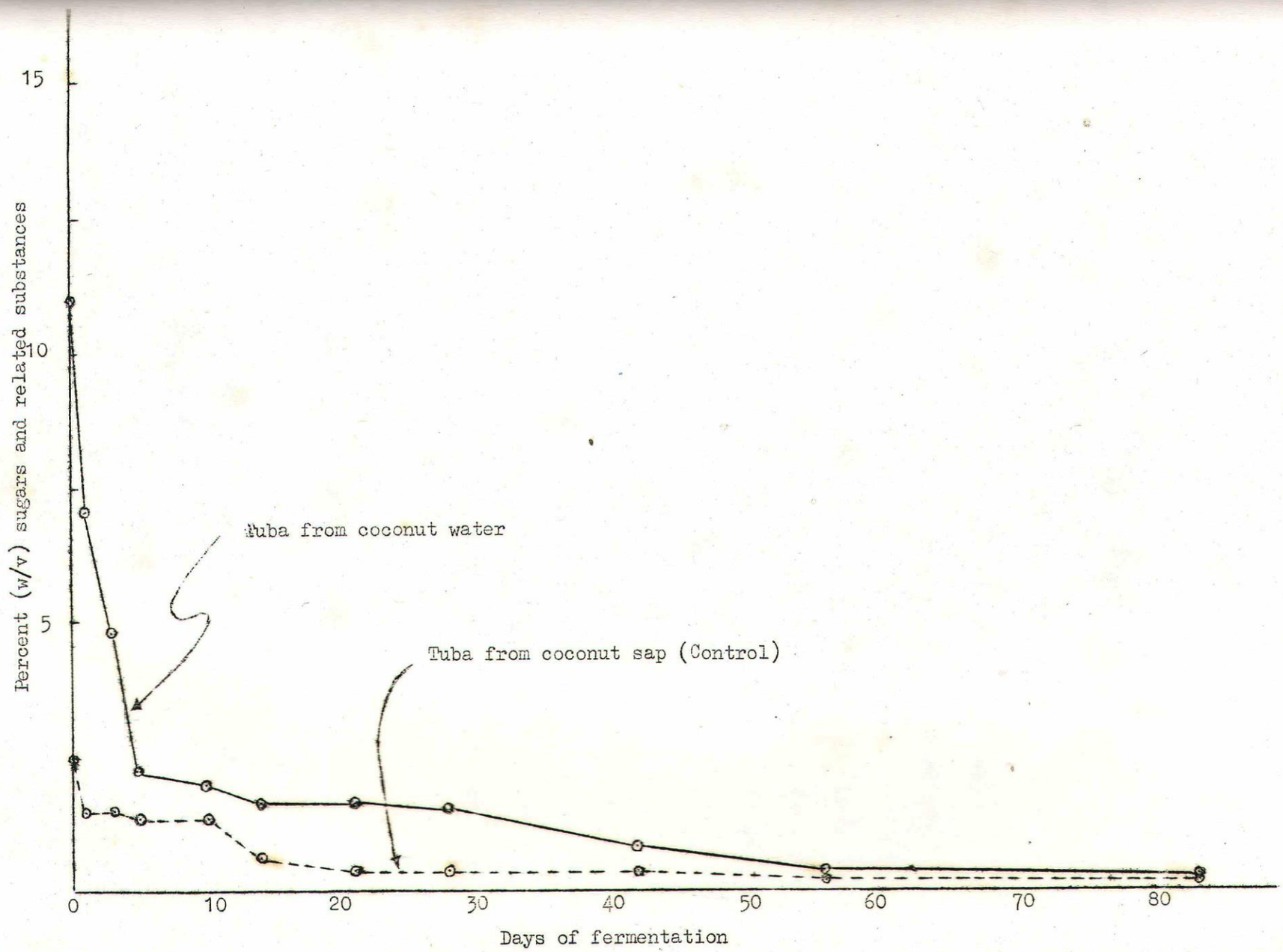
*Day 0 was when the common tuba was just placed into the gallon jar. It must be noted that the process of collecting tuba from the coconut inflorescense takes about a day (24 hours). For the tuba prepared from coconut water, day 0 was right after the second addition of "tungog".


15
10
5
Percent dissolved solids
Tuba from coconut water
Tuba from coconut sap (Control)
0
10
20
30
40
50
60
70
80
Days of fermentation

completed during the first week and the residual soluble solids might have represented the non-fermentable dissolved solids.

For the control (common tuba) the concentration of soluble solids practically remained constant at 4%. This may be attributed to the fact that the coconut sap contains only a small amount of fermentable sugars which might have been all fermented into alcohol even while the tuba was still in the bamboo collectors. It should be recalled that the process of gathering tuba takes about one day (24 hours) which might be all that was needed to complete the alcohol fermentation. Again, the residual dissolved solids (4%) might have represented the non-fermentable solids.

The results of the analysis show that the concentration of sugars and related substances (Fig. 2 and Appendix Table 2) followed similar trend with that of the dissolved solids in both types of tuba. As expected, the concentration of the sugars and related substances were lower than the soluble solids contents at any period of the fermentation. The difference was attributed to the non-sugar and/or non-carbohydrate dissolved solids. It may be further noted from Figure 2 that even in the later part of the fermentation period, the concentration of the sugars and related substances did not reach zero. This further shows that a small fraction of the sugar and related substances are non-fermentable. The gradual decrease in the concentration of sugars after the fifth day of fermentation might also imply that some non-fermentation carbohydrates were being slowly hydrolyzed into fermentable sugars. On the average, the concentration of the non-fermentable dissolved solids


15
10
5
Percent (w/v) sugars and related substances
Tuba from coconut water
Tuba from coconut sap (Control)
0
10
20
30
40
50
60
70
80
Days of fermentation

may be estimated at about 4% in both types of tuba.

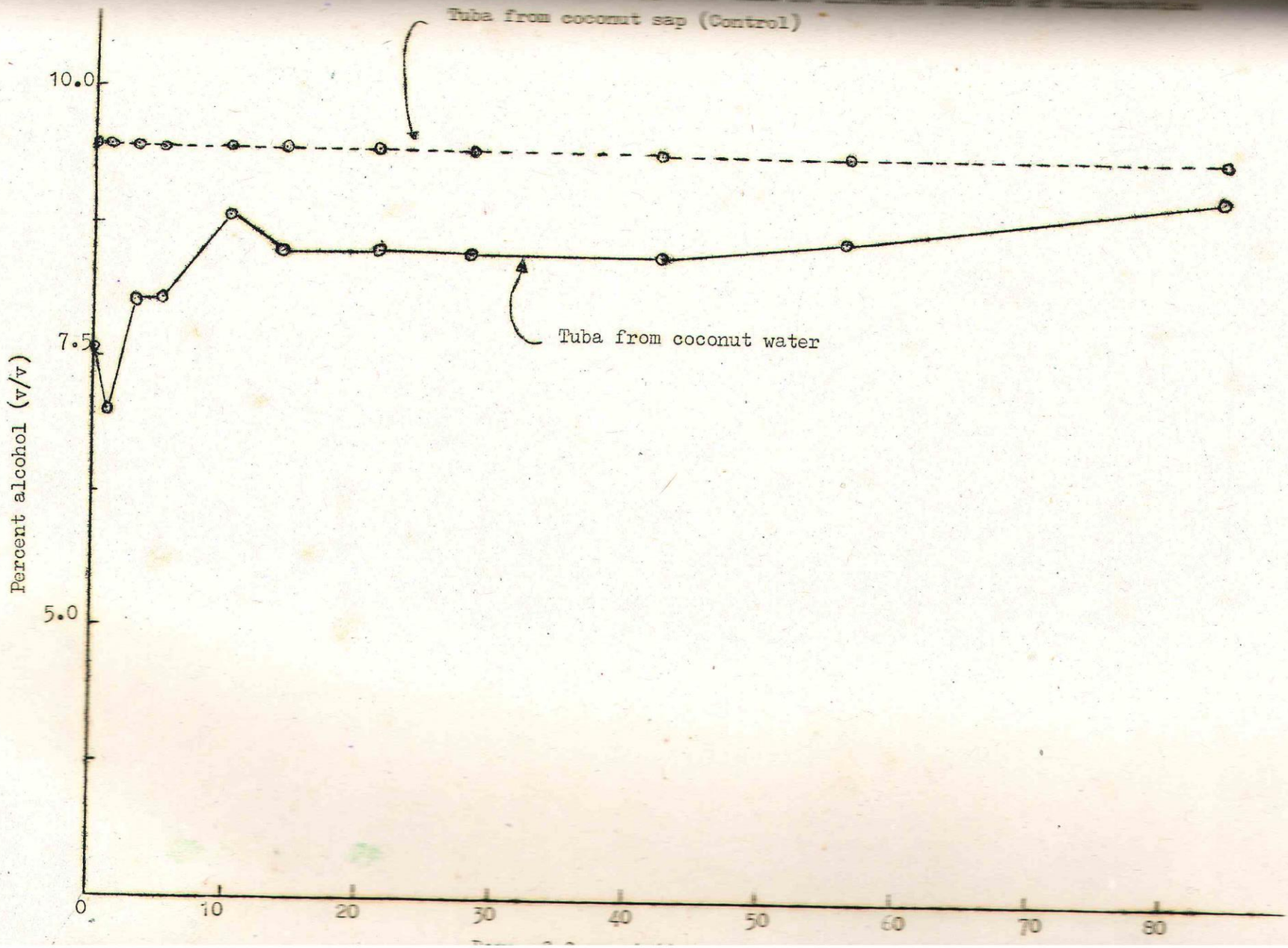
Alcohol Content

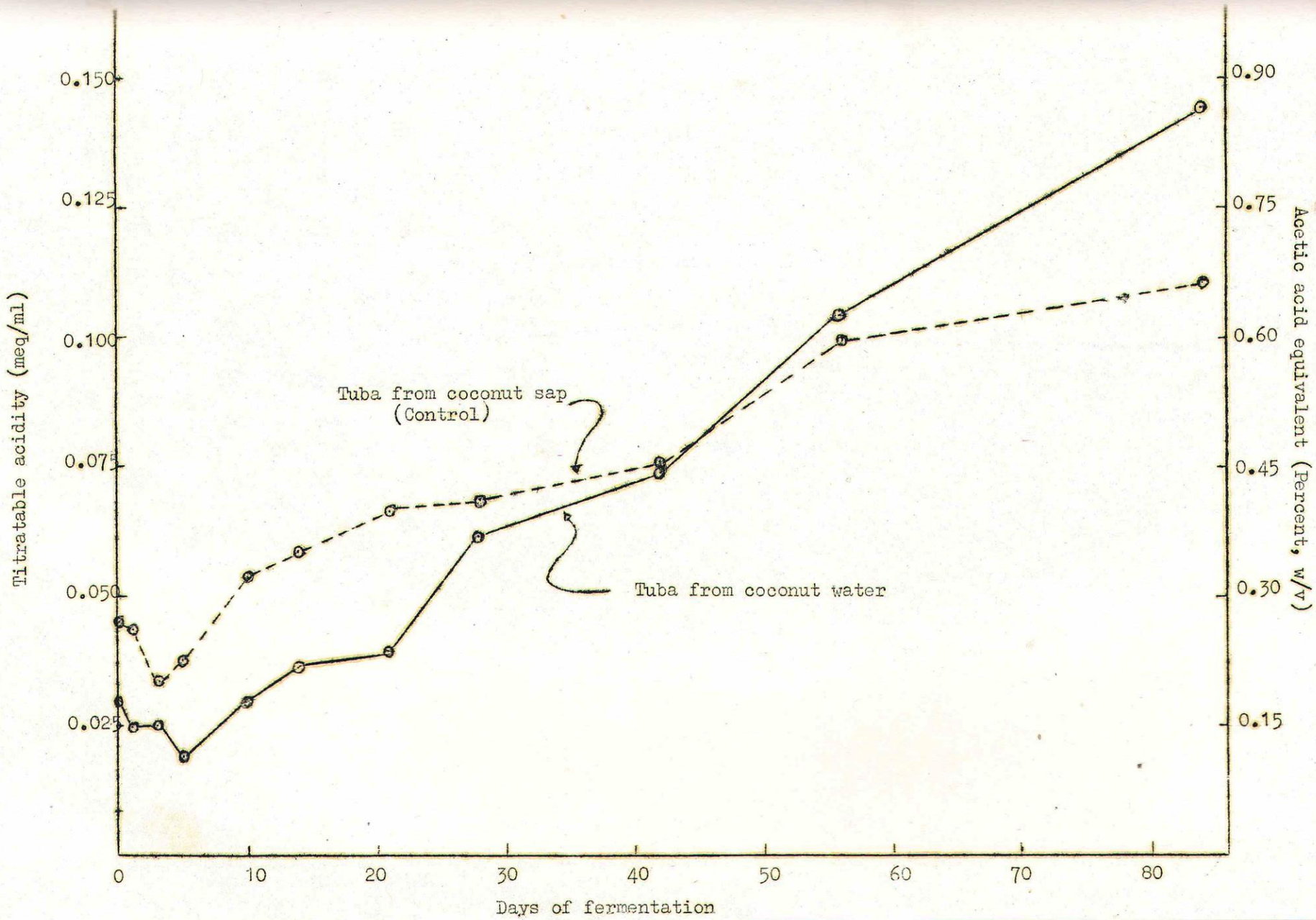
The concentrations of alcohol in the two types of tuba are shown in Figure 3 and Appendix Table 3. It can be observed that the alcohol content in the control remained constant at 9.5% throughout the fermentation period. This further supports the assumption that at day zero (that was about 24 hours when the tuba was still being collected from the inflorescence into the bamboo tube) fermentation was already completed.

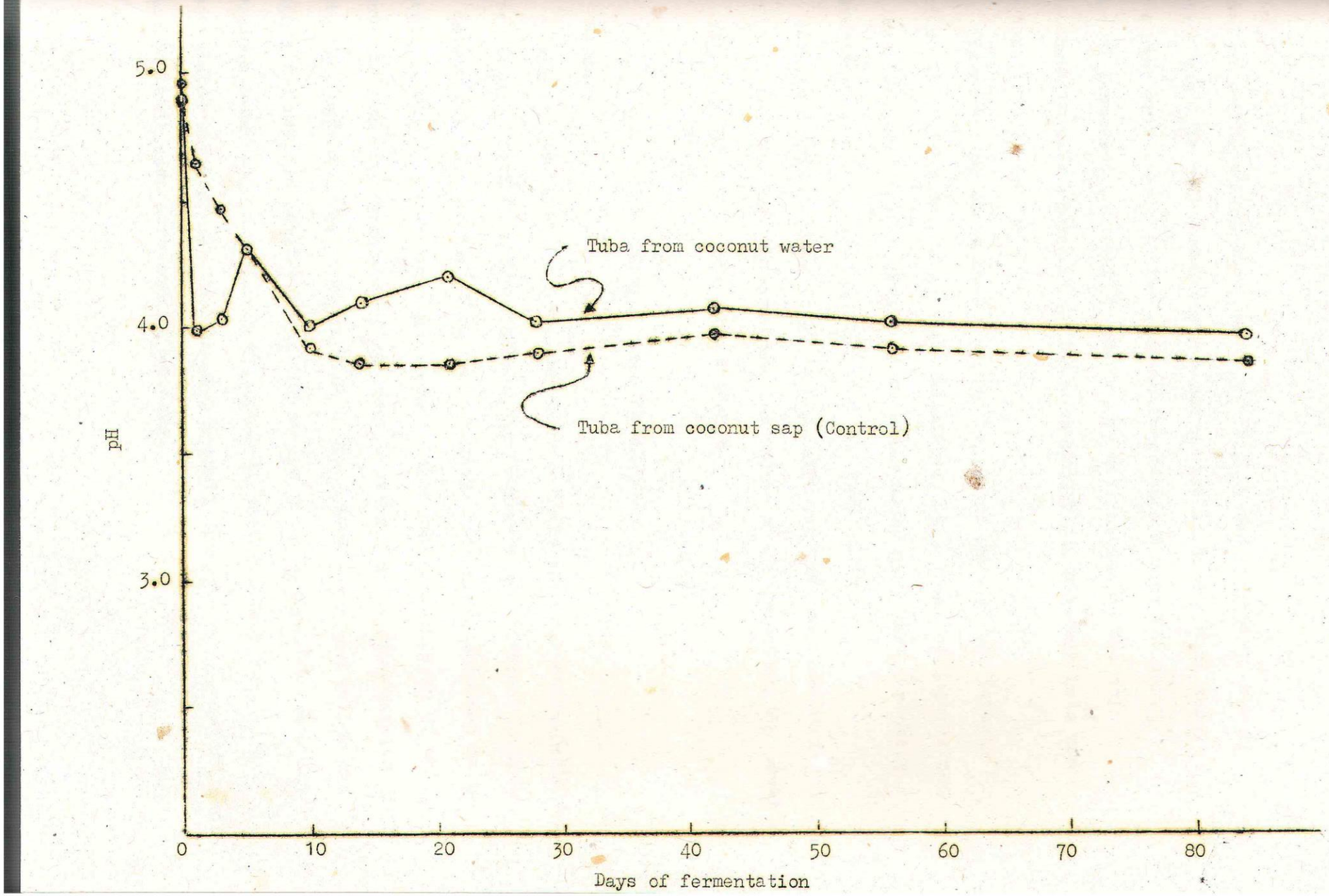
On the other hand, there was a noticeable increase in alcohol content in the tuba from coconut water during the first week of fermentation. This corresponded to the decrease in concentration of dissolved solids and sugars and related substances during the same period (Fig. 1 and 2). It is therefore logical to assume that the alcohol fermentation in the tuba from coconut water was most active and practically completed during the first week. It can be further observed in Figure 3 that in the later part of the fermentation the alcohol contents in the two types of tuba reached a similar proportion.

Acid Content

Figure 4 and Appendix Table 4 show that there was a general increase in titratable acidity with fermentation period in both types of tuba. This might be an indication that a small portion of the alcohol was converted into acid, most probably acetic acid, which can be produced from ethanol by some acetobacter species that might have contaminated the wine. The observation that the increase in acidity was not accom-


Tuba from coconut sap (Control)
Tuba from coconut water
Percent alcohol (v/v)
10.0
7.5
5.0
0
10
20
30
40
50
60
70
80


Titratable acidity (meq/ml)
0.150
0.125
0.100
0.075
0.050
0.025
Acetic acid equivalent (Percent, w/v)
0.90
0.75
0.60
0.45
0.30
0.15
Tuba from coconut sap
(Control)
Tuba from coconut water
0
10
20
30
40
50
60
70
80
Days of fermentation


5.0
4.0
3.0
pH
Tuba from coconut water
Tuba from coconut sap (Control)
0
10
20
30
40
50
60
70
80
Days of fermentation

panied by corresponding decrease in pH (Fig. 5 and Appendix Table 5) further supports this assumption, since acetic acid is a weak acid. The slight decrease in acetic acid concentration during the early stage of fermentation might be due to the utilization of the acid into the metabolic processes in yeast reproduction, although this was not confirmed in this study.

Figure 4 also shows that even in the latter part of the fermentation, the acid content was still relatively low, that was, equivalent to less than one percent acetic acid. This would mean that the aerobic conversion of alcohol into acetic acid was very limited.

Figure 5 further shows that in the later part of the fermentation, the pH of the two tuba attained similar values and were within the usual pH range of the most foods and beverages.

SUMMARY AND CONCLUSION

A. Summary

Tuba was prepared from coconut water and its chemical characteristics were compared with tuba from coconut sap (control) at different lengths of fermentation. The tuba from coconut water initially contained much total dissolved solids and sugars and related substances, both of which decreased rapidly during the first week of fermentation then leveled off with the control. The concentration of the total dissolved solids and sugars and related substances in the common tuba (control) practically remained constant. Not all of the total dissolved solids were sugars and related substances. Furthermore, a small fraction of the sugars and related substances were non-fermentable.

The alcohol content of the two types of tuba differed at the early stage of fermentation but also tended to equalize at the later period of fermentation. After the first week of fermentation the acid (acetic) content in the wine progressively increased but its final concentration was only less than one percent. Inspite of the increase in titratable acidity with fermentation period, the pH of the wine practically stabilized after one week. The final pH of the wine was about 4 which was fairly within the usual pH of foods and beverages.

B. Conclusion

The results clearly show that tuba can be prepared from coconut water. Its chemical characteristics slightly differ from those of the common tuba within the first week of fermentation. However, their chemical characteristics become increasingly similar at the later part of the fermentation period.

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Appendix 1. Determination of sugars and related substances (Dubios, et al., 1956)1/

Procedure:

A. Preparation of standard curve

A standard curve was prepared by dissolving 1,000 gram of glucose into 100-ml solution. One ml of the resulting solution was pipetted and diluted to 100 ml (equivalent to 100 mg glucose per ml). Into separate test tube, 0.10, 0.30, 0.50 and 0.70 ml of the diluted standard solutions were pipetted and appropriately diluted to make each a total of 1.00 ml. This corresponded to 10, 30, 50, and 70 ml glucose. For the blank, 1.00 ml of distilled water was used. One ml of 5% phenol was added to each of the test tubes, followed by the rapid addition of 5.00 ml concentrated sulfuric acid, the stream of acid being directed against the liquid surface rather than against the side of the test tube to obtain good mixing. The sample was allowed to cool at room temperature and its absorbance at 490 nm was measured in a Spectronic 20. An absorbance vs. concentration (mg glucose per ml) graph was then plotted.

B. Determination

Five ml of the tuba sample was pipetted into a 100-ml volumetric flask and diluted to volume. Two ml of the diluted sample was again pipetted into a 100-ml volumetric flask and diluted to 100 ml. One ml of the resulting solution was pipetted into a 30-ml test tube and 1.00 ml of 5% phenol was added. Five ml of concentrated sulfuric acid was added and the solution was allowed to cool at room temperature. The absorbance of the sample was determind and its corresponding concentration (mg glucose/ml) was calculated from the prepared standard curve.

1/ The method determines the total concentration of simple sugars, oligosaccharides, polysaccharides, and their derivatives, including the methyl ethers with free or potentially free reducing groups. Hence the use of the term "sugars and related substances."

Appendix 2. Determination of alcohol concentration

Procedure:

One hundred milliliters of the tuba sample was transferred into a 250-ml distilling flask. The distilling flask was connected into the distillation set-up. The sample was distilled until about 60 ml of the distillate was collected into a 100-ml graduated cylinder. The distillate was then diluted back to 100 ml and its alcohol concentration (%) measured using an alcohol hydrometer.

Appendix 3. Determination of Titratable Acidity

Procedure:

Fifty ml of the tuba sample was placed into a 250-ml Erlenmeyer flask and diluted with another 50 ml distilled water. Three drops of bromthymol blue indicator were added and the sample titrated with 0.1N sodium hydroxide until a faint but permanent blue color appeared. The titratable acidity was calculated in terms of milliequivalents acid per ml or expressed as percent acetic acid.

Appendix Table 1. Percent soluble solids (°Brix) of two types of tuba at different periods of fermentation.

entation eriod	Tuba from Coconut Water				Tuba from Coconut Sap			
	Trial I	Trial II	Trial III	Mean	Trial I	Trial II	Trial III	Mean
y 0	16.0	14.0	16.0	15.3	4.0	4.0	4.0	4.0
y 1	11.0	11.0	11.0	11.0	4.0	4.0	4.0	4.0
y 3	8.0	8.0	8.0	8.0	4.0	4.0	4.0	4.0
y 5	6.0	6.0	6.0	6.0	4.0	4.0	4.0	4.0
y 10	5.5	5.5	5.5	5.5	4.0	4.0	4.0	4.0
y 14	5.0	5.0	5.5	5.2	4.0	4.0	4.0	4.0
y 21	5.0	5.0	5.0	5.0	3.9	3.9	3.9	3.9
y 28	5.0	5.0	5.0	5.0	3.9	3.9	3.9	3.9
y 42	5.0	5.0	5.0	5.0	3.9	3.9	3.9	3.9
y 56	5.0	5.0	5.0	5.0	3.9	3.9	3.9	3.9
y 84	5.0	5.0	5.0	5.0	3.9	3.9	3.9	3.9

Appendix Table 2. Percent total sugars and related substances of two types of tuba at different lengths of fermentation.

mentation Period	Tuba from Coconut Water				Tuba from Coconut Sap			
	Trial I	Trial II	Trial III	Mean	Trial I	Trial II	Trial III	Mean
y 0	10.56	11.05	11.05	10.89	2.48	2.40	2.31	2.40
y 1	7.30	6.08	7.71	7.03	1.57	1.48	1.32	1.46
y 3	4.46	5.37	4.63	4.82	1.32	1.65	1.57	1.51
y 5	2.07	2.07	2.48	2.21	1.44	1.24	1.36	1.35
y 10	1.82	2.15	2.15	2.04	1.40	1.34	1.38	1.37
y 14	1.44	1.78	1.73	11.65	0.61	0.58	0.62	0.60
y 21	1.68	1.49	1.65	1.61	0.47	0.45	0.37	0.43
y 28	1.56	1.40	n1.65	1.54	0.41	0.43	0.40	0.41
y 42	0.80	0.85	0.82	0.82	0.45	0.49	0.37	0.44
y 56	0.35	0.45	0.40	0.40	0.33	0.32	0.34	0.33
y 84	0.30	0.33	0.33	0.32	0.26	0.21	0.25	0.24

Appendix Table 3. Alcohol content (%) of two types of tuba at different periods of fermentation.

Fermentation Period	Tuba from Coconut Water				Tuba from Coconut Sap			
	Trial 1	Trial 11	Trial 111	Mean	Trial 1	Trial 11	Trial 111	Mean
Day 0	7.54	8.02	7.09	7.55	9.44	9.44	9.44	9.44
Day 1	8.49	6.66	5.76	6.97	9.44	9.44	9.44	9.44
Day 3	8.02	8.02	8.02	8.02	9.44	9.44	9.44	9.44
Day 5	8.02	8.02	8.02	8.02	9.44	9.44	9.44	9.44
Day 10	9.44	8.49	8.49	8.81	9.44	9.44	9.44	9.44
Day 14	8.49	8.49	8.49	8.49	9.44	9.44	9.44	9.44
Day 21	8.49	8.49	8.49	8.49	9.44	9.44	9.44	9.44
Day 28	8.49	8.49	8.49	8.49	9.44	9.44	9.44	9.44
Day 42	8.49	8.49	8.49	8.49	9.44	9.44	9.44	9.44
Day 56	8.49	8.96	8.49	8.65	9.44	9.44	9.44	9.44
Day 84	9.44	8.49	9.44	9.12	9.44	9.44	9.44	9.44

Appendix Table 4. Total titratable acidity in tuba (ml of 0.1N NaOH per 50 ml) sample at different periods of fermentation.

Fermentation Period	Tuba from Coconut Water				Tuba from Coconut Sap			
	Trial I	Trial II	Trial III	Mean	Trial I	Trial II	Trial III	Mean
Day 0	0.028	0.029	0.029	0.029	0.046	0.042	0.045	0.044
Day 1	0.025	0.024	0.023	0.024	0.043	0.042	0.043	0.043
Day 3	0.025	0.024	0.026	0.025	0.033	0.033	0.034	0.033
Day 5	0.019	0.017	0.020	0.019	0.035	0.035	0.037	0.037
Day 10	0.030	0.027	0.029	0.029	0.052	0.054	0.054	0.053
Day 14	0.033	0.036	0.038	0.036	0.063	0.065	0.062	0.063
Day 21	0.039	0.036	0.043	0.039	0.068	0.067	0.064	0.066
Day 28	0.062	0.060	0.061	0.061	0.069	0.068	0.067	0.068
Day 42	0.076	0.075	0.074	0.075	0.072	0.072	0.074	0.073
Day 56	0.103	0.104	0.101	0.103	0.098	0.101	0.97	0.099
Day 84	0.140	0.143	0.144	0.143	0.110	0.109	0.112	0.110

Appendix Table 5. pH of two types of tuba at different periods of fermentation.

Period of fermentation	Tuba from Coconut Water				Tuba from Coconut Sap			
	Trial I	Trial II	Trial III	Mean	Trial I	Trial II	Trial III	Mean
Day 0	4.95	4.95	4.95	4.95	4.85	4.90	4.90	4.88
Day 1	4.10	3.95	3.90	3.98	4.70	4.60	4.60	4.63
Day 3	4.10	4.00	4.00	4.03	4.50	4.45	4.40	4.45
Day 5	4.3	4.25	4.35	4.30	4.3	4.3	4.28	4.29
Day 10	4.0	4.0	4.0	4.00	3.9	3.9	3.9	3.90
Day 14	4.15	4.05	4.05	4.08	3.95	3.80	3.80	3.85
Day 21	4.17	4.17	4.2	4.18	3.83	3.85	3.85	3.84
Day 28	4.00	4.05	4.00	4.02	3.9	3.88	3.91	3.90
Day 42	4.05	4.05	4.08	4.06	3.95	3.08	3.98	3.97
Day 56	4.01	3.99	4.03	4.01	3.95	3.89	3.90	3.92
Day 84	3.95	3.95	3.98	3.96	3.88	3.86	3.85	3.86

APPENDIX C

VISAYAS STATE COLLEGE OF AGRICULTURE
Baybay, Leyte

March 19, 1982

Dr. F. A. Bernardo
President, Visayas State
College of Agriculture
Baybay, Leyte
(Through Channel)

S i r :

This is in connection with the replacement or substitution of Atty. Alfea C. Javier who is on leave for a year. We really need a lawyer this time to represent the College in Court and other quasi-judicial bodies to some of ViSCA's pending cases which are set for hearing in April of this year. At this juncture, I wish to inform your Office that all lawyers in Baybay. Leyte who were invited to apply for the position of a legal Officer turned down said invitation after knowing the remuneration to be very small for them. However, Atty, Guiraldo Fernandez has come up with the following proposals:

1. He is willing to serve ViSCA on a part-time contractual basis reporting to the College for duty only on Thursdays, Fridays and Saturdays to perform the following duties:

   a. Prepare and notarize all contracts/documents involving transactions of the College free of charge provided that the College shall provide him with a Notarial Register.

   b. Represent the College in court and quasi-judicial bodies in all cases for or against ViSCA anytime of its scheduled hearing.

   c. Provide the President and other key officers of the College with legal assistance in the formulation and proper interpretation and implementation of College policies, rules and regulations.

   d. Pass upon recommendations and/or decisions on disciplinary cases involving the faculty, administrative personnel and students.

   e. Provide the College with legal assistance in the implementation of its land acquisition program under PD #1107.

f. Perform such other legal functions as the President may assign him.

2. In all litigations involving ViSCA, he should be provided with transportations and per diem during the hearing. He likewise proposes for a gasoline allowance of 9 liters per week for his own car during his travel from poblacion to ViSCA and back.

3. He is charging ViSCA for a net amount of ₱1,000.00 per month for all his services.

Hiring Atty. Fernandez on the basis of his proposal is acceptable because of the following reasons:

a. ViSCA can directly avail of his expertise or legal services since he accedes to report for duty to the College on the aforementioned dates which could not be done by other lawyers of his quality;

b. The 10 pending cases of ViSCA excluding the expropriation cases can be well attended to because of his presence here, and considering further his good ability as a lawyer which is augmented by his dedication and experience in the practice of law for a period of 11 years;

C. Notarization of urgent contracts or documents especially for research services, and all other contracts relevant to land acquisition or construction projects can be executed within reasonable time with his employment in ViSCA.

Anticipating your favorable approval.

Very truly yours,

(SGD.) WILFREDO C. VALENZONA
Administrative Officer

Recommending Approval:

(SGD.) SAMUEL S. GO
Vice President for Administration

Approved on trial basis.

(SGD.) F. A. BERNARDO
President

PERSONAL DATA

I 1. Name . . . . . Fernandez, Guiraldo, Baltazar

2. Postal Address . . . . Baybay, Leyte

3. Place of Birth . . . . Baybay, Leyte

4. Date of Birth . . . . Feb. 27, 1944

5. Civil Status . . . . Married

Wife - Adelaida Centino

Children:

Guiraldo, Jr. - 8 yrs. old
Aldwin - 7 yrs. old
Geraldine - 6 yrs. old
Adrian - 2 yrs. old

II Educational Background:

1960-64 - Bachelor of Arts major in Economics, cum laude
University of San Carlos, Cebu City

1964-68 - Bachelor of Laws
University of San Carlos

1970 - Admitted to the practice of law

III Organizations:

Chancellor - Knights of Columbus
Baybay, Leyte

Member - Baybay Tennis Club
Baybay, Leyte

IV Experience:

Private law practitioners - 1980 to present

APPENDIX D

APPOINTMENTS OF COLLEGE PERSONNEL FOR CONFIRMATION

A. Recruitment

Regional Coconut Research Center

1. Ms. Tessie U. Cabela
   MS in Agronomy
   UPLB 1982
   Age: 28 yrs. old

   Instructor
   Salary: ₱19,584.00 p.a.
   Effectivity: Feburary 16, 1982
   Status: Temporary

Philippine Root Crops Research and Training Center

2. Mr. Nestor L. Pido
   MS in Genetics
   UPLB 1982
   Age: 24 yrs. old

   Instructor
   Salary: ₱14,532.00 p.a.
   Effectivity: Feb. 16, 1982
   Status: Temporary

B. Reclassification of Academic Staff

Name	Highest Degree	Points Earned	Equivalent Rank	Present Rank
1. Oscar L. Colis	Ph.D. in Agric'l Education	55.97	Associate Prof. I	Assistant Prof. II
2. Rogelio A. Jaime	Ph.D. in Agric'l Extension	53.213	Assistant Prof. IV	Assistant Prof. I

C. For Permanent Status

1. Mr. Veronico S. Subere
   MS in Animal Science
   No. of years in present position - 3 years
   Performance Rating: Satisfactory

   Assistant Professor
   Dept. of Animal Science & Veterinary Medicine
   Effectivity: April 1, 1982