

# Alternatives to Khamouk in Southeast Asia (2020)

Jill Emma Strothman

## I. Introduction

Khamouk, lacquer mixed with khi-thao (the ash of the Bodhi tree), is commonly used in Lao PDR as a pate to fill cracks in wood or to mold forms. In previous research, it has been shown that in khamouk made by native Lao artists, the pigment volume concentration (PVC) of khi-thao in khamouk produced for use as a wood pate was around 70-72wt%, and for khamouk used to make Buddha curls, the PVC of khi-thao was around 72-73wt%.<sup>1</sup> Further research by Kyoto Municipal Institute of Industrial Technology and Culture Research Fellow for Industry-Culture Communication Hiroshi Oyabu<sup>2</sup> corroborates the previous study but shows that the ratio of khi-thao can be lowered through improving the degree of polymerization of the lacquer, thus reducing the probability of cracking. Because khamouk is such an important part of Lao Buddhist art, it is essential for a Lao artist to master the art of making and using khamouk.

Khamouk is commonly used when decorating temples or when creating Buddhist art works such as Buddhist statues or baskets to give alms to monks. This is because the founder of Buddhism, Siddhartha Gautama, later known as Gautama Buddha, was sitting underneath a Bodhi tree when he achieved enlightenment. But the Bodhi tree cannot be found everywhere in Lao PDR, nor can it be found in every village in Myanmar and Thailand. So when they were not creating artwork specifically for temples, artists in these countries improvised by using other materials that could be locally procured. In this

paper, some of these alternative options are explored.

In her study of Burmese lacquerware, Sylvia Fraser-Lu reports that “Once the object has been polished, a second coating of finer material (htaung-thayo) is applied, it is made by mixing lacquer with finely sifted ash made by burning teak sawdust. Glue from boiled rice may sometimes be added to increase adhesives. For the finest work, the ash is obtained from burnt cow dung, rice straw, or powdered bone which has been carefully sifted through a cloth before being blended into the lacquer to form htei-thayo.”<sup>3</sup> As we can see, in Myanmar many alternatives to the traditional khi-thao have been used.

In Thailand as well, many alternatives to khi-thao have been used. In วัฒนา ตริภุคษ์พันธ์, “ตำราสำหรับหาเครื่องภาชนะต่างๆ หาร์ก หาสี หาสีน้ำมัน หาวานิช”, สถาบันศึกษาวัฒนธรรมญี่ปุ่นไทย, 1941 (Wattana Triprukphan, 塗工術 (tokoujutsu). 1941, タイ日文化研究所), methods of production of the following six types of materials that are similar to khamouk are reported.

- 1 Mixing plaster and lacquer, with a half-and-half mixture of water and alcohol added if the lacquer is not from Thailand
- 2 Thai samuk. Banana leaf ash mixed with lacquer. If quick drying is necessary mix in limestone or ash.
- 3 Lacquer mixed with nam-mannyang\*, used to repair boats. Because it dries quickly this should not be used for glass decoration.
- 4 Lacquer mixed with powder made by crushing ceramic material, or mixed with soil that is about 35% clay and 65% calcium carbonate deposits. This type should be applied thinly. If applied thickly it will not dry. If banana leaf ash or limestone are added it can be applied thickly.
- 5 Hide glue\*\* is mixed with soil that is about 35% clay and 65% calcium carbonate deposits, then mixed with a mixture that is one part formaldehyde to 10 parts water. After drying it does not dissolve in water.
- 6 In a method often used by Chinese, pig blood is mixed with powdered mudstone. If polished with water this comes off so it must be polished with

sandpaper. To fill cracks, put cloth in the crack and then fill with samuk.<sup>4</sup>

- \* In a process similar to harvesting maple sugar, the nyang tree (*dipterocarpus alatus* ยางพารา) is cut and fire is lit under the cut section. The sap, called nam-mannyang, comes out of the tree and is collected and used as a glue across Southeast Asia. In Lao PDR it is mixed with pigment to make paint.
- \* \* Hide glue in southeast Asia is usually made by charring to remove the hair on the hide, boiling for about three days, straining to remove hair and parts that have not melted thoroughly and drying. In Lao PDR it is usually made with water buffalo hide, but in Thailand cow hide is also used.

More recently, ash made by burning the outer layer and fibrous husk (exocarp and mesocarp) of the coconut is often used in Thai samuk, as seen in Figure 1, a photo received from Dr. Tomohito Takata, Department of Japanese for Communication, Faculty of Liberal Arts, Siam University, a specialist in Southeast Asian art. This is a convenient material that is left over after the white coconut meat (endosperm) has been eaten. Using it to make ash is environmentally friendly as it simultaneously reduces waste.

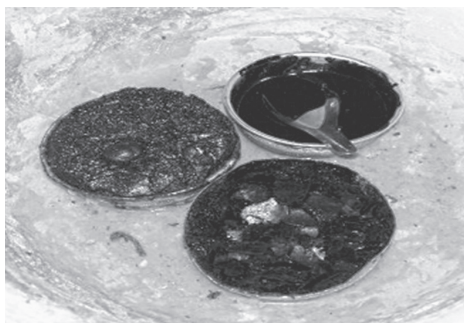


Figure 1 Thai samuk

In Lao PDR, two different methods of using water buffalo dung were reported in interviews. In an interview on February 27, 2020 with Ms Phonekeo Nok, a maker of baskets to give alms to monks, she said that her grandmother had used water buffalo dung to mix with lacquer and use as an undercoat for baskets around 1915. She was too young at the time to remember the method exactly, but she said that the water buffalo dung was immersed in water before

use. Similarly, in an interview on February 29, 2020 with Mr Phimpha Phongsavath, a teacher at the Luang Prabang Academy of Fine Arts, he reported the following method of preparing water buffalo dung to mix with lacquer:

1 put in water; 2 throw away water that rises above the sediment; 3 strain using cloth; (2 times if necessary); 4 dry; 5 pound if necessary; 6 sift; and 7 mix with lacquer.

The other method used in Lao PDR was not only a past method, but was actually used on a daily basis by Mr Ounheuang Soukkhaseum in his store, Mani Lacquerware Workshop in Luang Prabang. He was quick to assure us that he had learned the proper method of use and that the wet method described by the other two Lao artists was incorrect. His method uses water buffalo dung that has been dried completely. This is pounded and sifted. It is used as an undercoat, not for molding. This dry method is much easier than the wet method.

## II. Hypothesis

Now handmade traditional art has been largely replaced by mass-produced products, and most Lao artists have never used traditional alternatives to khi-thao. However, as the flora and fauna of the natural environment remain in a similar condition to bygone eras and the environment is similar to Thai and Myanmar, it should be possible to produce and use these materials made with local Lao ingredients even in this day and age.

## III. Materials

The lacquer used to make the alternatives to khamouk was Myanmar lacquer purchased at Mani Lacquerware. According to Kyoto Municipal

Institute of Industrial Technology and Culture Research Fellow for Industry-Culture Communication Hiroshi Oyabu, a solvent had been added to the lacquer, so the lacquer as purchased was 26% solvent. Solvent is often added to increase the viscosity of lacquer to facilitate application with a brush. As alternatives to khi-thao, three materials were prepared especially for this research.

### III-1 Banana leaf ash

Dried banana leaves were collected from a yard behind the HIS in Luang Prabang, with the owner's permission. Some had already fallen, some were still slightly attached to the tree, but the color of all of the leaves had changed from green to a yellowish brown and clearly the water content was low enough to burn easily. The leaves were not especially cleaned or treated, and it can be assumed that some amount of dust and insect material was also included. The banana leaves were put in an aluminum tub before burning to assure that other types of ash would not be mixed in (see Figure 2). Then the leaves were burned (see Figure 3). After that, the ashes were pounded to achieve a finer texture and then sifted (see Figure 4).



Figure 2



Figure 3



Figure 4

### III-2 Coconut ash

In a verbal explanation of the usage of coconut husks to make Thai samuk, Professor Takata explained that the material was black, not grey, with

occasional hard bits still included. Attempting to create this state as accurately as possible, 3 bags of mesocarp (fibrous husk) and two bags of exocarp (the outer hard layer of the coconut) were bought at the Market in Luang Prabang from a coconut meat seller after extraction of the white meat (endosperm) for sale. Then the mesocarp and exocarp were burned in an aluminum tub (see Figure 5). After burning to the state described by Professor Takata, the material was pounded (see Figure 6) and then sifted (see Figure 7) to achieve as fine a consistency as possible.



Figure 5



Figure 6



Figure 7

### III-3 Water Buffalo Dung

As mentioned above, cow dung and water buffalo dung have been used in many ways in many countries across Asia. For this experiment, I prepared three versions of water buffalo dung.

#### III-3-1 Mr Ounheuane's method

Dried water buffalo dung (see Figure 8) was bought at the Mani Lacquerware Workshop in Luang Prabang, Lao PDR. That was then pounded (Figure 9) and sifted (Figure 10), until the dung became fine.



Figure 8



Figure 9



Figure 10

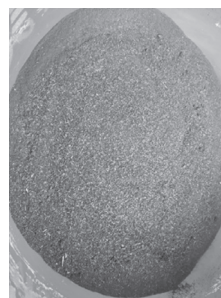


Figure 11

### III-3-2 Myanmar method

Dried water buffalo dung bought at the Mani Lacquerware Workshop was put in an aluminum tub (Figure 12) and burned until it became ash (Figure 13). Then it was pounded until it became fine (Figure 14) and sifted to remove any lumps (Figure 15).



Figure 12



Figure 13



Figure 14

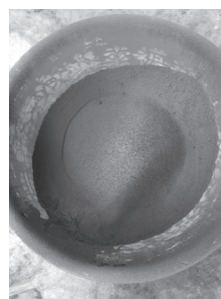


Figure 15

### III-3-3 Wet method

For this experiment, fresh dung from water buffalo running freely on a farm in Luang Prabang was used. As per the instructions given by Mr. Phimpha Phonexay, the dung was first put in water for 3 days, after which the water that rises above the sediment was thrown away. Then it was strained using a cloth for washing rice and spread out on a plastic sheet to dry (see Figure 16). Because it rained twice this took about 4 days. After drying the dung was in a



flaky form. This was pounded (Figure 17) and sifted (Figure 18).



Figure 16



Figure 17



Figure 18

#### IV. Methods

The first three alternatives to khamouk, coconut ash and lacquer, banana leaf ash and lacquer and Mr Ounheuan's dry pounded water buffalo dung and lacquer were made under the supervision of Kyoto Municipal Institute of Industrial Technology and Culture Research Fellow for Industry-Culture Communication Hiroshi Oyabu, and valid data could be taken. For each kind, 5 grams of aggregate was kneaded into 7 grams of lacquer (see Figure 19). The resulting material was molded using a traditional Lao mold used to make khamouk designs for baskets to give alms. The data regarding the materials can be seen in Table 1.

Table 1

| Experiment data    | 見かけ比重 |                           | dung                 | lacquer           |
|--------------------|-------|---------------------------|----------------------|-------------------|
| Dried buffalo dung | 0.317 | apparent specific gravity |                      |                   |
|                    |       | weight                    | 5 grams              | 7 grams           |
|                    |       | volume                    | 15.8 cm <sup>3</sup> | 7 cm <sup>3</sup> |
| PVC                | 69.3% |                           |                      |                   |
|                    |       | apparent specific gravity |                      |                   |
| Banana leaf ash    | 0.476 |                           | ash                  |                   |
|                    |       | weight                    | 5 grams              | 7 grams           |
|                    |       | volume                    | 23.8 cm <sup>3</sup> | 7 cm <sup>3</sup> |



|             |                           |        |                      |                   |
|-------------|---------------------------|--------|----------------------|-------------------|
| PVC         | 77.3%                     |        |                      |                   |
|             | apparent specific gravity |        | ash                  |                   |
| Coconut ash | 0.476                     | weight | 5 grams              | 7 grams           |
|             |                           | volume | 23.8 cm <sup>3</sup> | 7 cm <sup>3</sup> |
| PVC         | 77.3%                     |        |                      |                   |

Regarding the other two alternatives to khamouk made with different types of water buffalo dung, due to lack of time these were made but accurate data could not be taken. Verbal reports of all five kinds were taken from the same Lao artist, Mr. Aounheuan Inpadhit, seen in Figure 20, who had great experience in using khamouk for molding.



Figure 19



Figure 20



Figure 21



Figure 22



Figure 23

## V. Results and Discussion

### V-I Banana leaf ash and coconut ash

The banana leaf ash and the coconut ash had the same apparent specific gravity, 0.476, which was much higher than the water buffalo dung. Put simply, the same volume of the ash material was significantly heavier in each case than the water buffalo dung material. The particles were smaller and had less space between them. This showed clearly in the results. While all of the substances could be used for molding, the size of the particle affected the resulting form clearly. Looking at Figure 21, we can see that the surface and the edges of the mold made with water buffalo dung and lacquer are not smooth due to the large-sized particles. In comparison, the shapes molded using the banana leaf

ash and lacquer mixture (Figure 22) and the coconut ash and lacquer mixture (Figure 23) have clear and smooth surfaces and edges. Put simply, ash particles are small and can be kneaded into lacquer and molded easily.

### Verbal report

According to Mr. Inpadhit, the banana leaf ash was firmer than khi-thao and dried more quickly. He also mentioned that the material came out of the mold smoothly, always a plus for molding. He preferred the coconut ash, however, saying that the particles were small and the material was soft and easy to cut after molding. Of these three materials, he said that the coconut ash was the best for molding purposes. This verbal report agrees with the actual situation in Thailand, where banana leaf ash used to be the mainstream alternative but now has been replaced by coconut ash in the creation of Thai samuk. Mr. Inpadhit also said that the design of the mold showed more clearly than in any other alternative.

### V-II The three different kinds of water buffalo dung



Figure 24

Figure 24 shows molds made from the three different kinds of water buffalo dung mixed with lacquer. Of the three, the version made using the ash of the dung had the finest particles and made the smoothest form. The shape of the

mold appeared very clearly, with little difference in appearance from traditional khamouk made with khi-thao. Since I had read the material and knew that water buffalo dung ash was used in Myanmar to make thayo, I asked unbiased people if they could tell the difference between the mold made with water buffalo dung ash and one made with ordinary khamouk using khi-thao. No one could tell the difference. The color and texture are the same. However, Lao artists agreed that it would be very rude to use water buffalo dung to make Buddhist statues. Lao PDR is a Buddhist country and most Laotians believe in the teachings of Buddhism. This would probably be the same even if the religion were different – Christians probably wouldn't want cow dung to be used to make a statue of Christ.

The other two versions were far worse as substitutes for khi-thao. The dried dung that had been pounded was slightly better than the wet variation, but in either case, the fiber from the grass in the dung made an uneven surface that was not appropriate for molding. However, these versions were reportedly used as an undercoat. In that case, the fibrous material may have provided support, making the object stronger.

### **Verbal Report**

Mr. Inpadhit had trouble molding the wet variation of water buffalo dung. He said that the particles were not small enough to show the shape of the mold clearly. He said that this variation would be better used for filling cracks in wood than for art.

About the variation made by pounding dried dung, Mr Inpadhit said that it was lightweight, but the particles were too large. He added that the material was not sticky and didn't stick to the mold. In other words, unless it is burned to ash, dung is not useful for molding fine art objects.

Mr Inpadhit had only praise for the water buffalo dung ash and lacquer mixture. He said that the drying speed was just right, not too fast and not too slow, and the texture was very similar to khi-thao.

## VI. Conclusion

The simple conclusion of this research is that ash material is appropriate for mixing with lacquer to make fine art objects. Considering the production process and the resulting art object, the traditional khi-thao (ash of the Bodhi tree) and the Myanmar traditional khi-kuai (ash of water buffalo dung) produced equally beautiful molded objects. However, as mentioned above, social norms dictate that for Buddhist statues khi-thao should be used.

Next in order, coconut ash mixed with lacquer could be molded easily and made clear clean shapes when molded. It is no surprise that this material replaced banana leaf ash in Thailand. Banana leaf ash mixed with lacquer can be used for molding, but the edges of the produced shape are not as clear as with coconut ash.

Finally, the two versions made with water buffalo dung that was not burned were not viable alternatives for molding art objects. However, they have been used as undercoating, with finer material on the outer layer. In this case, the fibrous material from grasses would strengthen the object. However, it should not be used for religious objects but for everyday repair work.

## Acknowledgement

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## References

- 1 Jill Emma Strothman, Minoru Suzuki, Viraiavan Phonsamai: Journal of International Institute

- for Nichiren Buddhism, 2,1 (2018)
- 2 「ラオス漆工材料『カモク』の製造」, Hiroshi Oyabu Ph.D. and Isao Saito, Kyoto Municipal Institute of Technology and Culture 2020 Research Report
  - 3 “Burmese lacquerware”, Sylvia Fraser-Lu, White Orchid books, Bangkok, 2000
  - 4 วัฒนา ตรีพฤกษ์พันธ์, “ตำราสำหรับหาเครื่องภาชนะต่างๆ ทาร์ก หาสี หาสีน้ำมัน ทาวานิช”, สถานศึกษาวัฒนธรรมญี่ปุ่นไทย, 1941.  
Wattana Triprukphan, 塗工術 (tokoujutsu). 1941, タイ日文化研究所