



A Comparison of BAQ Henna Paste, Pre-made Pastes, and “Black Henna”

Becoming Moonlight®

A little while ago, I read a post by a henna artist on a social media site bemoaning that yet another person contacted her to say that henna was dangerous and that it would cause allergic reactions. This is not uncommon in the henna body art community. Henna paste for body art made from body art quality (BAQ) henna and other natural ingredients is completely safe. This person had most likely heard of the dangers of “black henna.” Then, there are those people on the opposite side of misinformation who believe that if a product is called “henna,” it must therefore be natural and safe 100% of the time. Also not true.

The sad truth is that there are innumerable mass-produced products easily accessible online and on international store shelves which claim to be “henna” but are a mixture of food dyes, solvents, preservatives, [para-phenylenediamine \(PPD\)](#), and other additives. These products are labeled as “henna,” but may not contain any material from the [lawsonia inermis plant](#).

These products are designed to be a fast, cheap, and easy alternative to mixing true henna paste from scratch. True henna paste must be mixed, dye-released, and coned. It degrades at room temperature. True henna must be left on the skin for several hours for a deep stain; after paste removal, the stain is light at first, then oxidizes to a deeper color over the subsequent 48 hours. Stains from true henna paste vary depending on skin thickness and texture. Pre-made pastes are designed to have long shelf-lives, and quick, dark stains, but at potential risk to the consumer.

As the word “henna” is not regulated, it can be used simply to describe a form of body art which involves temporarily staining the skin, rather than the product of the henna plant. To learn more about the differences between pure, BAQ henna, mass-produced henna cones, and “black henna,” [click here](#). To learn more about the dangers of PPD and “black henna,” [click here](#).

The population is very diverse in my neighborhood of Montreal, Quebec, and as a result, there are several international grocery stores within just a few blocks of my home. I went out to the nearest two and purchased all of the pre-made “henna” cones I found on the shelves. I also purchased two types of powdered black hair dyes popularly used to create “black henna” paste. I compared each of these products to my own BAQ paste in terms of texture, odor, and color. I also recorded notes on the packaging and instructions, and conducted a paper chromatography test to observe dye separation. Here are my findings.

Comparing BAQ Henna Paste, Pre-made Pastes, and Paste Made From Powdered Hair Dye

The purpose of this study is to note physical and chemical differences between true, BAQ henna paste, and products which are used as alternatives. As I sampled only the products available within a short distance from my home, future studies may be done on a wider range of products such as those most popular on online shopping sites.

Without more advanced methods at my disposal, it is impossible to determine the exact ingredients in the products, and therefore their level of safety. To err on the side of caution, I assumed that all of the store-bought products were potentially harmful, taking the safety measures described in the section below. The powdered hair dyes clearly indicated their ingredients, which included para-phenylenediamine, known to be highly sensitizing when in contact with the skin.

The purpose of this study is *not* to comment on the quality, popularity, or reputation of any of the products involved, but rather to report on the attributes which can be noted through basic observation.

Safety Measures

Please note that I do not, under any circumstance, recommend replicating this experiment. There was no way to determine what the products contained and whether they were dangerous. The powdered hair dyes contained a concentrated amount of PPD, which is known to be highly sensitizing, as well as toxic if ingested. Many of the pre-made pastes possessed no ingredients label; those that did were likely to have excluded ingredients from their list due to lax regulation. I wore protective gloves and worked in a well-ventilated space to prevent skin contact and inhalation of fumes. Afterward, I thoroughly cleaned all surfaces to prevent future exposure or contamination.

Product Selection

For this experiment, a product qualified if it met one or more of the following: 1) It was labeled “henna” and came in a cone or tube; 2) it did not have the word “henna” but packaging showed

images of decorated skin; 3) it was packaged and marketed as a black hair dye, but is known for use on skin.

I purchased every product available in two local international stores, without purchasing duplicates, or more than one product from each brand. In the case of two products from the same brand, I chose that which advertised a darker color.

In total, I purchased six pre-made pastes and two powdered black hair dyes. All products except Cone 4 (Kanza) are shown in the image below.



Procedure

Using written notes as well as visual and audio recording, I commented on each product's packaging, including the presence of ingredients lists, instructions, warnings, promised results, and country or manufacture.

After opening the packaging, I noted physical qualities of the paste: consistency, color, and odor. I tested each paste by drawing lines and dots. In the case of the two hair dye powders, I mixed each with water to a consistency similar to the pre-made pastes.

I then conducted two additional tests: one for flammability, and the second a chromatography test to compare dye separation between products. The procedures and results for these two tests will be discussed in detail later in this article.

All products' results were compared to a cone of BAQ henna paste which I created using henna powder, lemon juice, water, sugar, and essential oils.

Packaging

The pre-made pastes were relatively similar in packaging. They were either in a plastic tube with a small twist cap, similar to the type of packaging for an ointment; or, they were in a rolled foil cone which was taped at the top and sealed with a pin at the tip.

Nearly all of the products came from Pakistan, with the exception of Cone 4, which was from Dubai. Only two products featured ingredients lists, and only one recommended a patch test. Very few instructions were present. Cone 5 read, "Wash hands after 15 minutes" which could be interpreted either as instructions, a warning, or an advertisement of the speed of the product's staining ability.

Four of the six pastes had "Export Quality" printed somewhere on the packaging. I could not find clear information about the countries' standards for determining this. More likely than not, they are just words put on there to sound fancy.

The two powdered hair dyes had complete instructions, warnings, and ingredients lists. Warnings and ingredients were printed on the box; the pamphlets inside repeated the warnings, and provided instructions for conducting a patch test as well as mixing and application.

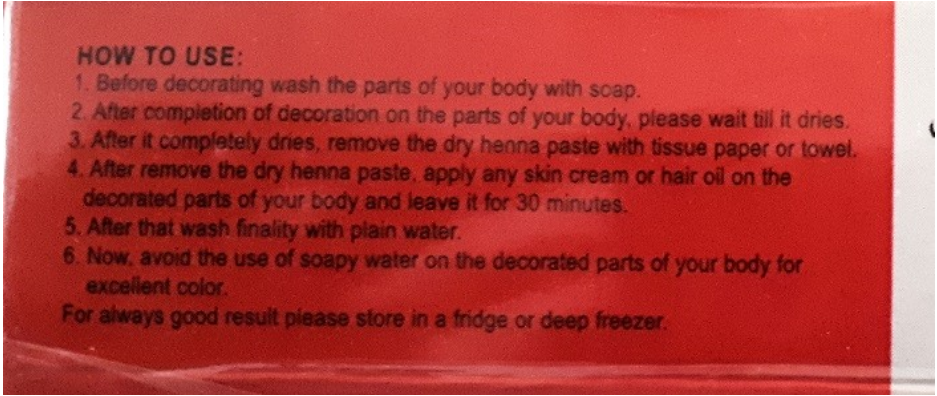
The boxes of hair dye each contained a small glass bottle with a twist cap, underneath which was a rubber stopper. Each supplied a small measuring cup, and one supplied disposable gloves.

Both hair dyes were marketed toward Eastern Asian customers, and/or included Eastern Asian elements on the packaging. One was from a Japanese company which outsourced its manufacturing to India; the other was produced in Pakistan. Both boxes included promises of no ammonia or peroxide, adding to the sense that the product was safe or healthy. (Side note: the woman who rung me up commented that these dyes were "natural," and "much safer than what you'd get at a drug store." I just smiled and nodded.)

Below are details for each product's packaging.

Cone 1

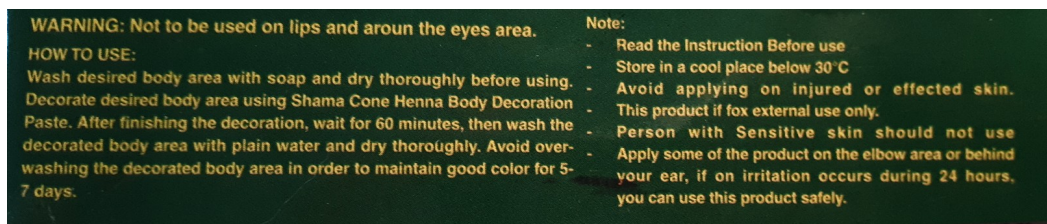
Name of Product	On Box: "Almas / Cone Henna Paste / Henna Body Decoration Paste" On Tube: "Special Cone Henna Paste"
-----------------	---

Type of Packaging	Plastic tube with thin tip twist cap, within a paper box
Country of Manufacture	Pakistan
Ingredients Listed	None listed
Instructions	
Warning	“External Use Only”
Additional Details	<p>On Box:</p> <p>“Black”</p> <p>“One of the finest quality and largest selling Henna in the world”</p> <p>On Tube:</p> <p>“100% Color”</p> <p>“No side effect.”</p> <p>“We feel proud that your trust is on our product...”</p> <p>“Export Quality From Pakistan”</p> <p>An email address provided</p>

Cone 2

Name of Product	“Shama / Cone Henna / Henna Body Decoration Paste”
Type of Packaging	Plastic tube with thin tip twist cap, within a paper box
Country of Manufacture	Pakistan
Ingredients Listed	“Natural Hinna, Hinna Oil, Citric Acid & Water” (sic)
Instructions	See Image Below
Warning	“Warning: Not to be used on lips and aroun the eyes area” (sic)
Additional Details	<p>“Extra Dark Color”</p> <p>“Finest Quality Henna in The World”</p>

	"Halal"
--	---------



Shama Instructions and Warnings

Cone 3

Name of Product	"Special / Najma / Gel Cone / Mehndi"
Type of Packaging	Foil cone with pin tip, within paper box
Country of Manufacture	Pakistan
Ingredients Listed	None
Instructions	None
Warning	None
Additional Details	"Export Quality"

Cone 4

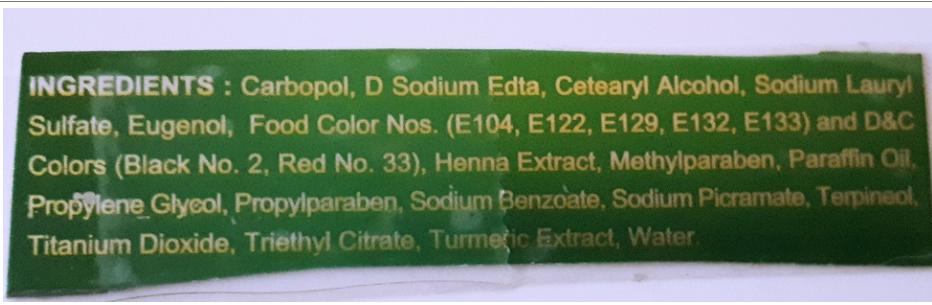
Name of Product	"Kanza / Henna Cone"
Type of Packaging	Foil cone with pin tip
Country of Manufacture	Dubai, UAE
Ingredients Listed	None
Instructions	None
Warning	None
Additional Details	"The Supreme Quality Henna Selling in the World" "Trademark 383381" "Emergency Cone Henna" "Export Quality"

	<p>"A Product of Noorani & Company"</p> <p>A website provided</p>
--	---

Cone 5

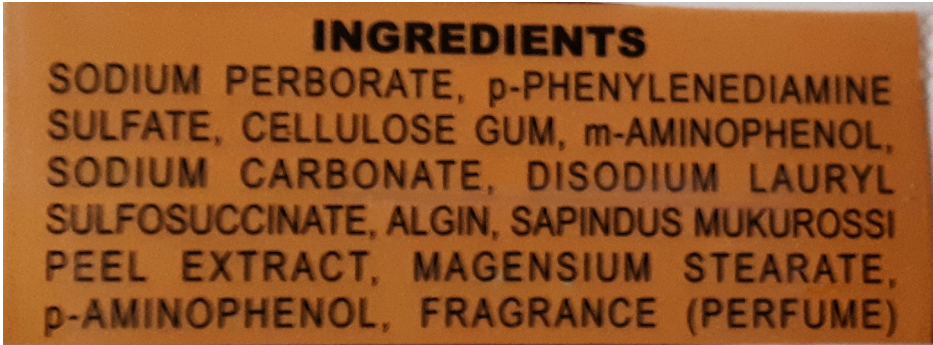
Name of Product	"Anarkali / Brown Out Liner"
Type of Packaging	Foil cone with with pin tip
Country of Manufacture	Pakistan
Ingredients Listed	None
Instructions	"Wash Hands Within 15 Minutes"
Warning	None
Additional Details	<p>"Registered 152393"</p> <p>An email address provided</p>

Cone 6

Name of Product	"Al Qamar / Nail Henna"
Type of Packaging	Small foil tube with twist cap, within paper box
Country of Manufacture	Pakistan
Ingredients Listed	
Instructions	None
Warning	None
Additional Details	<p>"Export Quality"</p> <p>"Approved by PCSIR"</p> <p>Company address and phone numbers provided</p>

Powder 1

Name of Product	"Bigen / Permanent Powder Hair Color / 59 Oriental Black"
-----------------	---

Type of Packaging	Paper box containing glass bottle of powder sealed with rubber stopper and twist cap. Box also contained a small plastic measuring cup and pamphlet of instructions.
Country of Manufacture	Pakistan
Ingredients Listed	 <p>INGREDIENTS SODIUM PERBORATE, p-PHENYLENEDIAMINE SULFATE, CELLULOSE GUM, m-AMINOPHENOL, SODIUM CARBONATE, DISODIUM LAURYL SULFOSUCCINATE, ALGIN, SAPINDUS MUKUROSSI PEEL EXTRACT, MAGESIUM STEARATE, p-AMINOPHENOL, FRAGRANCE (PERFUME)</p>
Instructions	See Image Below
Warning	See Image Below
Additional Details	“Contains No Ammonia” “Requires No Hydrogen Peroxide”

See the reverse side before use.

BEFORE USE

■ IMPORTANT ADVICE

- Complete the skin allergy test 48 hours before each application.
- Wear plastic or rubber GLOVES.
- Cover shoulders with a TOWEL or CAPE.
- Be sure hair is clean and free of styling product buildup. Shampoo 24 hours in advance if your hair is very oily or has excessive hair styling product buildup.
- To prevent staining, apply COLD CREAM around your ears, hairline and the nape of your neck.

① PREPARATION

- Pour Bigen Powder into a NON-METALLIC BOWL or CUP.
Add room-temperature TAP WATER (DO NOT use hot or boiling water.) in the proportion specified on the right.
- Mix well with a BRUSH to make a homogeneous paste.

Bigen Powder	Water
1 Bottle	➔ 5 Bigen measuring cups
½ bottle	➔ 2½ Bigen measuring cups
¼ bottle	➔ 1 Bigen measuring cups

② APPLICATION

- Quickly apply the mixture on dry hair.
If you are partially gray haired, start application where the hair is most gray.
- Comb through the hair to ensure every hair-strand is thoroughly covered with mixture.

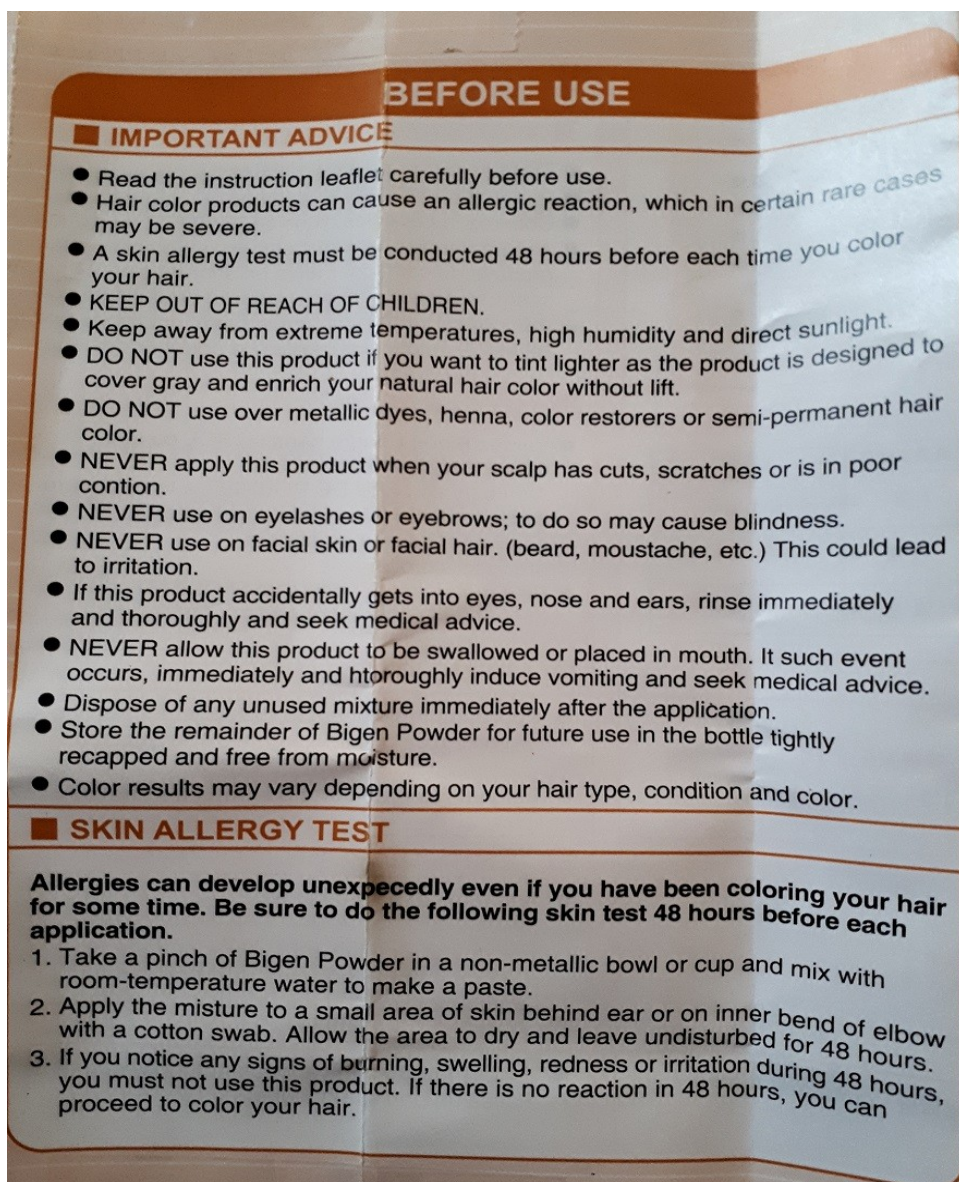
③ TIMING

- Wait for 20 to 30 minutes.
To adjust your developing time, check color development several times by wiping a strand of the hair with a cotton ball or paper tissue. Once desired color is obtained, proceed to rinse your hair.

④ RINSE

- Rinse hair thoroughly with warm water until water runs clear and shampoo well.

Instructions for Bigen Hair Dye



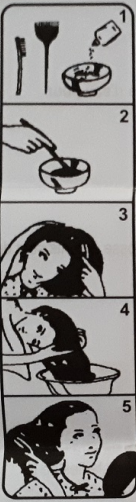
Warnings and patch test for Bigen Hair Dye

Powder 2

Name of Product	"ShoHan / Japanese / Instant Powder Hair Color"
Type of Packaging	Paper box containing glass bottle of powder sealed with rubber stopper and twist cap. Box also contained a small plastic measuring cup and pamphlet of instructions.
Country of Manufacture	India

Ingredients Listed	<p>Caution : This product contains ingredients that may cause skin irritation on certain individuals and a preliminary test according to accompanying directions should first be made. This product must not be used for dyeing the eyelashes or eyebrows. To do so may cause blindness.</p> <p>Read the instructions enclosed carefully before use.</p> <p>Ingredients : P-Phenylenediamine, P-Aminophenol, P-Methylaminophenol Sulfate, Sodium Sulfate, Tannic Acid, Gum Arabic, Sodium Carboxymethyl Cellulose, Sodium Alginate, Sodium Perborate, Sodium Carbonate, Sodium Lauryl Sulfate</p> <p>Ingredients Analysis : P-Phenylenediamine not more than 3% after water dilution</p>
Instructions	See Image Below
Warning	See Image Below
Additional Details	<p>“Contains No Ammonia Peroxide”</p> <p>“100% Gray Coverage”</p>

DIRECTIONS FOR USE
(Read Carefully Before Use)



1. Pour powder of the bottle into a suitable vessel, a cup or saucer.
Three cup (enclosed) water to be mixed with 6gms. of Black-S powder and 4 cup water to be mixed for 6gms. of Black Brown/Dark Brown and Light Brown.
2. Then, stir it thoroughly till it becomes a soft paste. **No boiling should be done.**
3. This paste is to be applied to your hair from root to top. A comb or tooth brush is a suitable instrument for this operation.
4. About 20 to 40 minutes after this operation, wash it out with soap or shampoo etc.
5. Your hair is now coloured and conditioned with natural glossiness.

"ShoHan" Powder, if left over should be kept in the bottle tightly closed with existing rubber and cap. It can be used again whenever some grey hair grows. Those persons who are exceptionally susceptible to skin diseases, a test on the arm or leg with a little drop of paste of "ShoHan" for about 24 hours is recommended. If nothing comes about, safety is assured.

NOTE : Wipe off stains on skin or along hairline with a swab of cotton as soon as they appear.

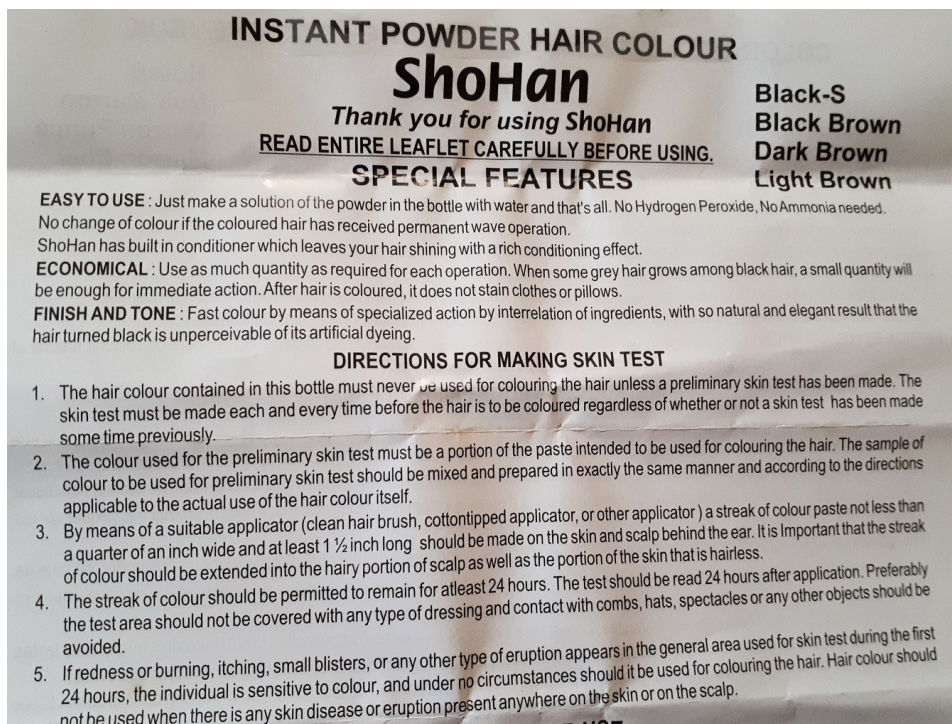
IMPORTANT : Please do not use extra quantity of water than the quantity indicated above.

For best results use on clean hair.

CAUTION : This product contains ingredients which may cause skin irritation on certain individuals and a preliminary test according to accompanying directions should first be made. This product must not be used for colouring the eyelashes or eyebrows : to do so may cause blindness.

Manufactured by : ShoHan Chemical Pvt. Ltd. (ML/COS1314)

ShoHan Hair Dye instructions and warnings



ShoHan Hair Dye Special Features and Patch Test Instructions

Physical Qualities

Notes were made on the texture, color, and odor of each paste. It is important to first note the qualities of a true henna paste, to use as comparison.

BAQ henna paste is green-brown in color when it is first applied. The paste is smooth and opaque, but with a very fine natural grit, as it is mixed from a plant powder. It dries to a matte deep brown. The stain that is left begins as a bright orange, then oxidizes to deep reds and browns. The odor is that of wet grass, citrus, and essential oils. It is a pleasant odor. The pre-made pastes were all relatively similar in their textures, colors, and odors, but completely different from the BAQ paste.

Texture

As indicated on many of the labels, the pre-made pastes were “gels.” They were extremely smooth and glossy. Some pastes were thicker, while others were runny. Cone 1 (Almas), was the most liquid-like; lines did not hold, and the product formed runny puddles. Nearly all of the pre-made pastes had a sticky or stringy consistency. If I dipped a toothpick in a sample of product and pulled it out, the product would stretch in thin strings. There was clearly some sort of binding or thickening agent added into the products to give them such a consistency. This is different from the stringy consistency one might find with BAQ henna paste, which allows the paste to be draped in thin, even lines. While

BAQ henna drapes the way a smooth icing might, the gel pastes were more comparable to sticky paint.

The pastes I mixed from the hair dye powders were denser and grittier. The pastes turned smoother with stirring, but retained some grit. While evidence of some sort of thickening agent was present, these pastes were not as sticky and glossy as the pre-made pastes.



Texture tests for BAQ paste and pre-made pastes

Color

With the exception of Cone 1 (Almas), which was blue-black in color, the pre-made pastes showed variations of deep reddish brown to coffee brown when first squeezed out of the tube or cone. When smeared across a surface to form a fine layer, one could see that the gels were all translucent, and orange-red to brown-red in color.

The hair powders were gray before mixing with water. Once water was added, the pastes deepened from gray-brown with hints of blue or purple, to deep brown, to off-black.

Odor

All of the pre-made pastes had an overwhelmingly solvent-like odor that was noticeable within seconds of squeezing out a sample. The smell was similar to turpentine or gasoline. Even in a well-ventilated area, the odor took hours to dissipate after completing the tests. While I would describe BAQ henna as having a strong *scent*, the pre-made pastes emitted *fumes*, in the same way that an open bottle of nail polish remover quickly fills a space with the smell of something flammable. Cone 6 (Al Qamar) had a faint menthol or eucalyptus odor in addition to the solvent. The hair dye powders did not give off any notable odor, in neither powder nor paste form.

It is interesting to note that Cone 2 (Shama) had an ingredients list that is very similar to a true henna paste—henna, oil, citric acid, and water—but basic observation showed that this was far from

the truth. Like the other products, this paste was a glossy gel with a deep red-brown color and strong odor. This goes to show that looking at an ingredients label is not enough when shopping for henna products.

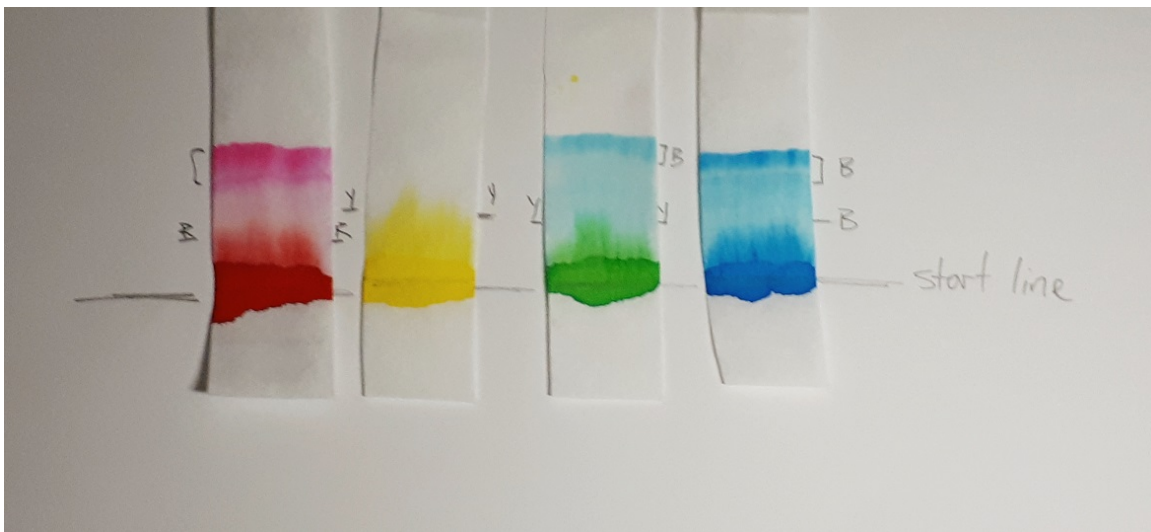
Flammability

The flammability of the pre-mixed pastes was tested by saturating pieces of cotton with one of each of the products. Each piece of cotton was then held with tweezers over a flame for a few seconds. The BAQ henna paste was also tested using the same method. This test was not done with the hair dye pastes.

None of the samples ignited. A few sizzled and emitted dark wisps of smoke, but otherwise showed no difference in reaction when compared to the BAQ paste. The BAQ paste became dark and dry. An absence of combustion does not exclude the possibility of the pastes containing flammable ingredients; there may not have been high enough concentrations to cause combustion, or the additional moisture may have acted to prevent a flame.

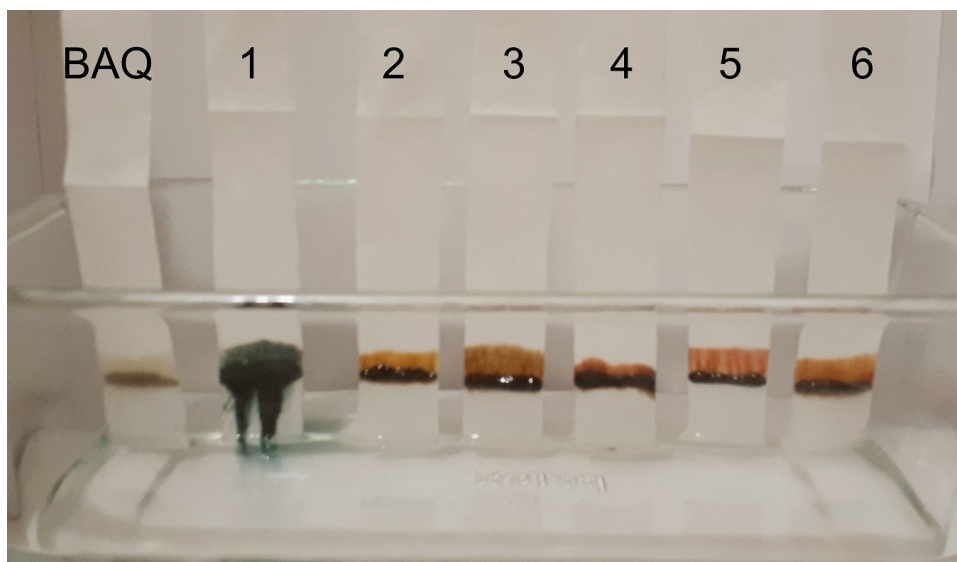
Paper Chromatography

Chromatography tests are used to separate dyes. The paper chromatography test involves allowing a strip of absorbent paper holding a sample to wick a solvent such as isopropyl alcohol. As the solvent travels up the paper, it brings any dye contained in the sample along with it. Dyes will travel varying distances, resulting in unique bands of color to appear. This test alone cannot determine the exact dye ingredients, but comparing results can provide an idea of what types of dyes were involved. Below is a sample conducted on standard food coloring one can buy from the grocery store. One can see that the green dye contained both the blue and yellow dyes.

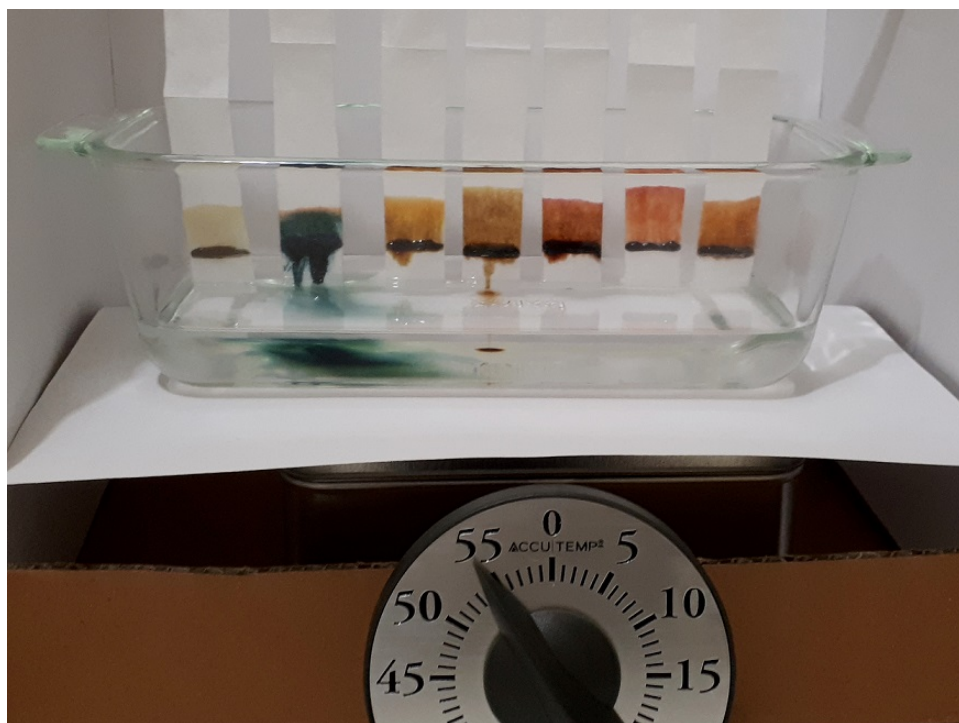


Using gloves to prevent my skin's oils from contaminating the test, I cut 2 x 16cm strips from coffee filters. I measured and marked a line 2cm from the bottom of each strip. I applied a sample of each product along that line. All the strips were clipped to a rod and hung above a flat glass dish containing isopropyl alcohol (99% USP) so that the bottoms of the strips were in the alcohol, but the sample lines remained above. The samples were left for 60 minutes, and observed during that time.

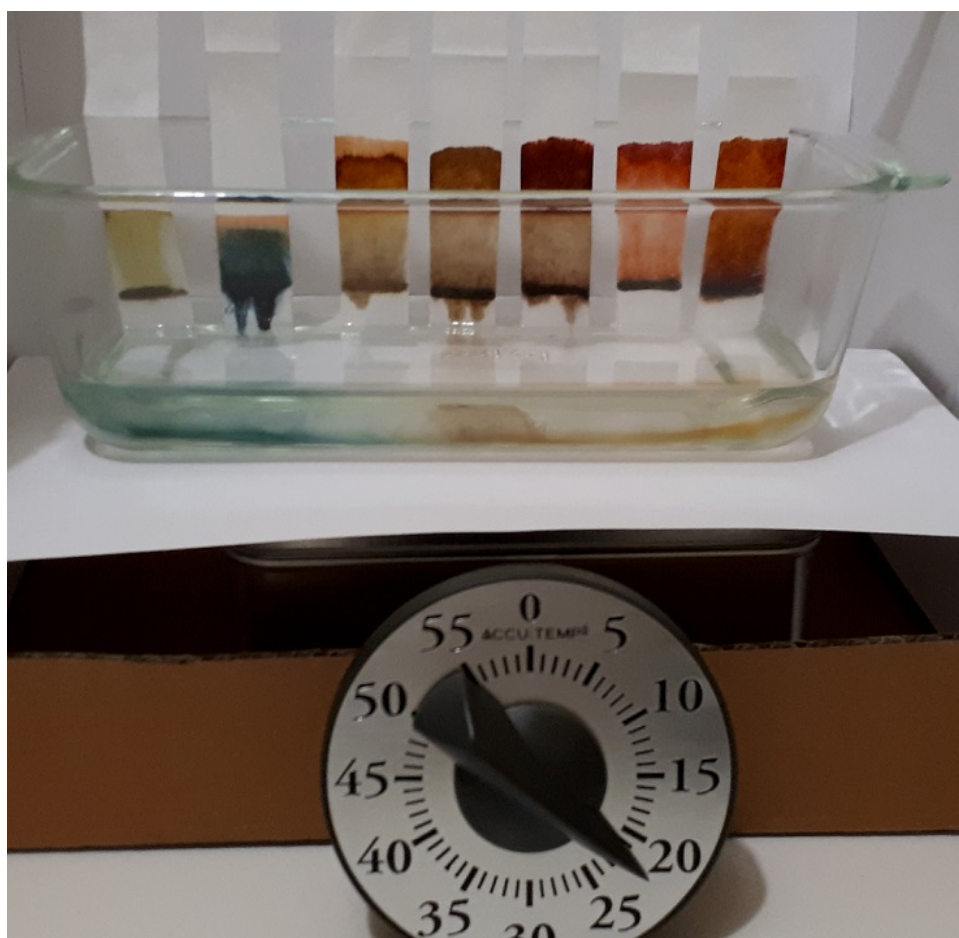
Below are images of the process. The timer indicates remaining time.



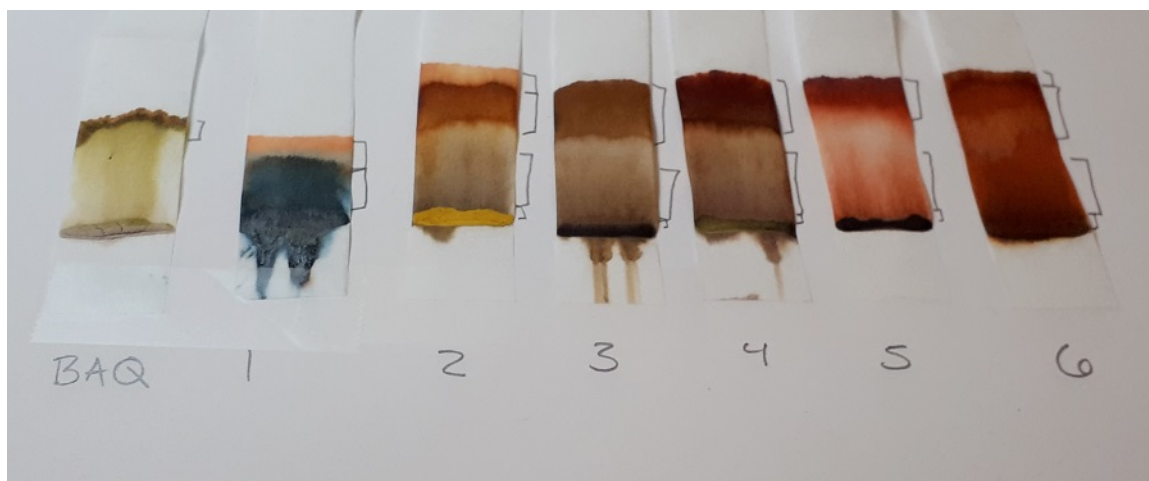
Within seconds, the solvent began moving up the paper. Cone 1 (Almas) bled down into the solution. Luckily, this caused no noticeable contamination of results.



After five minutes. Cone 3 (Najma) begins bleeding into the solvent as well. Both cones 1 & 3 had been noted to be thinner and more liquid when tested for texture earlier.



With just over 20 minutes remaining, dye separation is quite apparent. Notice that the BAQ sample on the far left is very pale in comparison to all other samples.



Analysis of Pre-made Paste Chromatography

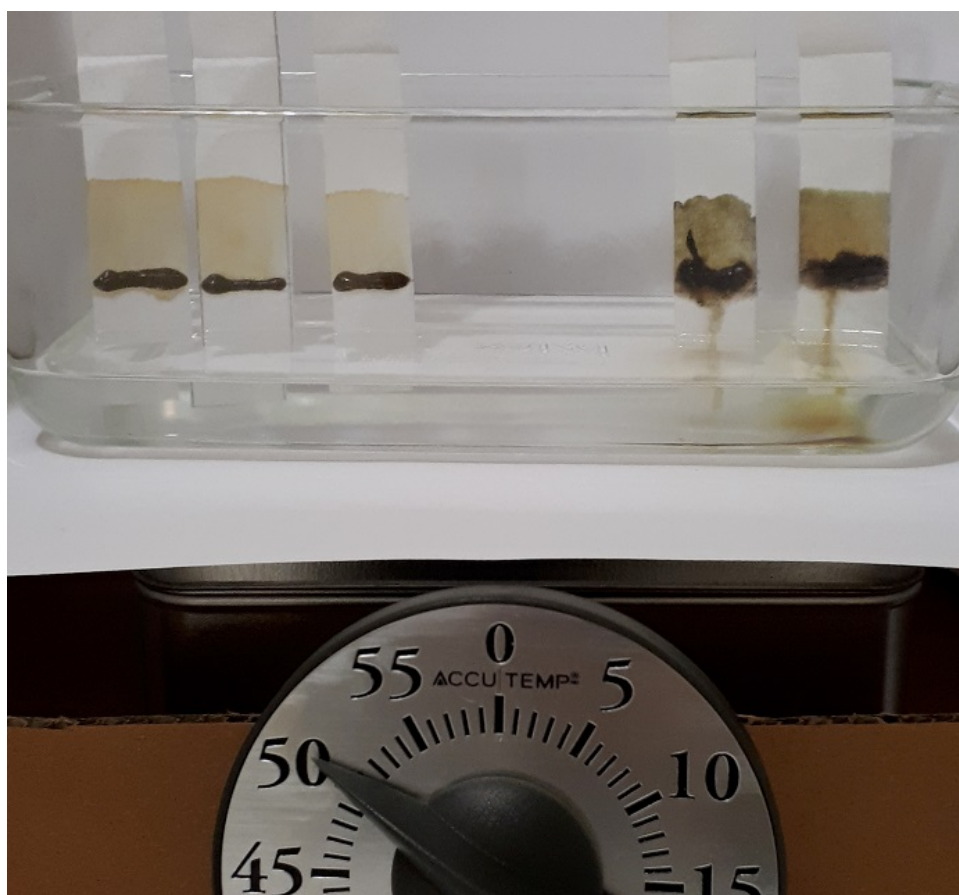
It is important to know that BAQ henna paste contains only one dye molecule, which is lawsone. Lawsone stains the skin by binding to the keratin. Initially, the stain on the skin is light, and then it oxidizes to deeper shades. BAQ henna usually contains 1-3% lawsone concentration. The dye is kept stable in an intermediary state by the low pH liquid used to mix the paste-- in this case, diluted lemon juice.

Cone 1 (Almas) was the only pre-made product I found which claimed to give a black result. Initially I assumed that it must have contained PPD. The results of this chromatography test showed that to be untrue; the dye is a deep blue color and most likely a concentrated food dye, or something similar. Below I will show the chromatography results for PPD hair dye. Strangely enough, a small amount of red-orange dye also separated from Cone 1's sample, but it is clearly not lawsone.

Cones 2-6 showed similarities in the presence of highly concentrated brown-red dyes. Cone 2 (Shama) also exhibited an additional lighter dye strip at the top. It appears similar to that of Cone 1, but is present at a different height. Also interesting to note in Cone 2 is how the solvent turned the initial sample stripe a bright yellow color. This could be because all of the other dye was dissolved and wicked upward. The BAQ henna shows a similar result, as the initial line turned dull gray.

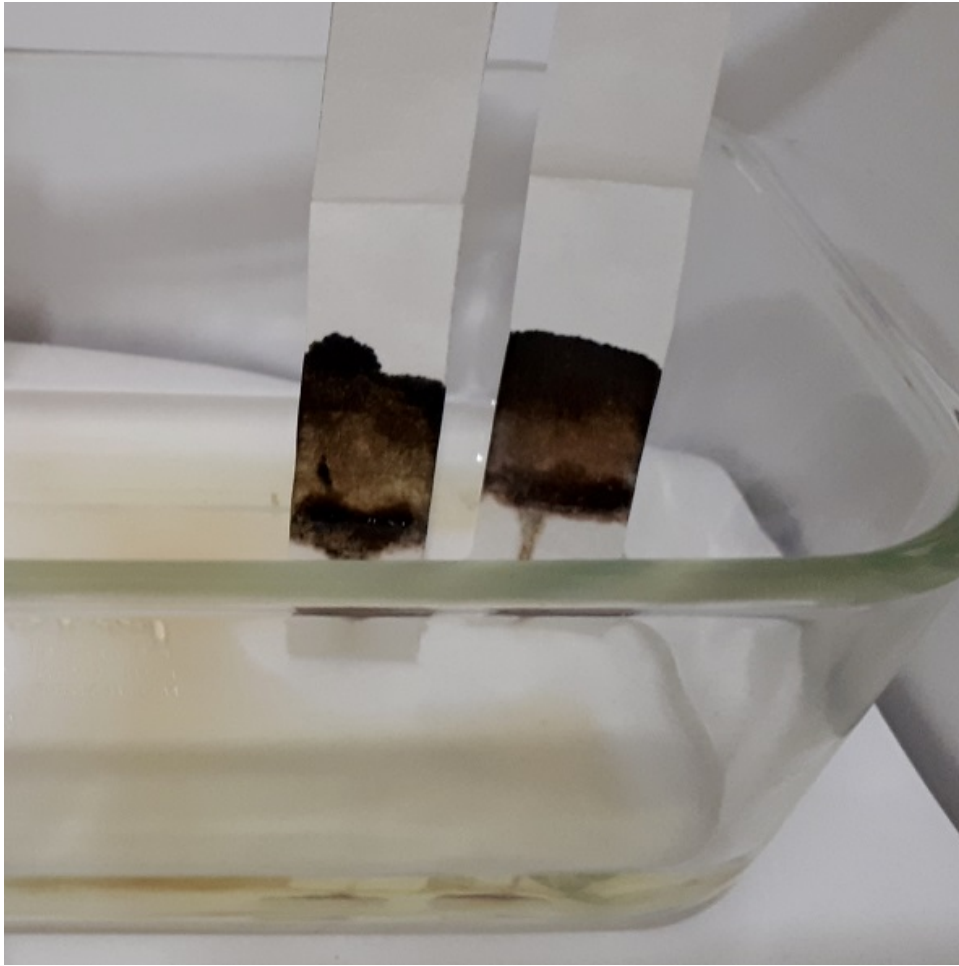
Powdered Hair Dye, and Additional BAQ Chromatography Samples

I conducted another chromatography test on the two powdered hair dyes, and to re-sample the BAQ henna which I felt may have been contaminated when Cone 1 bled beside the first BAQ sample.

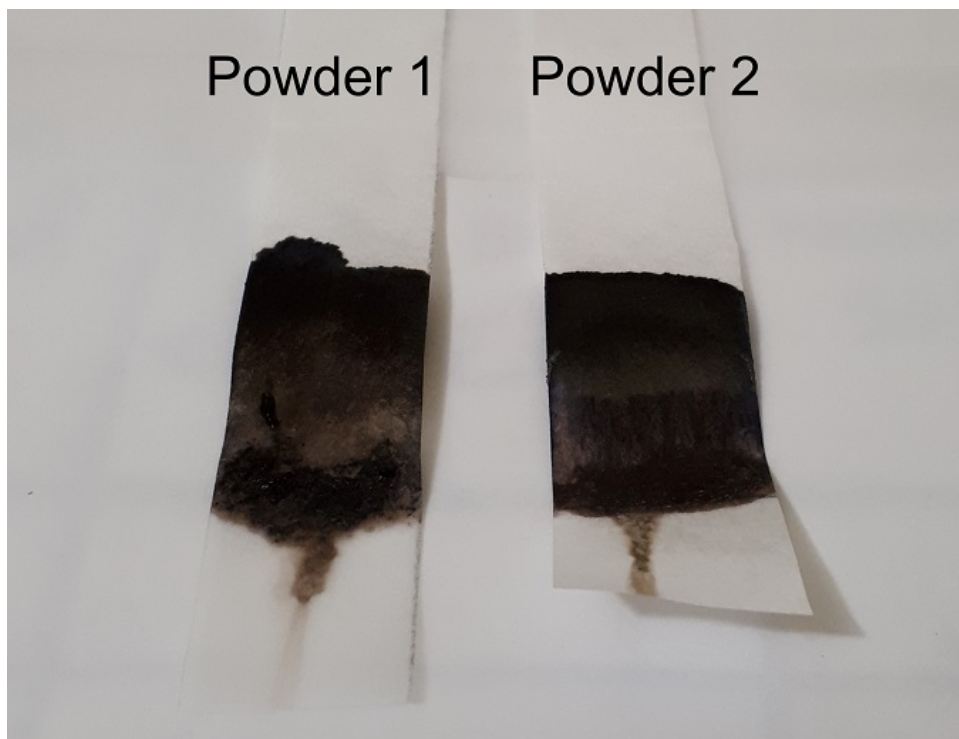


Three identical BAQ samples on the left. On the right, Powder 1 (Bigen) and Powder B (ShoHan) respectively.

While both powdered hair dyes were labeled “black,” the pastes appeared to be very deep brown at the beginning of the test. These dyes are oxidative, meaning they darken as they process within the hair shaft (or in the case of “black henna,” while on the skin). Both PPD hair dye samples bled into the solvent, which made sense given that they were created by mixing the powders with water.



This photo was taken forty minutes in. I noted that both hair dyes samples showed a violet tinge as time went on.

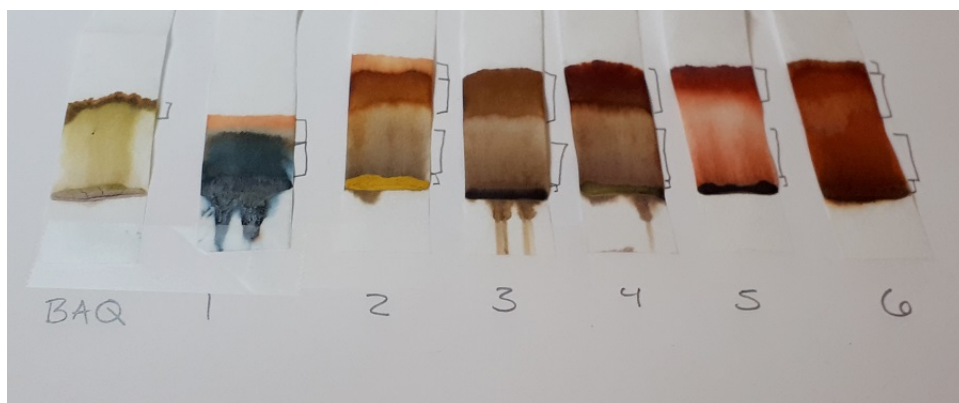


The hair dyes appeared nearly identical in their chromatography results. The initial brown color darkened through a deep, muddy violet color, to a cool, charcoal black. As both products included full ingredients lists, there was no need to guess the presence of PPD.

These products were not marketed as henna, or for use on skin. They do not claim to be or contain henna. However, powdered black hair dyes such as these are very often used to create “black henna” which is applied in stalls and kiosks in tourist areas. They are simply highly concentrated PPD mixtures.



The additional BAQ samples were relatively similar to the initial sample. Here, the lawsone lines are more visible. A faint, green-brown line present beneath the orange dye lines was most likely due to plant residue which was wicked up along with the solvent. While the sample on the left appears as if there are four distinct dyes, one can see that the shape of the lines is uneven; rather than going straight across, indicating a clear separation of dyes, this separation is more likely due to inconsistencies in sample application, and solvent absorption/evaporation. Below are the results from the pre-made pastes, once again, for comparison.



Conclusions and Limitations

The purpose of this study was to investigate and report observable differences in texture, color, odor, flammability, and dye qualities of six pre-made “henna” pastes, and two “black henna” pastes. These products showed little to no similarities with BAQ henna paste, but were very similar to one another. Unlike BAQ paste, pre-made pastes were glossy, translucent gels. These pastes emitted a very strong solvent-like odor and contained highly concentrated dyes. Despite a possible presence of flammable ingredients, none of the pre-made pastes ignited when exposed to flame. Pastes mixed from powdered hair dye were dark brown to black and had no odor. Hair dye pastes were not tested for flammability.

Access to advanced laboratory equipment and methods would help to shed light on the chemical qualities of the products, and even determine the ingredients within them. Equipment such as a mass-spectrometer can do just this, but is very expensive and difficult to access without an established relationship with a lab.

However, the simple methods used in this study are more than enough to determine that pre-made pastes are far from true BAQ henna. True henna is made in small batches, and must be kept cold to prevent demise. The paste is opaque, green/brown, and smells pleasant. If you come across a product and are unsure of its ingredients or safety, err on the side of caution and do not use it. If you are very curious, squeeze a small amount onto a napkin and note its texture, color, and odor.

True henna is wonderful. It has been used for centuries in numerous countries. It has been observed to provide benefits to skin and hair. Commercialization has tainted the term, “henna” with innumerable products which are far from the real thing. For quality and safety, it is best to skip the cheap, fast stuff, and mix your own henna paste using BAQ henna from a reputable supplier.