

## Evaluation of Khaung-Yay (Traditional Myanmar Ethnic Alcoholic Beverages)

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### ABSTRACT

A study was conducted to evaluate the characteristics of Khaung-Yay (Traditional Myanmar Ethnic Alcoholic Beverages) which are ordinarily made from fermented rice. Three types of Khaung-Yay, Kachin, Kayar and Chin were collected to study the physico-chemical characteristics, microbiological assay, antioxidant activity, total phenolic content and sensory qualities of ethnic alcoholic beverages. The significant correlation between the values in percentage (100%) of DPPH free radical scavenging activity of each Khaung-Yay observed from  $25.74 \pm 3.73$  to  $83.60 \pm 1.61$ ,  $57.71 \pm 0.99$  to  $94.71 \pm 0.43$  and  $21.62 \pm 55.25$  and the resultant in the values of total phenolic compounds  $203.09 \pm 8.62$ ,  $251.98 \pm 4.35$  and  $132.18 \pm 5.36$  were observed. The mold contamination was not found in each types of Khaung-Yay.

### INTRODUCTION

Myanmar is home to several major ethnic groups and over 100 ethnicities in all, each with their own distinct culture and unique cuisine. "Khaung-Yay" is a kind of alcoholic beverage made locally in some parts of Myanmar, mostly among ethnic people. There are various kinds of Khaung -Yay produced locally but most widely known are Kachin, Kayar and Chin Khaung-Yay and all of them are rice-based beverages[1]. Almost cereal grain including rice have bioactive compounds which are antioxidants contribute to phenolic compounds. For the preparation of Khaung-Yay, rice is firstly cooked until it becomes thick and cool down then yeast is added to it and mixed properly. The mixture is then put into a clay pot and sealed air tight to ferment. The period of fermentation takes place at least one month.

### MATERIALS AND METODS

**Kachin Khaung:** Myitkyina, Kachin State, **Kayar Khaung:** Dawdamagyi Village, Kayar State, **Chin Khaung:** Lylo Village, Tee Tian, Chin State.

#### Characterizations of Khaung-Yay (Ethnic Alcoholic Beverages)

##### Physico-chemical Analysis

The pH of each Khaung-Yay was determined using digital pen type pH meter. The total solid content was determined by evaporating of each sample followed by drying in an oven at 105°C for 3 hours and the results were expressed as % (mass/volume). The alcohol content was determined on distillation followed by measuring specific gravity using sike's hydrometer. The percentage of alcohol by volume from specific gravity at 15.56°C was read from the table. The titratable acidity (as % tartaric acid) and volatile acidity (as % acetic acid) were analyzed by titrated with 0.1 N NaOH [2]. The color absorbance was measured at 420 nm to 580 nm using UV/ Vis spectrophotometer. Lane and Eynon's method was used for the determination of reducing sugar. Reducing sugar (mg/g) was calculated by the following equation [3].

$$\text{Reducing Sugar mg/g} = \frac{66.5}{\text{Titre}} \times \frac{100}{10^3}$$

### Microbiological Analysis

Microbial isolation and enumeration of three samples were conducted by serial dilution and spread plating method using Potato Dextrose agar (PDA). The results were reported as CFU/g (ml) sample[4].

### Antioxidant Activity

Determinations of antioxidant activity of Khaung-yay were carried out by the DPPH method [5]. Ascorbic acid was used as a standard and 50% EtOH was used as the control. Percent Radical Scavenging Activity (%RSA) was calculated by the following:

$$\%RSA = \left(1 - \frac{OD \text{ test compound}}{OD \text{ control}}\right) \times 100$$

### Total Phenolic Content

The total phenolic content of Khaung-Yay was investigated by using Folin-Clocalteu method and expressed as gallic acid equivalent (mgGAE/L) [6].

### Sensory evaluation of Khaung-Yay

Three types of Khaung-Yay were evaluated following the standard general procedure of sensory evaluation as described by Tand and Mabesa [7]. Panel of judges consisting of 20 students who had classroom training and are always involved in sensory tests, evaluated the sensory attributes of the prepared Khaung-Yay. The panels of judges were asked for preferences to sour, bitter, sweet, acerbity, and overall acceptability.

## RESULTS AND DISCUSSION

Physico-chemical properties of different Khaung-yay are shown in Table (1). According to these results, pH of Kachin Khaung-Yay was higher than the others and Kayar Khaung-Yay had the lowest value of total solid. Figure (1) indicates the maximum color absorbance at 420nm for all Khaung-Yay.

**Table (1) Physico-Chemical Properties of Khaung-Yay**

Characteristics	Different Types of Khaung- Yay		
	Kachin	Kayar	Chin
pH	5.4	6.3	6.5
TitratableAcidity(% v/v)	0.495	0.427	0.135
VolatileAcidity (% w/v)	0.45	0.43	0.016
Total Solid(% w/v)	2.3	0.4	1.2
Soluble Solid (Brix)	28	12	6
Reducing Sugar(mg/g)	1.7	0.2	1.1
Alcohol content (%) at 15.56°C	11.80	12	6.9
Sugar content (%) at 20°C	25	3	6

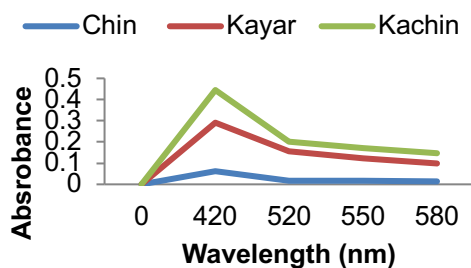


Figure 1. Color Absorbance of Khaung-Yay

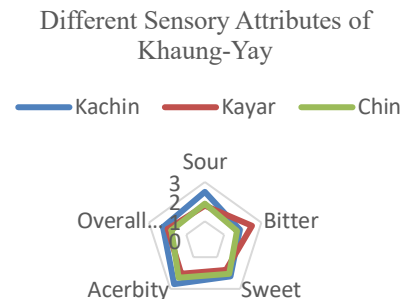


Figure 2. The spider diagram for sensory attribute of Khaung-Yay

Sensory Evaluations for three types of Khaung-Yay are shown in Table (2). The spider diagram indicates the sharpen results of sensory attribute in sour, bitter, sweet and

acerbity tastes. The tastes are predominant difference owing to the difference brewing process and difference species of yeast.

**Table (2) Mean Score of Different Sensory Attributes of Khaung-Yay**

Types of Khaung-Yay	Sensory Attributes				
	Sour	Bitter	Sweet	Acerbity	Overall Acceptability
Kachin	2.5	1.85	2.2	2.7	2.25
Kayar	1.8	2.5	1.8	2.05	2
Chin	1.9	1.7	2.05	2.3	1.8

Ranges of Scores

Sour, Bitter, Sweet, Acerbity: 1= extremely light sour, 5 = extremely sour;

Overall Acceptability: 1 = extremely unacceptable, 5= extremely acceptable.

Any mold contamination was not found in all of Khaung-Yay (Figure 3a, 3b and 3c). The higher alcoholic content decreases the growth of some micro-organisms [8]. The microbiological analysis results of Khaung-Yay are shown in Table (3). The worth of fermentation, yeast growth was observed in Kayar and Chin Khaung-Yay and it was not any colony observation in Kachin Khaung-Yay which indicate that they are different in locally production methods and types of yeast.

**Table (3) Total Combined Yeast and Mold Count of Khaung-Yay**

Types of Khaung-Yay	Microbiological Analysis			
	Total Combined Yeast and Mold Count(CFU/g/ml)	USP Recommended Limits	Methods	Used Media
Kachin	Not Detected	-	Spread Plate Method	PDA (Potato Dextrose Agar)
Kayar	$5 \times 10^2$	-		
Chin	$1.5 \times 10^5$	-		

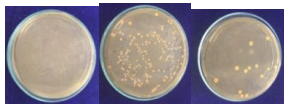


Figure 3. (a) Kachin (b) Kayar (c) Chin Khaung- Yay

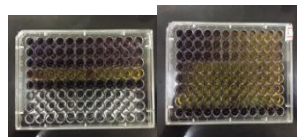


Figure 4. Antioxidant activity of Khaung-Yay

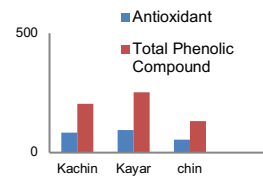


Figure 5. Correlation of Antioxidant and Total Phenolic compounds

**Table (4) Antioxidant Activity of Khaung-Yay**

Sample Concentration (%)	%DPPH Scavenging activity of Khaung-Yay at different percentage										Method
	10	20	30	40	50	60	70	80	90	100	
Kachin	25.74 ± 3.73	32.07 ± 0.86	45.47 ± 4.29	55.57 ± 2.36	66.75 ± 1.57	73.70 ± 0.96	80.15 ± 2.15	82.81 ± 1.74	82.99 ± 2.36	83.60 ± 1.61	DPPH Radical Scavenging Assay
Kayar	57.71 ± 0.99	75.19 ± 2.36	87.95 ± 1.28	89.32 ± 0.66	89.67 ± 0.21	90.41 ± 0.16	91.33 ± 0.18	91.88 ± 0.11	92.78 ± 0.56	94.71 ± 0.43	
Chin	21.62 ± 0.12	25.72 ± 1.72	34.47 ± 0.59	37.50 ± 0.27	38.16 ± 0.12	41.05 ± 0.38	47.90 ± 0.48	54.75 ± 0.32	55.07 ± 0.40	55.25 ± 0.22	

The antioxidant activity of Khaung Yay was examined by reducing the purple color of DPPH free radical at 515nm absorbance (Figure 4). The hydrogen atom donation of sample is occurred which can reduce the oxidant DPPH. Table (4) shows DPPH scavenging activity increased as much as the concentration of samples. The maximum DPPH scavenging ability was Kayar Khaung-Yay in the value of  $94.71 \pm 0.43$ . As a result shown in Table (5), phenolic compounds comprise in each one significantly. Lower

phenolic content of Chin than the two other was found owing to different method of fermentation and types of yeast [9]. The significant linear correlation of three samples of Khaung-Yay between antioxidant activity and total phenolic content was observed (figure 5). The liberation of natural bioactive compounds, phenolic in rice grain occurred during fermentation process due to the enzymatic activity of grain [

**Table (5) Total Phenolic Content of Khaung-Yay**

Sample	Total Phenolic Content (mgGAE/L) Mean±SD
Kachin	203.09±8.62
Kayar	251.98±4.35
Chin	132.18 ± 5.36

### CONCLUSION

This work describes actually the evaluation of Myanmar Ethnic alcoholic beverages, Khaung-Yay. Although the rice based alcohols in different area have different physico-chemical properties and microbiological properties, the antioxidant activities of all of them observed significantly. As a result of the present study, it can be concluded that Khaung-yay qualities differs with rice varieties and fermentation methods and significant differences were observed with respect to various parameters like physico-chemical properties, overall acceptance and microbiological characteristics. To achieve the good quality and high yields of valuable products like Khaung-yay (rice wine), the variable parameter such as fermentation condition, types of yeast and shelf life should be analysed in future researches.

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## NUTRITIONAL ATTRIBUTES ON VELVET BEAN SEEDS (*MUCUNA PRURIENS*)

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### ABSTRACT

Black variety of *Mucuna prurines* bean seeds were collected from Yenanchaung Myotma market, Yenanchaung, Magway Region, Upper Myanmar. The nutritional values were determined into three categories: raw seeds, roasted seeds and seed coat based on crude protein, crude fiber, crude fat, moisture, ash and carbohydrate contents. The results show that nutrient qualities of the selected velvet seeds were improved by processing method of roasting. Energy values of *Mucuna prurines* are also higher, 356 kcal/100g in roasted seeds than 342 kcal/100g in raw seeds and 205 kcal/100g in seed coat. The mineral contents in raw seed and seed coat were firstly analysed by EDXRF method and mineral contents were determined by Atomic Absorption Spectrometry (AAS). The mineral contents of Na, Cu, Zn, Mn, Fe and Ca contents were higher in seed coat than in raw seed. According to FT IR spectral data, fatty acid ester may be contained in extracted velvet bean seed oil.

**Keywords** : *Mucuna prurines*, nutritional values, energy values, EDXRF, AAS, FT IR

### INTRODUCTION

*Mucuna prurines* Linn. (velvet bean) is found in tropical countries and it is a popular tropical legume indigenous to Africa and Asian countries. In Myanmar also, velvet beans are medicinally used and it is now cultivated in Upper Myanmar. The roasted velvet seeds are sold and very popular nowadays. It is an annual climbing plant indigenous to tropical regions where it is found in bushes, bush paths and hedges. Its flowers are white to dark purple and hang in clusters. The plant also produces clusters of pods, which contains seeds known as velvet beans.

Seeds of *M.prurine* have been shown to possess antispasmodic, anti-inflammatory, antipyretic, and antivenin properties, aphrodisiac activity, and anabolic and fertility properties [1,2]. The plant and its extracts have been long used by tribes as a toxin antagonist for various snakebites including cobra, pit viper and krait [3]. The seeds of *Mucuna prurines* have been used in traditional Ayurvedic Indian medicine for treating Parkinson's disease because the mature seeds contain 3.1- 6.1 % of L-DOPA [4,5]. It contains protein (lectins, globulins, protease inhibitors), fat and fatty acids, water, minerals in trace amount, fiber and L-DOPA (or levodopa), and among others. The nutritional values of velvet seeds reported in the literature show that these values of common bean and other legumes are comparable [5].

### MATERIALS AND METHODS

In this research, the velvet seeds samples were collected from Yenanchaung Myotma market, Yenanchaung, Magway Region, Upper Myanmar. Firstly, the seeds were dried in air, they were uncovered to seed puff and seed coat, and then they were blended to powder samples and stored in air-tight glass bottles. Then, proximate chemical compositions of seed samples were determined using standard methods as described by AOAC [6]. The relative abundant elemental composition of velvet seed powder and seed coat powder were identified by EDX- 8000 Spectrometer. The detailed elemental contents of velvet seed powder and seed coat powder were determined by AAS. The extracted oil was also analysed by FT IR technique.