

Analytical Study on the Quality of Some Natural Oils used in Preservation of Ancient Myanmar Pe' (Palm - leaves)

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Abstract

In Myanmar, there are many ancient manuscripts, such as Pe', parabeik, minza kaunglaungza and so on. Their life-span generally has been as long as nearly 300 years. Pe' can easily be brittle and/or ruined due to the weather or other natural disturbances. Oils are thus required to be used to protect such disturbances. The common oils applied on Pe' are Camphor oil, lemon-grass oil and Neem oil. They are essential for the purpose of preserving and conserving for precious ancient Myanmar Pe' (palm-leaves) thoroughly analyzed and discussed.

Introduction

In Myanmar, before paper was introduced there were several materials for writing, such as palm-leaf (Pe'), parabike, minza, kaunglounza and so on. Of these, the palm-leaf was probably the most important and the most popular. There were two main techniques for writing for illustrating on palm-leaf, namely-

- (i) by making incisions with a pointed stylus.
- (ii) by writing with a pen or brush.

With the help of the iron stylus the writing and illustrations were incised into the leaf. At this stage, however, the writing was not legible. A black paint prepared by mixing lamp-black or charcoal powder in oil was applied on the surface of the palm-leaf. The excess paint was wiped off with cloth. By this process the black paint was deposited in the incisions and remains there. In this manner the writing becomes visible. In Myanmar, turmeric powder mixed in crude oil was applied on the surface of the palm-leaf in the manner of the traditional practice.

Life-span of the palm-leaf generally has been as long as nearly 300 years. But, there are various types of deterioration defects that develop in palm-leaf manuscripts. The main ones are:

- (i) Stains and spots
- (ii) Discolouration of the surface
- (iii) Insect damage
- (iv) Damage due to fungus
- (v) Loss of flexibility
- (vi) Splitting of the various layers of the palm-leaf.

With age palm-leaves become fragile and brittle. Old leaves can easily break into pieces. The edges become so weak they crumble at the slightest touch. The main cause for the loss of flexibility is the break-down of the structure of the leaf.

To solve of these problems, spread oils over palm leaves and studied various parameters. In this paper studied and compared about the characteristics of three natural oils:

- (1) Camphor oil
- (2) Lemon-grass oil
- (3) Neem oil

In order to impart to the leaf the original suppleness and also an insecticidal property an oil like Camphor oil, Lemon-grass oil is applied on its surface with a piece of soft cotton cloth. Based on the experimental results, these oils are recommended as being more or most useful in solving the problems.

Samples

The palm-leaves were procured from the UCL, Yangon, Myanmar. The dried leaves hanging on a tree were collected to conduct the experiments.

The naturally dried palm-leaves were approximately 90-120cm in length and 2.5-7.6cm wide; they were tough and broke easily on bending.

The leaves appeared yellowish in colour covered with dust and dirt. The leaves were cleaned with tap water and then distilled water to clean the dust and dirt, etc.,

To prepare the sample specimens 7cm long and 4cm wide for testing. The palm leaves were dried at room temperature after cleaning and conditioned for about 15 days in a sampling chamber.

Testing

To study the flexibility of palm-leaves manuscripts of stiffness and brightness were considered most important. The stiffness of palm-leaf was measured on a Taber stiffness Tester manufactured by India.

The brightness of palm-leaf samples before and after oil treatment was measured on a Gloss Reflectance meter (AIM-611) manufactured by India.

Natural oils

Some natural oils are essential oils for palm-leaf preservation. It may be defined as oily liquids which are entirely, or almost entirely, volatile without any decomposition.

Essential oils are generally liquids, though sometimes semi-solid at ordinary temperature.

Certain essential oils are capable of deterioration on strong as shown by changes in the quality of the odour, by increase of viscosity and by changes in other properties. These oils are very complex in their chemical nature.

In this paper, Lemon grass oil, Neem oil, Neem oil and Camphor oil used such as natural oils for palm-leaf preservation.

Lemon-grass oil

Oil of lemon-grass is one of the important natural oil. This oil is obtained by distillation from *Andropogon schoenanthus* grass. Large quantities are used for the extradiation of citral which contains 75-85%, the chief constituent of the oil.

Citral is the starting material for the preparation of the important ionones. Because of its high citral content the oil passes a strong lemon odour where the name lemon grass. The percentage of the oil content the lemon-grass grown in Inya Hall Gardewn, give a yield in the range of (0.39-0.59 %).

The trade distinguishes between two principal types of lemon grass oil, that is the East Indian and West Indian oil. Both contain from 75% to 85% citral; but the oil differ slightly is that West Indian product is usually less soluble in 70% alcohol than the East Indian.

Lemon-grass oils have a slightly yellow or but age changes it to reddish yellow coloured with a strong odour and taste of lemons. The oil is used in medicine and extensively used in perfumes, cosmetic, toilet soaps and also as a flavouring substance.

To make the oil, the grass is cut in pieces a span long the little roots excepted and the pieces are put into earthen pans. Their subsequent exposure to the warmth of fire extracts the oil.

Camphor oil

This natural oil is also found in hollows in the wood, which the natives crystallize artificially; but the camphor thus obtained is not so much esteemed as the found naturally crystallized from the oldest and richest trees they rarely collected more than two ounces.

Camphor oil is also said to be collected by incisions at the base of the trunk, from which the clear balsamic juice is very slowly discharged.

Camphor oils is more volatile, light and dry than the other oils; hence they get more easily absorbed in the parenchymal, cells of palm leaf through the epidermis.

Neem oil

All trees bearing the name "Tamar" in Myanmar means *neem*. Neem trees are found all over Myanmar. All the trees studied belongs to the family meliaceae and are of Asian origin.

It has been used most extensively throughout the country as a house-hold remedy for treatment of common ailments.

It is also recognized as a forest crop with multiple uses including fuel-wood , timber-production, oils, tannins, pesticides, organic manures and medicinal products. Almost all parts of the tree are utilized.

Neem products are oil, meal,soap, gum, tooth-paste, tooth-ache powder, seeds, kernels, neem glue, etc.

Collecting neem seeds for oil extraction is a traditional practice in Myanmar. At first, neem oil was used as lubricant and fuel for lamps. And then, it is the best and most important derivative to be used as medicine.

It displays stimulative, antiseptic and alternative effect when used for massage on the body and acts as a remedy against boils, ulcers, etc.

Experiments

In these experiments, camphor oil, lemon-grass oil and neem oil were used. The palm leaf samples prepared in strips were weighed on a digital balance and tested before oil treatment. The same samples were treated with oils for variable periods of time.

A sample set of six strips of palm leaf was dipped into each oil for 15 min in covered petri dish.

At the end of the stipulated period, the strips removed one by one and spread over the blotting paper. The excess oil was wiped away from the surface by using additional blotting and applying pressure gently on a smooth table.

The samples were kept in a sampling chamber for overnight drying at room temperature. The dried samples were weighed; the percentage of brightness and stiffness was tested for 0,0.5,3,6,24 and 72hrs. The results obtained before and after oil treatment were shown in table 1-3.

Table 1. **Results of palm-leaf samples treated with Camphor oil.**

Sample	Oil contact period (hours)	Weight of sample strips(g)	Brightness (%)	Stiffness(Taber units)
1	0	0.41	34%	20
2	0.5	0.42	34%	21
3	3	0.44	33%	23
4	6	0.47	32%	24

Sample	Oil contact period (hours)	Weight of sample strips(g)	Brightness (%)	Stiffness(Taber units)
5	24	0.49	30%	26
6	72	0.52	29%	27

Table 2. Results of palm-leaf samples treated with Lemon-grass oil.

Sample	Oil contact period (hours)	Weight of sample strips(g)	Brightness (%)	Stiffness(Taber units)
1	0	0.44	31%	18
2	0.5	0.58	25%	20
3	3	0.72	23%	20
4	6	0.82	22%	21
5	24	0.87	21%	21
6	72	0.91	20%	23

Table 3. Results of palm-leaf samples treated with Neem oil.

Sample	Oil contact period (hours)	Weight of sample strips(g)	Brightness (%)	Stiffness(Taber units)
1	0	0.42	35%	21.5
2	0.5	0.53	29%	21.5
3	3	0.59	28%	22.3
4	6	0.68	27%	23.2
5	24	0.72	26%	23.5
6	72	0.89	24%	24.5

Results and Discussion

An optical property such as brightness is significant in determining whether the sample strips have increased in weight. Brightness changes as the weight of sample strips changes and the weight of sample strips changes if oil is absorbed.

Camphor oil is more volatile, light and dry than the other oils; hence it gets more easily absorbed in the parenchyma cells of palm-leaf through the epidermis. Sample strips do not gain more weight from absorbing oil even after 72 hours of treatment and the leaves stay soft and flexible.

Lemon grass oil and Neem oil are more thick and viscous and get absorbed slowly into the leaf. So, Lemon-grass oil and Neem oil form a thick layer on the surface of sample strips on drying, which may become hard and tough and also add additional weight to sample strips, gradually decreasing the flexibility of palm-leaf.

Camphor oil is more helpful in treating the palm-leaf manuscripts in normal atmospheric conditions and also an insecticidal property. Lemon-grass oil and Neem oil can also be used for preservation; especially in hot weather, these oils can help to relax the old and fragile palm-leaf objects.

Camphor oil can be used in all seasons, but lemon-grass oil and Neem oil can not be used in all seasons, can be used only in summer time. In the market, Camphor oil is more expensive than Lemon-grass oil and Neem oil. So, if the Library's finances strong enough for preservation, from this result recommended that Camphor oil is the best.

References

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