

A Study on Traditional Main Dish *Melocanna Bambusodies* T. (Kayin-wa-dok) From Rakhine State

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Abstract

Harvested from natural forests, raw bamboo shoots are available all over Myanmar and widely consumed as a seasonal or traditional food during the period of June to September. In the remaining period of the year, preserved bamboo shoots are sold in urban city markets, but not available in rural villages and remote towns.

This research concerns with the verification studies of some physicochemical properties in Kayin-wa-dok sample, which was purchased and collected from Kyauk-Taw Township. This collected sample was rinsed, sliced, dried, ground and stored in an air-tight container for use in the analysis. The preliminary phytoconstituents, nutritive values and antimicrobial activity were carried out by using a test tube, AOAC and ager-well diffusion methods respectively. In the Kayin-wa-dok sample, cyanogenic glycoside was contained. The nutritional values such as moisture 11.51 %, ash 16.27 %, protein 14.43 %, fiber 22.73 %, fat 1.30 %, and carbohydrate 33.76 % contents were obtained. These values agreed with Food Science and Nutrition. The observed energy value was 237 kcal/100g. But bamboo shoot acts as nutraceutical or natural medicine itself. K (11.512 ppm), Mg (9.285 ppm), Ca (6.499 ppm) and Fe (5.391 ppm) were found to be higher contents than the other mineral contents. Although the EtOH extract sample showed antimicrobial activity, PE and H₂O extract sample did not show it. Therefore, the edible Kayin-wa-dok sample was a suitable food for seasonal or traditional foodstuff and main dish of Rakhine nationality.

Keywords: *melocanna bambusodies*, phytochemical constituents, nutrition, antimicrobial activity

INTRODUCTION

Bamboo

More than 1250 species belonging to 75 genera of bamboo are being reported worldwide. Bamboo is generally round and smooth. Bamboo consists of fiber bundles. The thickness of the outer shell and deposit of silica in the cortical layer make them hard. The culms have joints at intervals.(Ghosh, 2008)

Bamboo shoots are a popular food in Asia and the nutritional value is comparable to those of many commercial vegetables. Bamboo shoots are the edible shoots of the bamboo plant and are usually harvested before they are two weeks old. The shoots have a tough exterior and a tender interior with a faintly sweet flavor. It is important to peel the bamboo shoots before using since they have a bitter taste and are difficult to digest. Moreover, do not eat raw shoots and it can cause death.

Bamboo also provides many health benefits. Bamboo shoots have immense potential of being used as important health food as they have high contents of useful protein, amino acids, carbohydrates, minerals, vitamins and very low fat. Fresh bamboo shoot has also been found to be rich in potassium which prevents heart diseases and blockage of blood vessels (Tsaltas, 1969).

***Melocanna bambusodies* Trin (Kayin-Wa-Dok)**

Melocanna bambusodies (Kayin-wa-dok) is a kind of the family of grasses (Gramineae). As in grasses generally, they have well marked joints or nodes, at which the activity is closed by strong diaphragm. They have numerous branches. In some the branches are spiny. Bamboos are ordinarily rapidly growing (Ghosh, 2008). The photograph of Harvested Kayin-wa-dok shown in figure (1).

Scientific classification

Kingdom	:	Grasses
Family	:	Gramineae
Genus	:	<i>Melocanna</i>
Species	:	<i>bambusodies</i>
Botanical name	:	<i>Melocanna bambusodies</i> T.
English name	:	Bamboo shoot
Myanmar name	:	Hmyit
Rakhine name	:	Kayin-Wa-Dok

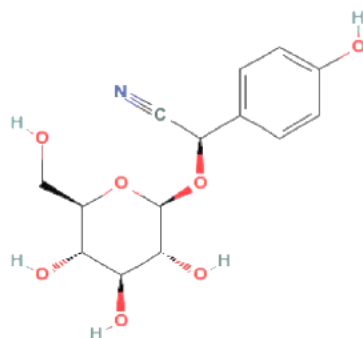


Figure (1). Harvested Kayin-Wa-Dok.

Toxicity of Bamboo Shoot and its Effect on Human Health

The bamboo shoots are rich source of various macro and micronutrients but they contain cyanogenic glycoside, which can prove to be hazardous to health if consumed in excess, and which cannot be ignored. Raw bamboo shoots have been identified as reservoirs of cyanide. Raw bamboo shoots are one of the recorded cyanogenic plant species in the world.

Taxiphyllin (4-hydroxy-(R)-mandelonitrile- β -D-glucopyranoside), a cyanogenic glycoside (Conn, 1969), has been found to be the potential toxic component present in the different species of bamboo shoots (Vetter, 2000).The cyanide content varies in different part of the plant and also between the same parts of different portions and the same species (Jones,1998).



IUPAC Name	:	4-hydroxy-(R)-mandelonitrile- β -D-glucopyranoside
Molecular Weight	:	311.28728 g/mol
Molecular Formula	:	$C_{14}H_{17}NO_7$

Structure of taxiphyllin

MATERIALS AND METHODS

Sample Collection and Preparation

The Kayin-wa-dok was purchased and collected from Yang Chaung Taung, Kyauk-Taw Township, Rakhine State in September 2015. This collected sample was rinsed three times with distilled water and air dried at room temperature. Then dried sample was ground by an electric blender. The powdered sample was stored in an air-tight container to prevent moisture and other contamination. The dried powdered sample was used to determine some physicochemical properties of kayin-wa-dok. The photograph of Harvested Kayin-wa-dok sample shown in figure (2).

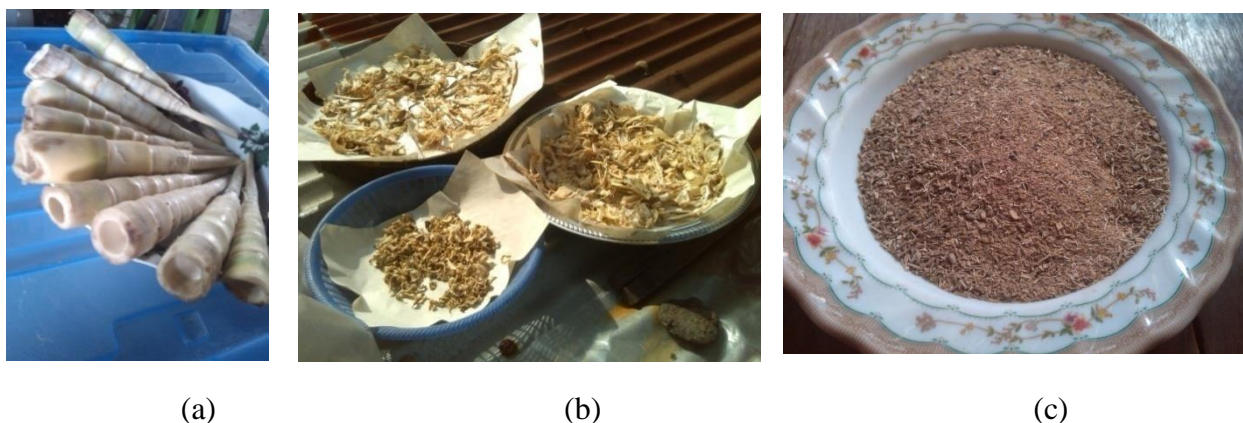


Figure (2). (a) Peeled Kayin-wa-dok, (b) Dried slice sample and (c) Dried powder sample

RESULTS AND DISCUSSION

Preliminary Phytochemical Constituents of *Melocanna bambusodies* T. (Kayin-Wa-Dok) Sample

After preparing the sample, the identification for type's of phytochemicals containing in the sample of *Melocanna bambusodies* T. (Kayin-Wa-Dok) was made employing phytochemical tests. The results are shown in Table 1.

Melocanna bambusodies T.(Kayin-Wa-Dok) sample showed the presence of alkaloids, α -amino acids, carbohydrates, glycosides, phenolic compounds, reducing sugar, tannins, flavonoids, saponins, cyanogenic glycosides ,starch, steroids and terpenoids in the sample. The physiologically active compounds referred to as phytochemicals. These phytochemicals are produced via secondary metabolism in relatively small amounts. There are being intensively studied to evaluate their effects on health. The nutritional values are shown in table 2 and figure 3. The determination of elemental contents are shown in table 3 and figure 4.

Table (1). Phytochemical Constituents of Kayin-wa-dok Sample.

No .	Types of Compounds	Extracts	Test reagent	Observations	Remark
1.	Alkaloids	1% HCl	Dragendroff's reagent Mayer's reagent Wagner's reagent	Dark-brown ppt White ppt Reddish brown	+
2.	α -amino acids	H ₂ O	Ninhydrin reagent	Purple spot	+
3.	Carbohydrates	H ₂ O	10% α -naphthol, conc:H ₂ SO ₄	Red ring	+
4.	Glycosides	H ₂ O	10% Lead acetate solution	Precipitate	+
5.	Flavonoids	EtOH	Mg turning, conc:H ₂ SO ₄	color	+
6.	Phenolic compounds	H ₂ O	5% FeCl ₃ solution	Brown color	+
7.	Reducing Sugars	H ₂ O	Benedict's solution	Brick-red ppt	+
8.	Starch	H ₂ O	1% iodine solution	Blackish-blue color	+
9.	Tannins	H ₂ O	1% gelatin solution	ppt	+
10.	Steroids	PE	Acetic anhydride, conc:H ₂ SO ₄	Green ppt	+
11.	Terpenoids	CHCl ₃	Acetic anhydride, conc:H ₂ SO ₄	Pink color	+
12.	Saponins	H ₂ O	Distilled water	Forming frothing	+
13.	Organic acids	EtOH	Bromothymol blue	Yellow ppt	+
14.	Cyanogenic glycosides	H ₂ SO ₄	Sodium picrate paper	Brick red	+

Table (2). Percentage of Nutritional Contents in Kayin-wa-dok Sample.

No	Parameters	Contents (%)	Mean ± SD
1	Moisture	11.51	11.51 ± 0.01
		11.52	
		11.50	
2	Ash	16.27	16.27 ± 0.01
		16.28	
		16.26	
3	Protein	14.43	14.43 ± 0.01
		14.44	
		14.42	
4	Fiber	22.73	22.73 ± 0.01
		22.74	
		22.72	
5	Fat	1.30	1.30 ± 0.01
		1.31	
		1.29	
6	Carbohydrate	33.76	33.76 ± 0.05
		33.71	
		33.81	
7	Energy value	276.76	

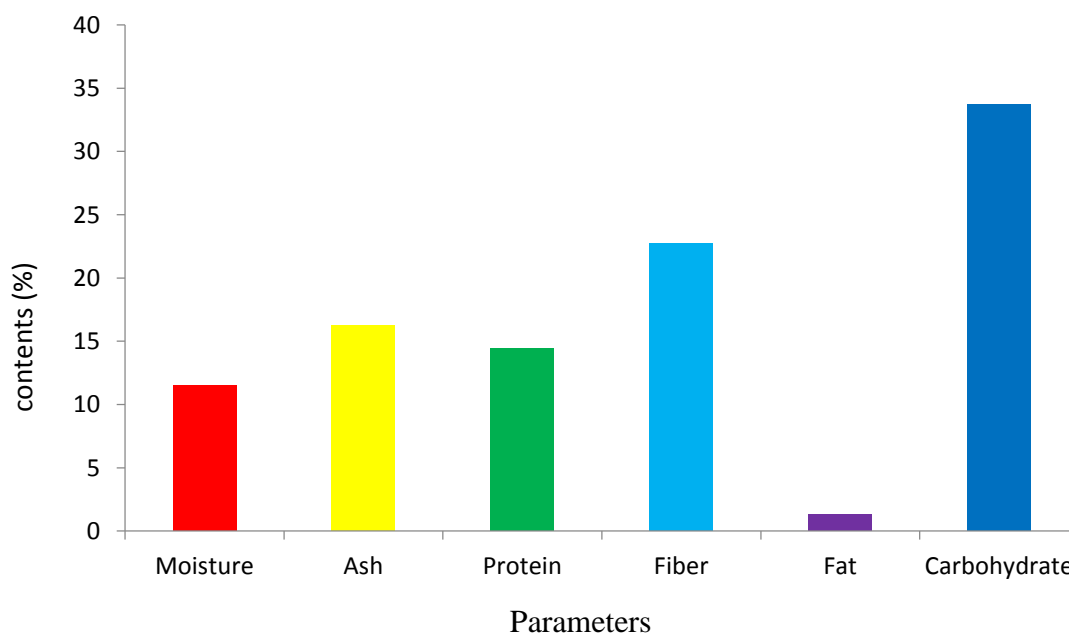


Figure (3). Histogram of nutritional values in *Melocanna bambusodies* T. (Kayin-wa-dok).

According to the literature, the beneficial effects of high fiber diets are protecting cardiovascular and the risk of developing diabetes or contribution to weight loss. Fat content is extremely low in bamboo shoots. Therefore it is very good for weight conscious and dieting people.

Table (3). Elemental Contents in Kayin-wa-dok by Atomic Absorption Spectroscopy (Based on Powdered Sample)

Element	Content (ppm)	Mean \pm SD
K	11.512	11.512 \pm 0.017
	11.512	
	1.875	
Mg	9.285	9.285 \pm 0.019
	9.285	
	1.696	
Ca	6.499	6.499 \pm 0.011
	6.499	
	0.191	
Fe	5.391	5.391 \pm 0.013
	5.391	
	0.170	
Mn	4.152	4.152 \pm 0.017
	4.152	
	0.134	
Zn	4.100	4.100 \pm 0.027
	4.100	
	0.533	
Cd	0.367	0.367 \pm 0.002
	0.367	
	0.034	
Cu	0.244	0.244 \pm 0.003
	0.244	
	0.013	
Pb	0.063	0.063 \pm 0.019
	0.063	
	0.001	
Cr	-0.260	-0.260 \pm 0.006
	-0.260	
	-0.004	

SD=Standard Deviation

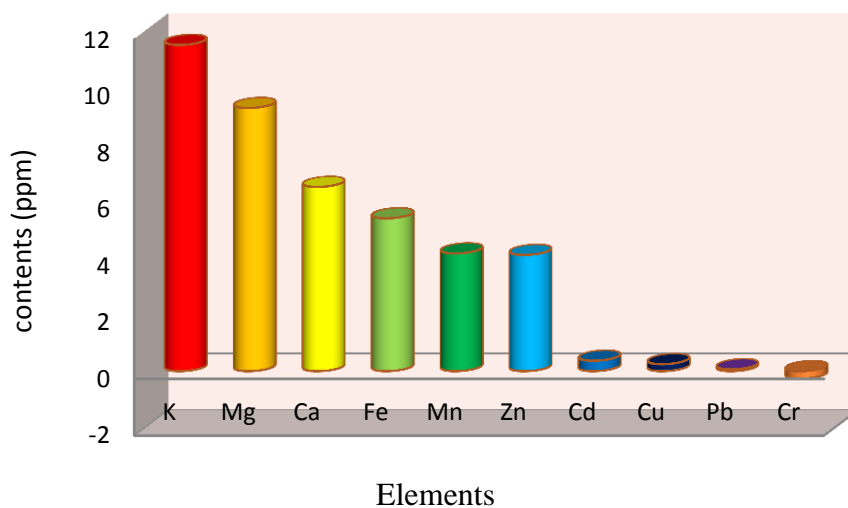


Figure (4). Histogram of quantitative elemental analysis in Kayin-Wa-Dok.

Antimicrobial Activity of some Crude Extracts by Ager Well Diffusion Method

From these results, PE and H₂O extract of Kayin-wa-dok sample did not show antimicrobial activity. EtOH extract of sample inhibited six organisms such as *S. aureus*, *P. aeruginosa*, *B. pumilus*, *C. albicans* and *E. coli* (11-14mm) as well as *B. subtilis* (17mm). Therefore, only EtOH extract sample showed antimicrobial activity . It can be useful as a supplement for ischemic injury treatment. The results are shown in table (4), and figure (5) and (6).

Table (4). Inhibition Zone Diameters (mm) of Various Crude Extracts of Kayin-wa-dok on Six Species of Microorganisms

No.	Organisms	Inhibition zone diameter (mm)		
		Pet-ether	EtOH	H ₂ O
1.	<i>B. subtilis</i>	-	17mm(++)	-
2.	<i>S.aureus</i>	-	12mm(+)	-
3.	<i>P.aeruginosa</i>	-	12mm(+)	-
4.	<i>B.pumilus</i>	-	13mm(+)	-
5.	<i>C. albicans</i>	-	14mm(+)	-
6.	<i>E.coli</i>	-	11mm(+)	-

Diameter of agar well = 10mm
 10 mm~ 14 mm = (+)
 15 mm ~ 19 mm = (++)
 20 mm above = (+++)

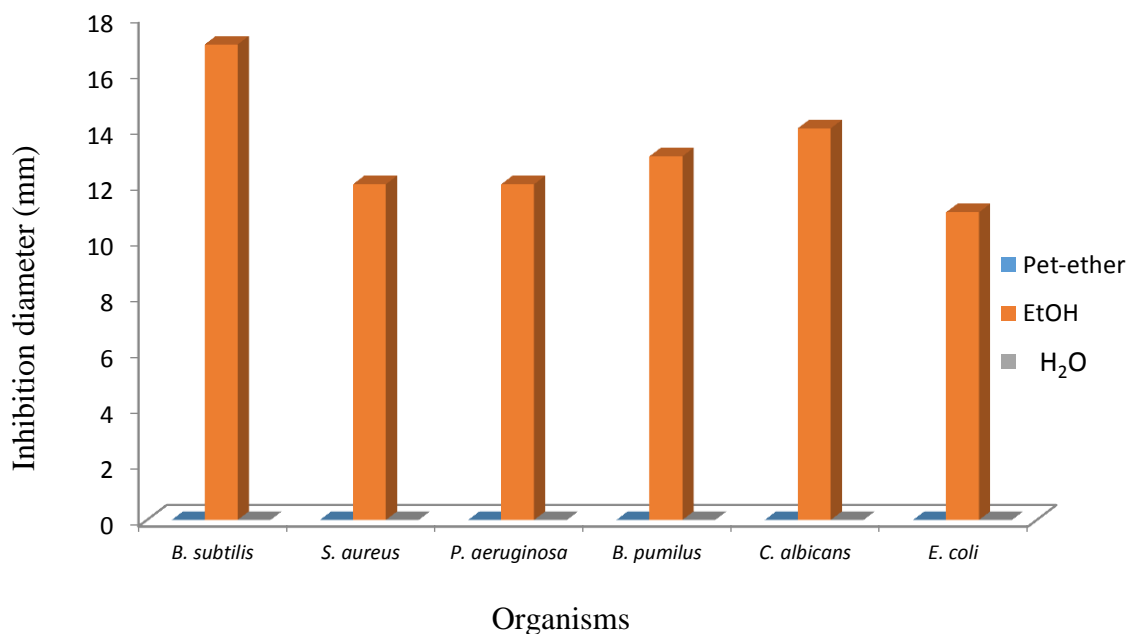


Figure (5). Bar graph of bacteria inhibition zone diameters (mm) of EtOH crude extracts of kayin-wa-dok on six microorganisms

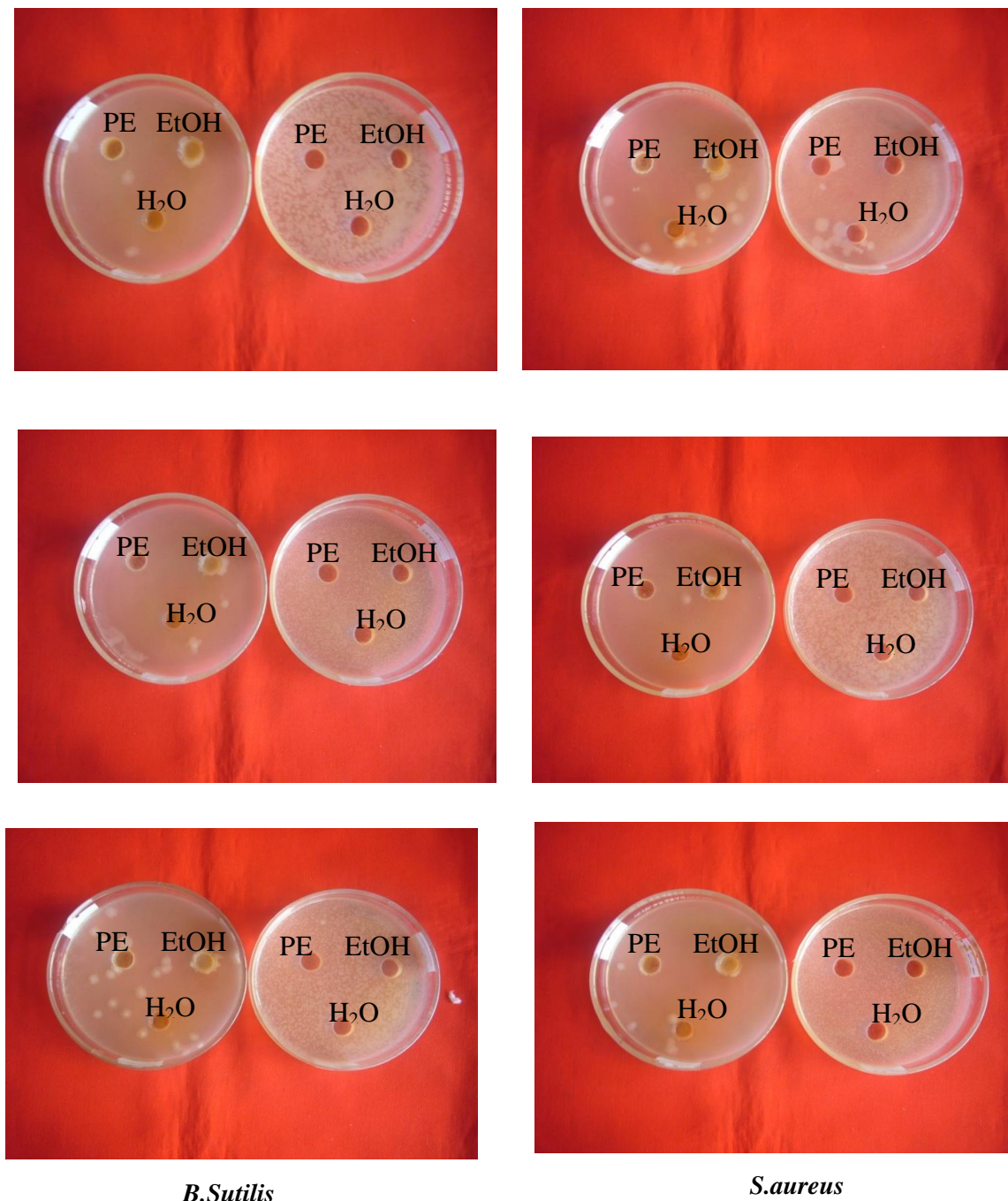


Figure (6). Effect of PE, EtOH and H₂O extracts from Kayin-wa-dok on some microorganisms.

CONCLUSION

From the overall investigation of the present work, the following interference can be drawn.

Phytochemical test, cyanogenic glycosides was found to be present in the Kayin-wa-dok sample. Therefore, Kayin-wa-dok should be consumed after sufficiently processing of bamboo shoot due to cyanogenic glycoside content.

The high fiber 22.73% and low fat 1.30% contents of sample were indicated as a diet supplement for the weight conscious and dieting people and it also agreed with Food Science and Nutrition data. Moreover, bamboo shoot acts as nutraceuticals (or) natural medicine.

The potassium was found to be the higher content 11.512 ppm than the other mineral contents.

According to the antimicrobial activity results, only EtOH extract sample was showed antimicrobial activity.

Finally, in this experiment, Kayin-wa-dok contains proper values of nutrients. It is also a suitable food for seasonal (or) traditional foodstuff and a main dish of Rakhine and other nationalities.

Acknowledgements

I would like to express my profound gratitude to Rector, Dr Tin Htwe and Pro-Rector Dr Theingi Shwe, Hinthada University, for their kind permission to present this paper. I also express my appreciation to Professor Dr Cho Cho Than, Department of Chemistry, Hinthada University for her kind supervision and encouragement to do this research work.

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