

# *Creating Art Works*

## Handmade Paper for Drawing and Painting: A Study on The Use of *Mengkirai* Fibres to Produce Fine Art Papers

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### **ABSTRACT**

*Papermaking has been an important craft of Southeast Asia for seven hundred years. Malaysia's rainforests offer the mengkirai tree as an unexplored material for papermaking. Papers made from the bast fibres of the mengkirai bark have enough tensile strength, elasticity and flexibility for making hand-made fine art papers for drawing and painting. These papers are ideal for a wide range of art media including pencil, charcoal, acrylic and ink. Moreover, their surfaces provide tonal variations with different drawing and painting techniques. This study shows that art papers manufactured from the mengkirai are durable products for Malaysian artists and art students.*

**Keywords:** *bast fibres, mengkirai fibre, art paper*

In this article, we present a report on the process of making handmade fine art papers using natural fibres obtained from the *mengkirai* (*Trema orientalis*) plant, which is available in the tropical region of Pulau Pinang, at the northern part of the Malaysian Peninsular. Located in equatorial Southeast Asia, Malaysia has a hot, humid and tropical climate and rich rain forests. Because of the type of atmosphere of the region, many types of plants grow in Malaysia most of which are rich sources of bast fibres (Moore and Garratt 2008) that are well-suited for papermaking. Bast plants have strong woody fibres obtained especially from the phloem (the inner bark or the skin) of various plants. Bast plants have long and strong fibres (Kozłowski 1996), which make them particularly suited for papermaking. The bast fibres in *mengkirai's* bark have enough elasticity, flexibility and tensile strength for making hand-made art papers. Papers made from *mengkirai* fibres are suitable for drawing with painting mediums such as pencil, charcoal, acrylic and ink. This research shows that art-handmade-*mengkirai*-papers are viable products for artists to use in Malaysia and beyond.

### **FIBRE PROPERTIES FOR PAPERMAKING AND THE LOCAL *MENKIRAI***

Paper can be made from any raw material that is capable of forming a continuous sheet and this is the key word for many handpaper makers in their choice of fibres. The properties of paper pulps and the resulting papers depend directly on the characteristics of the fibres. The processing to which they are subjected has a major impact on their morphology and strength; in general, most of the lignin has to be removed to make the best pulp. The most common reasons for choosing one fibre over another are characteristics of length, diameter and thickness of its wall, size of lumen, flexibility and rigidity. The relationship of the length of the diameter of the fibre and the thickness of its wall is the first criterion used to evaluate good pulp.

Natural fibres vary in length from a fraction of a millimeter to over three centimeters in length and are only tenths of a millimeter in diameter. They are flexible, when dried out in

sheet form and suspended in water. A sheet of paper may contain from 8 to 10 layers of fibres (Turner and Skiöld 1983; Asuncion 2003).

*Mengkirai* (*Trema orientalis*) is a kind of local plant which grows in tropical areas, such as tropical East Africa, Madagascar, Pakistan, India and southern China to New Guinea, Australia, Indonesia and Malaysia. In Malaysia, it is called *mengkirai*, and its other common names are "native peach" or "poison peach". The *mengkirai* is a medium size tree that grows well in the rainforest. The height of a small *mengkirai* tree reaches to 8 m and the diameter of its stem is around 15 cm. Its smooth and greyish bark is rich in cellulose, which gives the fibre good flexibility, strength and texture, and is suitable for producing art paper.



**Photo 1** Mengkirai tree from Bukit Jambul,  
Pulau Pinang, Malaysia.  
Photographer: Elham Shafaei



**Photo 2** *Mengkirai* internal tree bark from Bukit Jambul, Pulau Pinang, Malaysia.  
Photographer: Elham Shafaei

### **HANDMADE *MENKIRAI* ART PAPER: MATERIALS AND METHODS**

It is difficult to define the aesthetic qualities of a sheet of handmade paper because it is often the result of a personal relationship between the maker, user and the sheet of paper. Small irregularities are proof of the uniqueness of a sheet of handmade paper and are an integral part of the hand process. The best papers are the results of combined knowledge and experience; of feel, look, colour, performance, beauty and perhaps an inexpressible understanding of everything it takes to make a sheet (Turner and Skiöld 1983).

While hand-made papermaking is a highly individual process, this project employs as the general guideline, the methods of hand-made paper that have been established at the School of the Arts, Universiti Sains Malaysia, Malaysia. Generally speaking, the process involves some experimenting with pulp preparation in order to produce suitable raw materials for papermaking. This process begins with cutting, cleaning, cooking, washing and beating the *mengkirai* bark, followed by the pulping process, sheet forming, pressing and drying the paper. In some instances, sizing and finishing are done to further the potentials of the fibre. Every single process has to be coordinated with one another in order to achieve good results.

To make pulp from the *mengkirai* tree, the bark must first undergo the processes of sorting, cleaning, chopping and cooking before being beaten. For this research, the clean and chopped *mengkirai* bark is boiled in water for around three hours. Soda ash must be added to the water (one spoon full for one liter of water) to further break down the fibres. The boiling process softens the stem and removes lignin from the fibres. After that, the cooked stems are put in a blending machine to macerate the fibre. After boiling, the fibres are rinsed with water to remove the lignin. Subsequently, the *mengkirai* fibres are beaten in the Hollander beater machine to make them shorter. Beating is one of the most important operations in the manufacturing of good-quality paper which can result in the fibres being cut up and also in the fibrils splitting off from the parent fibres (Turner and Skiöld 1983). Finesse of the pulp determines the type of papers, for example, a water colour paper generally requires more prominently textured surfaces, made from less finesse pulp (Hiebert 2000).

For forming the sheets from *mengkirai* pulp, the pulp is added in water to get the semi-liquid mixture in a large tank of water which is called the vat. Besides that, a mould, which is a wire screen in a wooden frame, is fitted with a deckle that is a wooden frame. The fitted mould and deckle are submerged and pushed to the bottom of the vat to scoop some of the slurry out of the vat. The deckle and mould are then brought up from the bottom of the vat, gently shaking them side-to-side to spread out the *mengkirai* pulp on the mould. Finally, the deckle is lifted completely off the water to allow all the water to drain off. This produces a *mengkirai* pulp sheet.

Following this, wet sheets of *mengkirai* papers are transferred from the mould onto sheets of felt, one sheet on top of another. This process is called couching. Soft and absorbent felt should be used. The mould is pushed onto the felt firmly so that the paper adheres to it. This stack of wet papers is called a post of papers.

Then, the post of wet *mengkirai* papers is put under the press to squeeze the remaining moisture out over night. Pressure is gradually applied to the pulp sheet until no water comes out from the post of paper<sup>1</sup>.

After the pressing process, the sheets are transferred onto a large vertical wooden panel to dry. This process is called laying. The *mengkirai* papers still contain 65%–70% of water, after being pressed overnight. *Mengkirai* papers are carefully peeled off from the felt. This process is very sensitive, because the paper may also develop pinch marks if it is not handled carefully during the peeling. Once the *mengkirai* sheets are peeled off completely, they should be put on the wooden panel to dry.

For the final drying process that is commonly practiced in handmade papermaking, the *mengkirai* papers are placed on a vertical panel and allowed to dry at room temperature. For this research project, 100 g of metal cellulose is mixed to 1000 ml water, which helps the sheets to stick on the panel. The solution is evenly spread onto the panel using a roller. The papers are left to dry at room temperature for almost one day depending on the paper thickness.

Because of the hydrophilic quality of cellulose, each sheet of paper is like a potential sponge. This means that the *mengkirai* paper will easily absorb moisture and lose its shape if a wet drawing/painting medium is applied on it. Sizing glue is used in this research to avoid this problem.

Two methods of sizing are employed: external and internal (also known as coating)<sup>2</sup>. In external sizing, 300 g of pure gelatine and 30 g of alum (aluminium sulphate) must be soaked in 6000 ml of cold water until they swell. Then, the mixture should be heated slowly until it dissolves completely. Gelatine is added until the mixture becomes neutral. The percentage of acidity could be measured through pH meter. The mixture should not be very thick, because that makes the paper very hard. The best time to use sizing infiltration is when the solution is warm. Then, each sheet of *mengkirai* paper is immersed into the sizing solution.

Each sheet should be well covered. After that, the sized sheets are removed and placed on the vertical panel to dry.

Internal sizing (coating) in the current study, includes the filling of the empty holes of the pulp, coating the papers with calcium carbonate and recycling the paper pulp to make the paper more durable and water resistant. Fillers are used in papers to heighten absorbency, softness, dimensional stability, increased rigidity or fine resistance. For this purpose, 30% of calcium carbonate/recycled paper should be mixed with the 70% of *mengkirai* pulp, using the Hollander beater.

Finally, the finishing process helps the papers to have a smoother surface. This is done by compressing the *mengkirai* papers one by one through a press machine. Papers can either be hot-pressed or cold-pressed. Hot-pressed papers are characterised by very smooth surfaces while the cold-pressed papers can vary from rough to smooth (Staff and Sacilotto 1978). Both kinds of pressing have been applied in the current study to make pressed *mengkirai* papers.

## **STUDIO EXPERIMENTATION, PROCESSES AND RESULTS: *MENKIRAI***

For quality test in this study, pressed-sized and pressed-unsized pure *mengkirai*, *mengkirai* + recycled paper and *mengkirai* + calcium carbonate handmade papers were given to some well known Malaysian artists to test with pencil, charcoal, acrylic and printmaking (Figures 3–6). Each artist had to focus on one material to test. Additionally, some of the same tests had been done by the researcher herself.

The next section summarises the results of the tests which were carried out by different Malaysian artists on handmade *mengkirai* papers.

Pure *mengkirai*, *mengkirai* + recycled paper, and *mengkirai* + calcium carbonate papers are totally acid free. These papers have fair weight and very good texture to be used for the acrylic medium. Furthermore, sized and unsized papers have been used for the acrylic

medium. Unsized paper is good when acrylic is used as a thick paste which has characteristics similar to oil paint. However, when diluted to a wash, sized paper is suggested.

For this research, the printmaker artist used Intaglio print on all the varieties of *mengkirai* papers. The artist believes that *mengkirai* papers are quite thin to be used for Intaglio print. Nevertheless, all of the handmade papers have fair ability to hold colour pigments.

Based on the artists' comments about using pencil on different varieties of *mengkirai* papers, all the papers seem to be very interesting. They have beautiful textures and are suitable

for drawing with pencil. They also have a good ability for line variation and tonal variation. Furthermore, except for pure *mengkirai* paper, they are erasable.

The artists also say that all the different varieties of *mengkirai* papers are suitable for charcoal drawing. Their surfaces and textures are fine and have the capability for line variation and tonal variation. Additionally, with the exception of pure *mengkirai* paper, they are erasable. However, the colours of *mengkirai*, *mengkirai* + recycled paper and *mengkirai* + calcium carbonate papers are too dark to be used for charcoal.



**Photo 3** Artist's test result, acrylic on *mengkirai* paper, 30 x 30 cm, 2012, Malaysia.

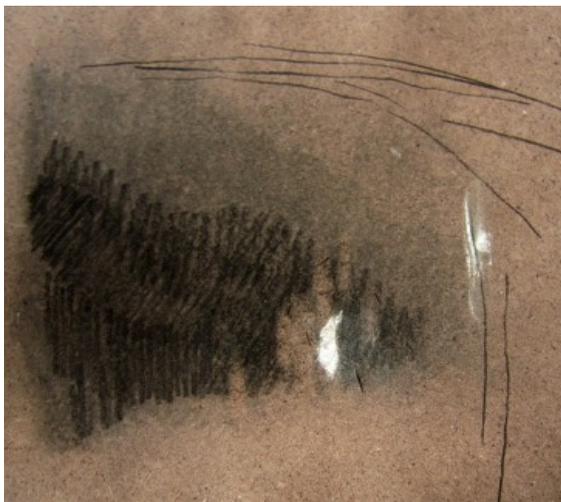
Artist: Fauzan Omar; Photographer: Elham Shafaei



**Photo 4** Artist's test result, printmaking on *mengkirai* paper,  
30 x 30 cm, 2012, Malaysia.  
Artist: Kim Ng; Photographer: Elham Shafaei



**Photo 5** Artist's test result, pencil on *mengkirai* paper,  
30 x 30 cm, 2012, Malaysia.  
Artist: Izmer Ahmad; Photographer: Elham Shafaei



**Photo 6** Artist's test result, charcoal on *mengkirai* paper, 30 x 30 cm, 2012, Malaysia.  
Artist: Izmer Ahmad; Photographer: Elham Shafaei

## CONCLUSION

This research shows that *mengkirai* fibres make excellent fine art papers since these papers are the purest, toughest and strongest papers which are comparable with commercial art papers. The bark of this tree is a rich source of cellulose. *Mengkirai* fine art papers are suitable to be used with different types of painting and drawing mediums. Overall, it is found that papers made from *mengkirai* bark are suitable for all the dried mediums tested, namely pencil and charcoal. Nevertheless, sized-*mengkirai*- papers are slightly better to be used with wet mediums.

Since Malaysia produces numerous internationally famous painters and draftsmen, all of these artists (and art students) are dependent on using imported papers that are very highly priced. It goes without saying that this research has an excellent potential for commercialisation, providing cheaper yet high-quality alternatives to local artists and art

students. Thus, *mengkirai* papers can enable them to be more self-sustaining by reducing their reliance on expensive imported art papers. Additionally, the local national economy can be advanced with the help of handmade paper enterprises (Poudyal 2004). It is also foreseen that this research will be able to create a promising future in the enhancement of human capital and commercial potential (Ganguly, Bhaduri and Day 2004; Poudyal 2004; Biggs and Messerschmidt 2005).

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#### **NOTES**

1. Couching would be repeated to make a post of papers. "Post" is a variable measurement and is the term given to a quantity of the freshly couched sheets with felts between them ready for pressing (Asuncion 2003; Turner and Skiöld 1983: 80; Shannon 1987).
2. A comparison of the appearance and feel of papers that were sized externally and internally shows the paper with external sizing is stiffer and harder than the internally sized paper (Asuncion 2003). Sizing materials include animal glue, gelatine and plant sizing (made from rice, corn, wheat or tapioca starch, algae, plant juices or rosin). Animal glue and pure gelatine are very useful materials for sizing. Pure gelatine is perfectly suitable, because the low quality of animal glue helps the papers to turn yellow quickly (Staff and Sacilotto 1978).

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