

## Chemical Investigation and Bioactivity Studying on *Tadehagi triquetrum* (L.) H. Ohashi (Lauk-thay)

Khin Zarli Htun<sup>1</sup>

### Abstract

The traditional system of medicine consists of a large number of plants with various medicinal and pharmacological importance and bioactive molecules. Lauk-thay is found all over the world. It has been recognized in different traditional systems of medicines for the treatment of various diseases of human beings. This paper includes phytochemical determination, mineral contents and antimicrobial activity screening of the leaves of Lauk-thay. Phytochemical constituents such as alkaloid, glycoside, flavonoid, polyphenol, saponin, reducing sugars and phenolic compounds were investigated by Harbone method. The elemental compositions in leaves were also determined by using EDXRF (Energy Dispersive X-ray Fluorescence) spectrophotometer. Antimicrobial activities of Lauk-thay were studied on crude extract such as 95% EtOH extract. According to the observation, ethanol extracts had antimicrobial activity.

**Keywords:** Lauk-thay, phytochemical, EDXRF, antimicrobial activity

### Introduction

Traditional medicine has been practiced for many years and is still widely used and important to Myanmar healthcare since it is more accessible and affordable, even in remote places. Traditional medicine, which is inexpensive and has few negative effects, is frequently used, particularly by the poor.

*Tadehagi triquetrum* (L.) H. Ohashi (Lauk-thay) is an erect perennial plant with stem that becomes more or less woody and persists; it can grow up to 3 meters tall. Flowers show raceme inflorescence type, which is small, pale purplish in color, fruit is a hairy legume. It was found to be widespread in all South Asian, East Asian, and South-east Asian countries. The plant is frequently collected in the wild and used locally as medicine. (Defilippis R.A, Krupick G.A, 2018)

Haemorrhoids are frequently treated using the leaves, typically in the form of a decoction. To soothe stomach discomfort, the leaves are infused. Lumbago is treated by externally applying the leaves. Both the leaves and seedpods are used as part of diuretic remedies to treat gravel in the kidneys and bladder. The root is used to cure kidney problems, TB and persistent coughs. (Hari Priyadi *et al.*, 2010)

The plant is reported to contain up to 8% condensed tannins. Condensed tannins are complex polymers of catechins and flavonoids, which are often esterified with gallic acid. The ability of tannins to form insoluble complexes with proteins, and their astringent properties are the basis for their use in traditional medicine, which includes treatment of conditions such as bleeding gums, haemorrhoids and to some extent, skin injuries. An ethanol extract of the aerial parts of the plant has shown antimicrobial activity.

In this research work, *Tadehagi triquetrum* (L.) H. Ohashi (Lauk-thay) plant leaves extract has been used. This plant extract was used to investigate the chemical composition and bioactivity.

---

<sup>1</sup>Demonstrator, Daw, Department of Chemistry, Mandalay University

**Botanical Description of Lauk - thay**

Botanical name - *Tadehagi triquetrum* (L.) H. Ohashi

Family name - Fabaceae

Genus - Tadehagi

Myanmar name - Lauk thay

Part used - Leaves



**Figure 1. The Leaves of Lauk-thay**

**Materials and Methods****Sample Collection and Preparation**

The leaves samples were washed with water to remove impurities from surface and cut into small pieces and dried at room temperature.

**Phytochemical Screening from Lauk-thay Leaves**

Preliminary detection of phytochemical compounds presents from Lauk-thay leaves were carried out according to the general methods mentioned in phytochemical methods (Harborne, 1984). These qualitative tests were done to indicate the presence of organic compounds such as alkaloids, glycosides, flavonoids, polyphenol, saponins, tannins, reducing sugars and phenolic compounds.

**Determination of Element Contents in Lauk-thay Leaves****Procedure**

Sample (3.5g) was fabricated into the pellet for EDXRF spectrometry. The EDXRF spectra of Lauk-thay leaves powder was shown in Figure 2.

The data regarding EDXRF analysis showing the presence of elements in the samples were determined qualitatively and were tabulated in Table 2. These results were measured at Department of Chemistry, Monywa University.

**Determination of the Antimicrobial Activity of Ethanol Extract of Lauk-thay Leaves**

Antimicrobial activity of ethanol extract leaves of Lauk-thay was checked by using agar well diffusion method with seven organisms at Department of Chemistry, Miettala University. The results are tabulated in Table3. The measurable zone diameter shows the degree of antimicrobial activity.

**Results and Discussion****Determination of Phytochemical Test for Leaves of Lauk-thay**

Lauk-thay leaves were tested by phytochemical screening and this result as shown in Table 1. alkaloids, glycosides, flavonoids, polyphenols, saponins, tannins, reducing sugars and phenolic compounds were present in Lauk-thay leaves. These results were shown in Table 1.

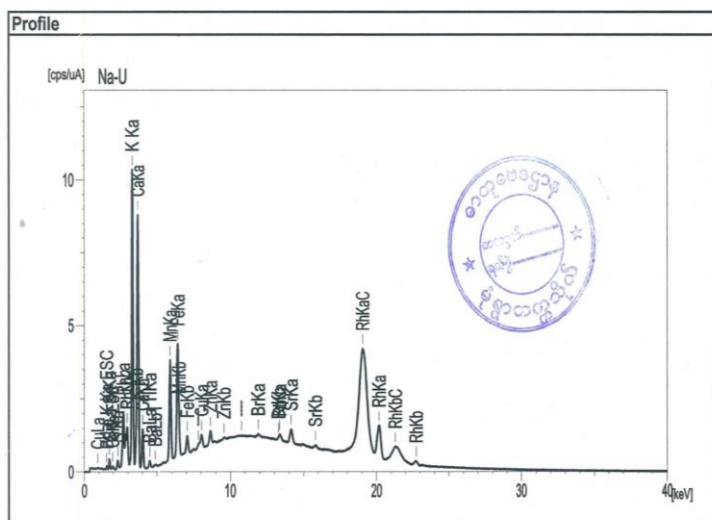
Table 1. The Results of Phytochemical Test for Leaves of Lauk- thay

No	Test	Extract	Reagent used	Observation	Result Lauk-thay
1	Alkaloid	1 % HCl	Wanger's reagent	Reddish Brown color solution	+
			Dragendroff's reagent	orange color solution	+
2	Glycoside	Distilled water	10% lead acetate	White color solution	+
3	Terpene	EtOH	CHCl <sub>3</sub> , Conc: H <sub>2</sub> SO <sub>4</sub>	No pink color solution	-
4	Flavonoid	EtOH	Mg, Conc: HCl, Conc: H <sub>2</sub> SO <sub>4</sub>	Orange color solution	+
5	Steroid	EtOH	1mL of acetic anhydride, Conc:H <sub>2</sub> SO <sub>4</sub> , CHCl <sub>3</sub>	Green color solution	-
6	Polyphenol	EtOH	3drops of 1% FeCl <sub>3</sub> , 1% K <sub>3</sub> [Fe (CN) <sub>6</sub> ]	Greenish blue color solution	+
7	Saponin	Distilled water	Distilled water	Froth	+
8	Tannins	Distilled water	10% FeCl <sub>3</sub> , dil:H <sub>2</sub> SO <sub>4</sub>	Yellowish brown color solution	+
9	Reducing sugar	Distilled water	Benedict's solution	Reddish color solution	+
10	Phenolic compound	Distilled water	10% FeCl <sub>3</sub>	Brown color solution	+

(+) = presence of constituents (-) = absence of constituent

### Determination of Elemental Contents of Leaves of Lauk-thay

The EDXRF spectra of Lauk-thay leaves powder was shown in Figure 2. The elemental content for leaves of Lauk- thay was determined by using EDXRF method at Department of Chemistry, Monywa University. These results were shown in Table 2.



**Figure 2.** EDXRF speratrum of leaves of Lauk- thay

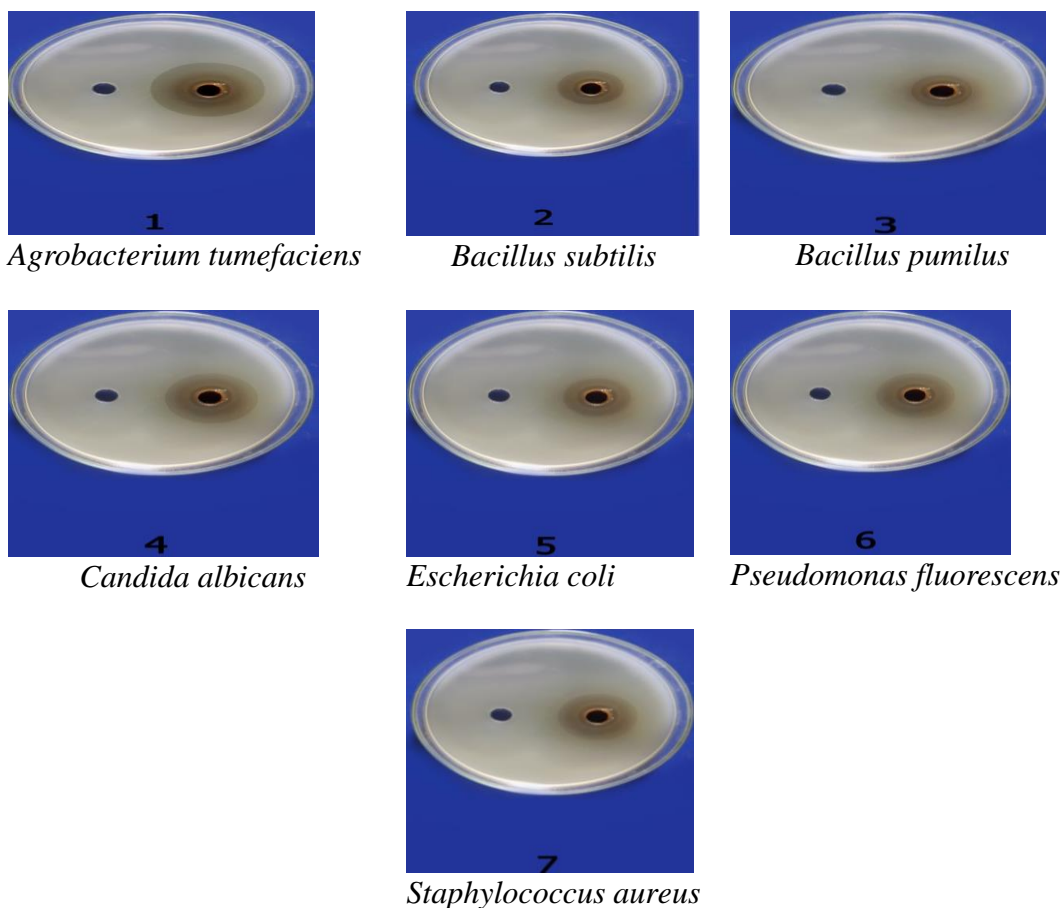
**Table 2. The Results of Elemental Contents of Leaves of Lauk- thay**

No	Elements	Symbol	Relative Abundance %
			Lauk-thay
1	Chlorine	Cl	-
2	Silicon	Si	1.321
3	Potassium	K	0.944
4	Calcium	Ca	0.473
5	Sulphur	S	0.101
6	Aluminum	Al	-
7	Phosphorous	P	-
8	Iron	Fe	0.027
9	Barium	Ba	0.005
10	Titanium	Ti	0.004
11	Manganese	Mn	0.033
12	Copper	Cu	0.002
13	Zinc	Zn	0.002
14	Strontium	Sr	0.001

According to this table, the higher amount of silicon and potassium were found in leaves of Lauk-thay. Moreover, calcium, sulphur, manganese, iron, barium, titanium, copper, zinc, strontium was also found in that order. This elemental content indicated that the leaves of Lauk-thay is a rich source of element.

#### **Determination of Antimicrobial Activity of Ethanol Extract of Lauk-thay Leaves**

The antimicrobial activities of ethanol extract of Lauk-thay leaves were performed by agar-well diffusion method. The results are tabulated in Figure 3 and Table 3.



**Figure 3. Antimicrobial Activities of Leaves of Lauk- thay**

**Table 3. The Results of Antimicrobial Activities of Ethanol Extract of Lauk-thay Leaves**

Sample	Solvent	Test Organisms (mm)	
		<i>Agrobacterium tumefaciens</i>	25.07(+++)
Lauk-thay	EtOH	<i>Bacillus subtilis</i>	16.82(++)
		<i>Bacillus pumilus</i>	12.89(+)
		<i>Candida albicans</i>	21.27(+++)
		<i>Escherichia coli</i>	19.79(+++)
		<i>Pseudomonas fluorescens</i>	20.42(+++)
		<i>Staphylococcus aureus</i>	20.63(+++)

Agar-Well-10mm  
 10mm-14mm (+)  
 15mm-19mm (++)  
 20mm above (+++)

### Conclusion

In this research work, firstly, phytochemical screening of Lauk-thay leaves extract was analyzed. According to the preliminary phytochemical screening results, Lauk-thay leaves contained alkaloids, glycosides, flavonoids, polyphenol, tannins, saponins, reducing sugar, phenolic compounds.

From the result of elemental composition, silicon and potassium were found to be higher than the other elements in Lauk-thay leaves. These minerals are essential for the human health.

The antimicrobial activities of the Lauk-thay leaves ethanol extracts were examined by agar well diffusion method. It found that ethanol extracts of Lauk-thay leaves can inhibit seven types of microorganisms. It shows the highest activity on *Agrobacterium tumefaciens*, *Candida albicans*, *Escherichia coli*, *Pseudomonas fluorescens* and *Staphylococcus aureus* than *Bacillus subtilis* and *Bacillus pumilus* bacteria. This sample possess the higher antimicrobial activity for multipurposes in medicinal field.

### Acknowledgements

The authors would like to thank Rector our deep appreciation to Rector, Pro-rectors and Head of Professor at Chemistry Department from Mandalay University for allowing to present this paper and also special thanks to Rector, Pro-rectors and Committee Members from Dagon University for allowing to read this research paper.

### References

- Defilippis R.A and G.A Krupnick (2018), " The Medical Plants of Myanmar", PhytoKeys 102,1-341  
Harbone, J. (1973) Phytochemical methods, London:Chapman & Hal,(49-88)  
Hari Priyadi *et al* (2010), Center for International Forestry Research; Indonesia 978-602-8693-22-6

Websites

<https://tropical.theferns.info>

<https://www.jica.go.jp>