ICOM-CC
18th Triennial Conference
2017 Copenhagen

TEXTILES

Brennan, J.M., N. Pianprasankit, and L. García-Alonso. 2017. Before they are gone *expanded*: Capturing traditional textile preservation knowledge in Southeast Asia and Latin America

JULIA M. BRENNAN*
Queen Sirikit Museum of Textiles
Bangkok, Thailand
Julia@caringfortextiles.com

NUCHADA PIANPRASANKIT
Queen Sirikit Museum of Textiles
Bangkok, Thailand
np35@qsmtthailand.org

LILIAN GARCÍA-ALONSO
National School of Conservation, Restoration and Museography
Mexico City, Mexico
lilianalonsoarte@gmail.com

*Author for correspondence

KEYWORDS: saponin, surfactant, detergent, polar, non-polar, staining, textile preservation, indigenous, bio-heritage, Southeast Asia

ABSTRACT

This research and associated publications are the result of initial professional conservation collaborations between Southeast Asian and Mexican conservators and preservation specialists to study, chronicle, and quantify the traditional practices and materials used in textile preservation. In 2016, the Regional Centre for Archaeology and Fine Arts, part of the Southeast Asian Ministers of Education Organization, and the Queen Sirikit Museum of Textiles sponsored a project of the regional Association of Southeast Asian Nations on Capturing and Sharing Traditional Methods in Textile Preservation in Southeast Asia, in collaboration with Mexico's National School of Conservation, Restoration and Museography. Following on the 2012 pilot research done in Thailand and published in the *Preprints* of the 17th ICOM-CC Triennial Conference in 2014, the project was broadened to engage 14 researchers to collect stories, recipes, preservation data, plant materials, traditional cleaning methods and beliefs, and hold a forum for testing of selected plant materials. This ongoing effort engages networking at a national and international level, embraces an

INTRODUCTION

This study is both a continuation of the Thai pilot project, which was presented at the 17th ICOM- CC Triennial Conference in 2014, and a collaboration with a sister project at the National School of Conservation, Restoration and Museography (ENCRyM), New Mexico. Since 2012, the Regional Centre for Archaeology and Fine Arts of the Southeast Asian Ministers of Education Organization (SEAMEO SPAFA) and the Queen Sirikit Museum of Textiles (QSMT) have partnered under the flagship program *Conservation in the Tropics*. The initial Thai project established that, over centuries, traditional methods and materials had been effectively used in textile preservation – for cleaning, stain removal, and pest mitigation. However, these processes and materials had not been properly documented and were at risk of disappearing, leaving invaluable, traditional knowledge in danger of being lost forever.

Consequently, the current study expanded its research to the 12 countries comprising the Association of Southeast Asian Nations (ASEAN), focusing on documenting and sharing this important knowledge on preservation. Selected Southeast Asian textile conservators and museum professionals engaged in community-based research, and convened in a regional forum in August 2016. Researchers from Mexico, at ENCRyM, conducted a parallel research project with Mesoamerican traditional technologies, testing both materials and recipes. The final product is a searchable database of plant materials and recipes for different surfactants and stain removers. This database will provide quantitative guidelines so contemporary textile conservators can again use these indigenous plant-based technologies and knowledge. The project is about preserving national and collective heritage, and is part of the future foundation of ongoing global textile conservation practices and training (Brennan 2014).

PROJECT STRUCTURE

Phase I was conducted by textile conservation and heritage specialists and entailed fieldwork, documentation, compilation of the collected data into the established data formats, and collection of regional plant materials for analysis and testing. There were 14 researchers from Asia;[1] 3 team leaders (the authors of this paper) provided mentorship for the researchers and the testing and analysis.

TEXTILES

BRENNAN, J.M., N. PIANPRASANKIT, AND L. GARCÍA-ALONSO. 2017. BEFORE THEY ARE GONE *EXPANDED*: CAPTURING TRADITIONAL TEXTILE PRESERVATION KNOWLEDGE IN SOUTHEAST ASIA AND LATIN AMERICA

interdisciplinary approach of diverse stakeholders, and promotes interest in scientific analysis of traditional technologies with the explicit aim of preserving ancient wisdom and incorporating this knowledge into modern, professional textile conservation practice.

Phase II was a 2016 Bangkok-based forum bringing together the researchers and scientists, and sponsored by QSMT and SEAMEO SPAFA (Figure 1). Participants presented their data about the history of textile preservation in their country, past methods, current practices, and traditional recipes. The forum identified the priorities regarding the most useful information for today's textile professionals in museums. A substantial part of this phase is the chemical and physical analysis and testing of a selected group of indigenous plant saponins, in comparison with synthetic compounds commonly used in textile conservation. The testing protocol and its subsequent analysis was designed and carried out in collaboration with researchers from Mexico; these results are included in this publication. A comprehensive plant chart, in all Southeast Asian languages, detailing all the traditional plants, is in process. A partial saponin chart can be found in Table 1.

Table 1. Partial list of plant-based saponins; abridged research to date (photos: Lilian Garcia Alonso, Julia Brennan, Benny Gratha)

No.	Material			Plant part	Preparation method	Notes	Photos
	Common name	Latin name	Country				
1	Xix-ki (Maya Yucatán, Mexico)	*Agave ixtli Karw.* (Agavaceae)	Americas, Asia	Root	Root, crushed and applied directly, also kneaded, dehydrated, molded into little rolls for later use.	Used on cotton and other fibers	
2	Amole (Mexico and Guatemala) Agave cactus (NA)	*Agave brachysta- chys Cav.* (Aga- vaceae)	Americas, Asia	Root	Root, crushed and applied directly, also kneaded, dehydrated and molded into little rolls for later use.	Used on cotton and other fibers	
3	Yucca (Mexico), cactus	*Yucca schidigera*	Americas, Asia	Root	Root applied directly	Used on cotton and other fibers	
4	Sterculia	*Securidaca inappendiculata Hassk.*	Asia	Outer skin of fruit	General cleaning, stain removal. Use the burnt ash of outer skin, soak in warm water, simmer, strain.	Used on cotton. Used in rural Thailand	
5	Soap nut, *lerak, rarak* (Indonesia)	*Sapindus rarak A.DC. Sapindus saponaria L.* (Sapindaceae)	World wide	Fresh fruit meat, or Dry shell	General cleaning, stain removal. Use the fresh or dry seed, mash, squeeze and put into warm water. No need to heat and simmer if using the fresh fruit. Strain.	Used on cotton, extensively in Java, but other fibers too. Most common saponin. Is gentle, insecticidal, antimicrobial.	
6	Kheenhon (Thailand)	*Zollingeria dongnaiensis Pierre,* (Sapindaceae)	Asia	Raw bark	General cleaning, stain removal. Cut the raw bark into pieces and put into water, heat, mash, strain.	Used on cotton. Has saponin in the roots too.	
7	Hualing (Thailand) หวลง	*Sarcolobus globusus apocynaceae*	Thailand, Asia	Leaves	General cleaning, used as a detergent. Put leaves in water, simmer, mash, strain.	Used on silk. A relatively soft cleaner. In India, the plant is associated with the *dhobi* caste, who wash clothes.	
8	Turmeric *khamin* (Thailand)	*Curcuma longa L.*	Worldwide	Root	General cleaning. Used as a turmeric soap. Mix with water.	Used on silk and cotton. Appears in some "ecological surfactant" shampoo in the USA, Europe, and Asia.	

Phase III has two objectives. The first is the planning for continued research with an interdisciplinary approach. The necessity to further develop what has already been accomplished in this first regional project will advance to a second study to expand the scientific testing of additional materials and methods, in collaboration with Mexican scientists. The second objective is the publication of data in two formats: a professional publication for conservators, collectors, and textile producers, and another, more general publication designed for the broader public. These publications and research represent the first professional conservation effort in Southeast

Table 1. Partial list of plant-based saponins; abridged research to date (photos: Lilian Garcia Alonso, Julia Brennan, Benny Gratha)

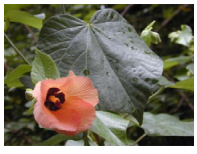
No.	Material			Plant part	Preparation method	Notes	Photos
	Common name	Latin name	Country				
9	*Baimee* - shampoo tree, *Mhimhen* (Thailand)	*Litsea glutinosa (Lour.) C.B.Rob. Lauraceae, Laurel family*	Thailand, Asia	Young Leaf	General cleaner, stain removal. Use the leaf, mix with water, heat, simmer, strain, and use soapy mixture.	Leaves exude sticky substance, used to make shampoo and cleaners. High in saponins. Thailand rural use.	
10	*Nhamtang* also known as *khet* (Thailand)	*Catunaregam tomentosum (Kurz) Bakh* (Rubiaceae)	Asia, Thailand	Raw/Dry seed or fruit	General cleaning, stain removal. Soak textiles in the water made from the seed, break up, mash, strain.	Used for silk, and cotton. In Thailand the soap for tooth brushing.	
11	Fenugreek, known in Hindi as *methi*	*Trigonella foenum-graecum L.* foxglove	World wide	Dry Seed	General cleaning. Soak and simmer seeds in water, strain.	Used for silk and cotton. Creates mucilage and oils. Used to make shiny cottons. Antimicrobial, antioxidant, antidiabetic and anti-tumorigenic.	
12	Chinese honey locust tree, *bo ket* (Vietnam)	*Gleditsia triacanthos Fructus gleditschiae*	Viet Nam, Asia	Ripe pods dried	Roast seed pods over fire, stove, crush in hot water to create the foam, strain, use liquid.	Sometimes called soap pods, with high saponin content, Vietnam history, sometimes mixed with lime peel, grapefruit.	
13	(Green Dragon), *tanh* Dragon Fruit - Pitaya (Vietnam)	*Hylocereus, undatus*	Asia, Americas	Stalks, vine, woody vines	Plant vines and stalks, pound wire vine pieces, mash with water, rub on clothes, rinse.	Mexico still harvests the fruit, a cactus-like plant.	
14	Burned rice straw water, 'merang padi' (Indonesia)	*Oriza sativa*	Indonesia, Asia	Stalks, hay	General cleaning, cotton. Burn dry rice straw and soak in water for 2 or 3 days. Use water only for cleaner.	Used as traditional shampoo. Also used as traditional mordant for cotton, and cleaner for cotton.	
15	Hibiscus, 'waru' (Indonesia)	*Hibiscus*	Indonesia	Leaves	General cleaning. Squeeze hibiscus leaves into water, mash, mix, and sieve. Use water.	Antioxidant, antibacterial, antimicrobial	
16	August flower, west indian pea. Hummingbird tree/ Turi / 'Lamtoro' (Indonesia)	*Sesbania grandiflora* L. Fabaceae (alt. Leguminosae) subfamily: Faboideae	Asia	Leaves and seeds.	General cleaning. Squeeze leaves water, mash, mix, and sieve. Seeds can be used the same way.	Antibacterial and antifungal, antioxidant/ popular in Indonesia	
17	Belimbing Wuluh blimpi' or 'carambola' (Indonesia)	*Averrhoa bilimbi* L.	Asia	Leaves	Cotton. Squeeze a bunch of bilimbi leaves into water, mix, mash, and sieve.	Indonesia - Fruits, leaves, and petioles of bilimbi contain saponin. Antibacterial	

Table 2. Three-pronged preservation approach (Moreau 2016)

Asia to quantify and contrast traditional practices and materials used in textile preservation, with the intent to incorporate these into contemporary professional textile conservation practice. By taking an active role in shaping the conservation profession, these specialists are helping to build a regional identity and community with shared standards, respect for tradition, and sustainability.

Figure 1. Participants from 12 countries gather for the 2016 Traditional Methods and Materials Forum in Bangkok at the QSMT (photo: Ploypailin Thapepong, QSMT)

BROAD DATA DISCOVERIES

The updated pan-Asian database of plants and knowledge provides a rich foundation. Cultural heritage, practical data, and scientific records are integrated into a user-friendly, illustrated, searchable database: the first resource of its kind. Inherent to the study is the recording of traditional wisdom from the actual sources, an important form of preserving intangible cultural heritage.

Traditional approaches are resources that provide practical and often locally sustainable alternatives for conservation practices. However, these approaches are rapidly disappearing due to environmental damage and replacement by modern chemicals and easier practices (Table 2). The sources of traditional wisdom and practice came from a variety of backgrounds, from members of royalty to weavers in rural areas. This resulted in a wealth of information that will contribute to the preservation of cultural and bio-heritage. In more than 50% of the data, the information gathered is about practices that are no longer used, but only recalled by elders, or that are noted in selected texts. In some cases, a plant material traditionally used exclusively for textile cleaning, has been "re-discovered" by pharmaceutical companies and is now formulated and promoted for a different use, such as personal beauty care, as the next "miracle" cream or cleaner.

One researcher, Mr. Wuttikai Phathong of Kaewanna Indigo, who has revived traditional indigo propagation and dyeing in northern Thailand, created a living link to the land and thus to the importance and use of traditional plants to support modern society. In his words, "If you stay

in the forest, you can protect the forest." Most of the plant materials in indigenous knowledge that are extinct or largely unavailable have been lost to massive land development and overuse of natural resources. Most predictable was the direct relationship between wealth of traditional knowledge and practice and the extent of westernization and consumerism of a given country or region.

Myanmar and Timor-Leste provided the richest resource for living traditional practices and materials. In these two cultures, informants are innately involved with textiles and the land and know the physical and chemical properties of many plant-based materials. In Myanmar, the use of a plant-based stain remover, known as *thanakha,* is pervasive. In Timor-Leste, the use of plant-based surfactants and stain removers goes hand in hand with the extensive practice of natural dyeing. While using these traditional materials and techniques for practical reasons, these cultures also are more fully permeated with spiritual beliefs and guidance than in cultures with less active traditional textile practices. By contrast, Singapore has no active traditional cleaning practices using plant materials. It is all historic data, sequestered in ethnographic studies.

Malaysia, Thailand, Vietnam, Indonesia, and Philippines straddle the middle as nations with semi-healthy agrarian cultures *and* aggressive and progressive modern urban societies. For example, efficient and ready-to-use Commercial detergents have infiltrated rural daily life, rendering traditional ones obsolete. One exception is the pervasive use of the natural soap nut, saponin or *lerak* to wash fine hand-drawn batik. This natural detergent is considered the best practice, affordable, and is therefore promoted, extensively used, and sustainable. In general, the only traditional practices that remain in these modern societies are ones that have not (yet) been replaced by readily available chemical solutions or that remain substantially more accessible and less expensive. This includes the widespread practice of traditional dry cleaning methods involving complex herbal smoking of fine textiles for cleaning and insect mitigation. A review of the research of this cluster of countries points to the most traditional practices being utilized by tribal or "minority" groups, often in mountainous regions, and isolated from mass consumerism or currency.

For insect mitigation, the traditional practices survive in many modern and traditional societies, as the herbal products are affordable and readily available. The uses of cloves, *pandan* leaves, peppercorns, citronella, or tobacco leaves are more prevalent than mothballs or other chemical insecticides. People, following common home practices, know they are safe and somewhat effective. Here the exception is in museum settings, where custodians have been trained and encouraged to use Western methods. Hence mothballs are a pervasive form of insect control in institutions.

In addition to the knowledge about cleaning and storage properties of specific plants, broader cultural values were revealed. Most important is that many of these cultures still champion their hand-woven textile traditions and their older fine and ceremonial cloths. In general, there is cultural pride in rich textile heritages, recognized by an increasing interest on the part of private collectors and public museums. This pride

shapes sensitivity for the care of special textiles, as well as an interest to learn better practices for the long-term care of fine textile heritage. There is a clear distinction in methods of care and preservation between daily clothes and those rare and exceptional cloths. These values were strongly reinforced by many informants from the weaving and collecting sectors.

OBSERVATION HIGHLIGHTS

To highlight a few of the most consistent observations and practices across Southeast Asia:

- Many elderly are concerned about the loss of indigenous textile knowledge and production, and want the government and the next generation to take a leading role in preservation.
- Approaches to cleaning are categorized by the type of cloth (silk, cotton, other plant) and the use (ceremonial, every day with sweat, every day with surface dirt).
- Most wet cleaning methods apply only to fabrics that are worn daily, and are cotton or synthetic.
- Most fine textiles (especially metallic silks) are never wet-cleaned.
- Dry cleaning (i.e., smoking, perfuming and airing) is still a common practice in many areas.
- Many cleaning methods double as insect mitigation practices.

It is not surprising that these practices were mirrored in another tropical country, Mexico. While these traditions have been continuously replaced with chemical non-local cleaning practices and materials to a point where traditional ones are almost extinct, the collective memory of pre-Hispanic cleaning methods remains, including the use of agave plants such as *Agave ixtli, Agave brachystachys* and *Yucca schidigera*. These are being vigorously revived and tested.

TESTING – PROTOCOL

In the field of textile conservation, cleaning treatments are carried out with careful criteria so that the physical appearance and/or chemical composition of the artifact are not degraded. Cleaning is appropriate only in very specific cases when a conservator determines the action to be ethical and necessary, following a detailed examination of the textile, its history, and current condition (Leene 1972). The effects of cleaning, moreover, can also affect the fiber, colorants, dyes, tensile strength, timestamps, and the integrity of the overall physical structure (Roman 2016). Therefore, whether cleaning with a chemical or plant-based material, cleaning is a conservation topic that requires extensive and ongoing investigation.

The cleaning protocol was guided by these overarching principles of textile conservation. It targeted the effects of cleaning cotton and silk fabrics using plant-based saponins (a natural surfactant) versus commercial conservation detergents (Figure 2).

The four plants tested were:

- *Litsea glutinosa* leaves (soft bollygum, bolly beech) from northern Thailand's Phrae Province (locally known as *baimee*);

- *Sapindus rarak* fruit (soap nut) from Java and Bali, Indonesia (locally known as *lerak*);
- *Trigonella foenum-graecum* seeds (fenugreek) from Thailand (locally known as luuksat); and
- *Gleditsia sinensis* pods from Vietnam (locally known as *bồ kết*).

The four commercial detergents were:

- Canasol NF 1000: ethoxylated alkyl phenol;
- Orvus paste: a Proctor & Gamble synthetic, anionic surfactant with wetting agent, detergency, emulsifying, and dispersing properties (complete ingredients are difficult to confirm from industry);
- "Rinske": a cleaning agent with three ingredients: a non-ionic surfactant (Triton X or Hostapon SG), a sequestrant (sodium tripolyphosphate) and an emulsifier (carboxymethyl cellulose)
- "Batik Attack": a famous clothes cleaner from Indonesia, containing a small percentage of *lerak* fruit (13.99%), citric acid and sodium lauryl ether sulfate.

The hands-on scientific testing, executed in teams, provided fundamental scientific and analysis skills and criteria to emerging conservators and specialists in Southeast Asia.

Figure 2. Four plant-based saponins: (left to right) *baimee* colored with pea flower, fenugreek, soap nuts *lerak*, and *bokhet* (photo: Ploypailin Thapepong, QSMT)

The four natural saponin recipes were made in the lab, following instructions gathered from regional informants. This included cooking, mashing, straining; a great deal of work to make surfactant concentrates (Figures 3 and 4). Two specimens of fiber common to Asia, cotton and silk, were soiled with polar and non-polar dirt, and pH measurements were taken. A typical oily Thai green curry served as the non-polar stain, and local dirt, sewer water, and molds made the polar ones. Two stains were cleaned with the selected saponins, and the remaining two stains with the chemical detergent. After cleaning, a piece of absorbent blotter was pressed onto the remaining stain for 5–10 seconds, and then examined for the amount of stain residue and impregnation (Figures 5 and 6).

Figure 5. Using cotton swabs to surface clean polar and non-polar stained samples (photo: Ploypailin Thapepong, QSMT)

Figure 6. Julia Brennan discussing cleaning results with researchers from Singapore, Indonesia and Brunei (photo: Ploypailin Thapepong, QSMT)

Figures 3 and 4. Linh Anh Moreau of SPAFA and Quyen Thi To Hoang from the Vietnam Museum of Ethnology mash *lerak* to create a soapy surfactant. Many hands made too many suds! (photo: Ploypailin Thapepong, QSMT)

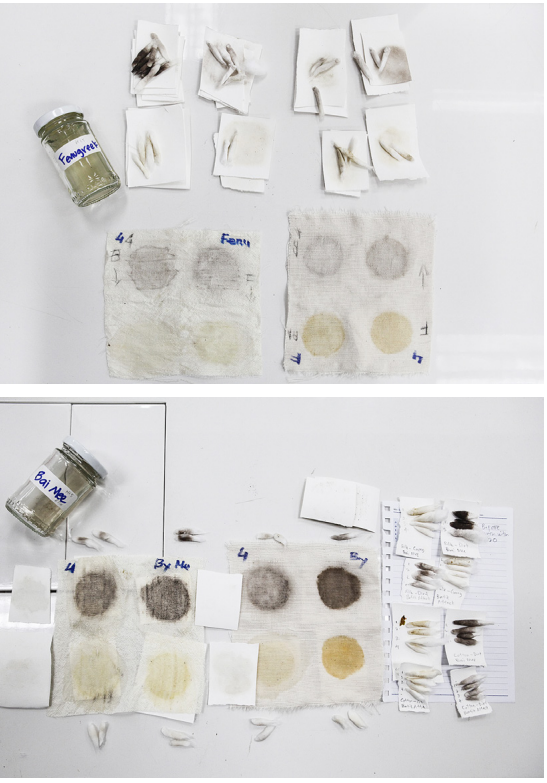
Observations included: the importance of the fiber type in relation to the pH of the soaps, the success of dirt removal, duration of the cleaning process, as well as the effects of the cleaner on the stain, and the textile appearance and texture before and after. This simple protocol was executed through visual comparisons between the cleaning agents and the effects on the fabric samples. Preliminary visual observations found that the plants were as effective as the commercial detergents, while being gentler to the fabric (Table 3). Clearly, some plant-based saponins were more successful than others, as seen here (Figures 7 and 8; Table 4).

TESTING – RESULTS

A colorimetric analysis was performed after the visual annotations and observations. By the end of the test protocol, there were three cleaned stains for each natural and commercial detergent, in both cotton and silk,

Table 3. pH measurements and observations of the test protocol on four saponin-producing plants for initial investigation

Plant	Common name	Picture	pH	Performance on cotton	Performance on silk	General observations
Baimee	*Litsea glutinosa*		5	Not a good stain removal both on polar and non-polar stains	Mild cleaner for polar stains Not a good removal for non-polar stains	Not an effective cleaner. pH is very low; could be used as an acidifier on alkaline cleaning solutions.
Fenugreek	*Trigonella foenum-graecum*		5.5	Mild cleaner for both polar and non-polar stains	Very good cleaner for both polar and non-polar stains	It performed very well on both fabrics and stains, pH makes it more adequate for cleaning silk.
Lerak	*Sapindus rarak*		5	Good cleaner for both polar and non-polar stains	Very good cleaner for both polar and non-polar stains	Produces more foam than other saponin-containing plants, due to higher saponin content. The pH is low; could be neutralized with other plants such as *bo ket*.
Bo ket, Chumket	*Gleditsia sinensis*		6.5	Good cleaner for polar stains. Mild cleaner for non-polar stains	Mild cleaner for both polar an non-polar stains	A mild cleaner -advantage of almost neutral pH produces less foam, requiring less rinsing.



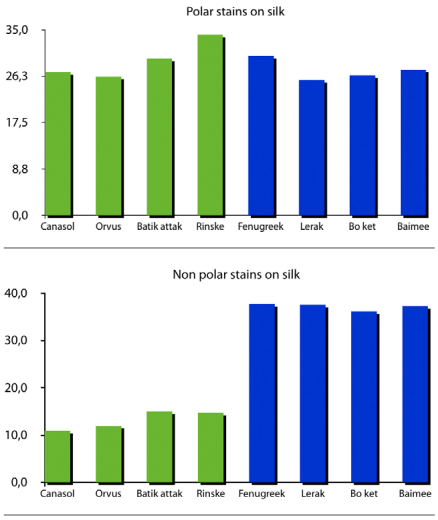
Figures 7 and 8. Results of the best plant surfactant (fenugreek) and the least effective (*baimee*) (photo: Ploypailin Thapepong, QSMT)

and un-cleaned stains and no stains, for comparison. The measurement of color differences between common detergents and saponins in polar and non-polar stains was done in triads: three measurements per cleaning agent to get an average, and comparison with the un-cleaned stains and the stain-free fabrics. With the help of Doctor Orlando Martinez of ENCRyM, a grey scale rating was achieved using a standardized equation and L*a*b* values (Table 5). This builds directly on the ongoing research of soap-producing plants, including empirical comparisons between agave fibers and other saponins such as *lerak*, being conducted by students of the ENCRyM. The study was instigated by the research into rapidly disappearing pre-Hispanic

Table 4. Results of scale of color

#	sample	L*(D65)	a*(D65)	b*(D65)
1	Polar stain on silk	49.98	3.36	10.8
2	Non-polar stain on silk	82.42	0.49	28.82
	sample name: cleaning agent/stain type/fiber			
3	Canasol/polar/silk	76.93	2.18	10.78
4	Canasol/non-polar/silk	85.8	-0.55	18.42
5	Orvus/polar/silk	76.1	2.02	10.32
6	Orvus/non-polar/silk	85.19	0.01	17.15
7	Batik Attack/polar/silk	79.45	1.86	9.2
8	Batik Attack/non-polar/silk	88.61	-1.03	15.24
9	Rinske/polar/silk	83.91	1.19	9.43
10	Rinske/non-polar/silk	88.62	-0.72	15.48
11	Polar stain on cotton	51.82	3	10.09
12	Non-polar stain on cotton	79.38	0.75	31.07
	sample name: cleaning agent/stain type/fiber			
13	Canasol/polar/cotton	71.61	2.41	10.49
14	Canasol/non-polar/cotton	80.78	0.97	26.7
15	Orvus/polar/cotton	76.09	2.28	10.01
16	Orvus/non-polar/cotton	80.12	0.35	25.19
17	Batik Attack/polar/cotton	81.47	1.97	9.28
18	Batik Attack/non-polar/cotton	82.03	0.37	19.1
19	Rinske/polar/cotton	75.64	2.23	9.51
20	Rinske/non-polar/cotton	83.3	0.29	22.33
21	Fenugreek/polar/silk	79.95	1.31	10.22
22	Fenugreek/non-polar/silk	87.07	-0.98	16.48
23	Lerak/polar/silk	75.42	2.25	11.35
24	Lerak/non-polar/silk	86.9	-0.47	16.73
25	Bo ket/polar/silk	76.24	1.71	13.11
26	Bo ket/non-polar/silk	85.11	-0.2	18.63
27	Baimee/polar/silk	77.43	1.98	10.07
28	Fenugreek/polar/cotton	78.38	1.99	11.81
29	Fenugreek/non-polar/cotton	81.97	-0.56	26.17
30	Baimee/non-polar/silk	86.43	-0.62	17.71
31	Lerak/polar/cotton	77	2.15	9.88
32	Lerak/non-polar/cotton	81.73	-0.2	21.1
33	Bo ket/polar/cotton	75.58	1.78	12.57
34	Bo ket/non-polar/cotton	79.3	0.17	25.91
35	Baimee/polar/cotton	71.37	2.42	9.96
36	Baimee/non-polar/cotton	80.74	-0.19	26.81
37	Silk	91.61	0.01	8.24
38	Cotton	86.36	1.68	10.75

Table 6 Cleaning values of saponins



traditional technologies, and the necessity to revive old practices and find ecological alternatives in cleaning processes, not only in conservation, but in the industrial field. The goal is to demonstrate that saponins and the endemic plants that produce them can, and should, be used as real alternatives for cleaning textiles.

Table 5. Grey Scale Colorimetry – scale rating using standardized equation and L*a*b* values

Colors on polar stains after cleaning			Colors on non-polar stains after cleaning		
#	Sample	Color on silk	#	Clave	Color on silk
3	Canasol/polar/silk		4	Canasol/non-polar/silk	
5	Orvus/polar/silk		6	Orvus/non-polar/silk	
7	Batik attak/polar/silk		8	Batik Attack/non-polar/silk	
9	Rinske/polar/silk		10	Rinske/non-polar/silk	
21	Fenugreek/polar/silk		22	Fenugreek/non-polar/silk	
23	Lerak/polar/silk		24	Lerak/non-polar/silk	
25	Bo ket/polar/silk		26	Bo ket/non-polar/silk	
27	Baimee/polar/silk		30	Baimee/non-polar/silk	

The results were surprising, as the performance of the saponins in each case is as good or better than the chemical detergents. This is particularly noticeable in the cleaning of non- polar stains from silk fabric, in which the performance of the saponins was considerably better than the detergents. To review: the *bo ket*, with a pH of 6.5–7, was an effective cleaner on the polar stains of cotton, but unexpectedly was the mildest, most gentle and effective detergent for silk; producing very little foam, and easy to rinse. It is not surprising that *bo ket* is now being commercially processed for high-end hair products, particularly in Vietnam. The *baimee* appeared to have a lower saponin content, higher pH, and was a good cleaner of both stains and fabrics. However, there was a slight visible alteration to the fabric surface. Fenugreek was successful; with a fairly neutral pH, it did not fully remove either type of stain on the cotton, but was very effective in stain removal on the silk, and did not alter the fabric surface, texture or color. Soap nut or *lerak* from Indonesia, with a pH of 5, was the most effective cleaner of both stain types on cotton in particular. Also relevant, is that the saponins, with a lower pH, are more compatible with the silk, a protein fabric with a naturally lower pH. Overall, the soap nut, and fenugreek, performed the best on both cotton and silk (Table 6).

CONCLUSION

What is remarkable is that even with this small set of plant-based detergents to launch this study, the visual and colorimetric observations, pH levels, and effectiveness of cleaning point to the success and value of the natural plant products. They all cleaned well, particularly on silks, and several were faster acting, and easier to rinse than the commercial detergents. Overall, the soap nut, now becoming a more common consumer choice, as well as

being adopted by some textile conservators, is the most effective cleaner for both polar and non-polar stains, and activates and rinses quickly. Without damaging the textile or the environment, it appears to be the most successful cleaner in all categories. This result matches the widespread cultural practice in Java of using *lerak* for cleaning traditional cotton batik cloths. The agave-based saponin of Mexico results demonstrated that they are better cleaners for silk than the commercial cleaners. This is no surprise as the main active compound in saponins is similar.

Comparatively, the commercial detergents, of which three are commonly used in textile conservation, yielded similar results. The Orvus, Rinske (another SLS) and Canasol – all detrimental to the environment, soil and water table, were the most successful in the removal of grease and stains. Orvus, as predicted, was most effective on the cotton stains. The Rinske performed stain removal about the same as Orvus, but was the easiest to rinse, making it gentler overall for the silks. The Canasol visibly altered the fabric surface, making the silk thin and stiff. The most successful one was the Batik Attack, with a pH of 7, which contained both a small percentage of natural saponin and sodium lauryl ether sulfate, an anionic detergent and surfactant. It foamed easily, acted fast, removing dirt without any agitation, and was easy to rinse out. The Batik Attack worked particularly well on polar stains and on silk; its success points perhaps to fabricating a pH 7 custom mix for conservators: a local plant-based saponin, with a small amount of sodium lauryl ether sulfate, which could perform as the most effective, yet still gentle stain remover and overall cleaner.

These initial results are encouraging for the textile conservation practitioner. The use of a natural surfactant, especially soap nuts or *lerak*, is available and affordable all over Asia; it is clearly an effective cleaner and stain remover, and a viable alternative to the petroleum-based detergents that are promoted in 'Western' conservation practices. To conclude, this research has already started to incorporate traditional practices and materials into the evolving modern professional textile conservation practice in Southeast Asia. Fourteen people and countries participated in a relatively simple research project and collaborative testing forum, establishing an ongoing international network. Researchers came forth with great curiosity not only of their own culture and findings, but with a keen interest to break ground in establishing some innovative yet sound textile conservation practices, grounded in their own heritage. Embracing an interdisciplinary approach of conservators, scientists, chemists, biologists, textile custodians, and anthropologists, first results are replicable and promising.

NOTES

[1] Researchers: Ms. Hajah Siti Norhayatty binti Haji Morni and Ms. Azeah binti Haji Ahmad, Brunei Museums Department; Mr. Benny Gratha, Museum Tekstil Jakarta; Ms. Annissa Gultom, Musea Tribuana Komunika and Nila Line, Indonesia; Ms. Viengkham Nanthavongdouangsy, Phaeng Mai Gallery–KHANG Center of Fine Silk in Lao PDR; Mr. Mohd Syahrul bin Ab. Ghani, National Textile Museum, Malaysia; Ms. Aye Mi Sein, Ministry of Culture Myanmar; Mr. Allan S. Alvarez, National Museum of the Philippines; Ms. Siti Suhailah Salim, Heritage Conservation Centre, Singapore; Mr. Wuttikai Phathong of Kaewanna Indigo, Thailand; Mr. Claudio Marques Cabral and Mr. Fernando Sousa Lay, National Directorate of Museums, Timor-Leste; and Ms. Quyen Thi To Hoang, Vietnam Museum of Ethnology.

REFERENCES

BRENNAN, J.M., N. PIANPRASANKIT, and P. POCHOOM. 2014. Before they are gone: Capturing and sharing the traditional methods of textile preservation in Thailand. In *ICOM-CC 17th Triennial Conference Preprints, Melbourne, 15–19 September 2014,* ed. J. Bridgland, art. 1306. Paris: International Council of Museums.

LEENE J. 1972. *Textile conservation.* The International Institute for Conservation of Historic and Artistic Works. London: Butterworths.

MOREAU, L.A. 2016. Back to the sources: Reviving traditions in textile preservation in Southeast Asia and beyond. *Newsletter Textile Forum 2016.* SEAMEO SPAFA.

ROMAN, L. 2016. *Textile conservation manual.* INAH-ENCRyM, Mexico, unpublished.

TIMÁR-BALÁZSY, A. And D. EASTOP. 1999. *Chemical principles of textile conservation.* London: Butterworth-Heinemann.

How to cite this article:
Brennan, J.M., N. Pianprasankit, and L. García-Alonso. 2017. Before they are gone *expanded*: Capturing traditional textile preservation knowledge in Southeast Asia and Latin America. In *ICOM-CC 18th Triennial Conference Preprints, Copenhagen, 4–8 September 2017,* ed. J. Bridgland, art. 1801. Paris: International Council of Museums.