Working with Soymilk
By John Marshall©

Nearly forty years ago I was fortunate enough to have made my way to Japan, to be immersed in color and textiles. Not long after arriving, I found myself apprenticed to Matsuyo Hayashi, a traditional dyer of *bingata*[1] textiles. This was my first experience with the Okinawan dye techniques and I took much for granted.

Within this process we used soymilk extensively. It was never really described to me why we used it or how it actually worked, but after returning to the States I began to experiment and investigate its properties.

Well, it turns out that soybeans contain one of the highest percentages of protein of all legumes. This cellulose-based protein has many properties.

- Once allowed to dry, it will stiffen the fabric, locking the fibers together where they cross – this will help to reduce wicking when applying the dyes
- The soy protein is very easy to stain with dyes, allowing for a greater concentration of color throughout
- As a plant derived protein, it gladly takes in protein-specific dyes as well as cellulose-specific dyes
- Once washed, it allows the fabric to return to its original hand
- Once cured it forms a protective coating over the fiber, locking in the dyes and giving some protection against UV light damage and fading.
- The protein, once cured, is no longer water-soluble. In this state it also has a protein-polymer memory.
- As a protein-polymer coating to your fabric, it will also function very much like ScotchGuard®, helping to reduce soilage.

So before I apply any dyes to the cloth, I always give it a nice coat of soymilk. This functions as a permanent sizing, allowing me to apply broad areas of color evenly, and it also helps to prevent wicking if I want to work with fine details.

To apply the soy I stretch the silk with traditional *harite* and *shinshi*[2] which allow me to suspend my fabric much like a hammock and still be able to tilt it like an easel.

Deer-hair brushes are used to apply the soy evenly – which helps to avoid streaking, however you may also use a large sponge, or even try spraying it on. For smaller pieces you may even be able to get away with dipping. Just remember–the soymilk comes from a bean, and will sour if not allowed to dry quickly (think of a bean salad sitting out on a picnic table in the sun in summer…). It is best to do this kind of work when it is fairly warm environment where there is low humidity.

Since the soy itself takes on quite a bit of dye, you'll find that you wind up with much richer colors in the areas sized. If you're up for an experiment, try sizing half your yardage and leaving the rest untreated. Then go about your normal routine. I believe you find as I do, that the soy-treated section has something about it–a quality rich aspect that is difficult to define.

I also use soymilk as an additive to my dyes. Since I make use of a wide range of natural pigments in much of my work, the soymilk acts as a glue and helps to bind them to the fiber. If you want to try this on your own, you may try substituting high quality

watercolor pigments for the dyes I use (simply use the soymilk instead of water to thin the paint).

Once I'm through with all my color applications, I allow the dried soymilk to cure. Drying means that the water content has evaporated away. Curing is the phase during which the protein molecule shrinks and bites into the fabric.

It is often necessary to wash your fabric before continuing on to another stage. Washing will break the bond between the fibers, mentioned above, allowing the weave to relax and return to its natural hand. However, if you wash the fabric before the soy has cured, you run the risk of having some or most of the soymilk wash away–and worse–carry the dyes it absorbed with it.

The best environment in which to cure your fabric is one that is very warm and very dry. In winter I hang the fabric from the rafters near my wood-burning stove. In summer it hang it outside under a southern exposed tin roof. For the quality I seek to achieve, I generally allow my fabrics to cure for two to three months, however this time may be cut back considerably depending on your circumstances. Just be aware of the risks you take.

Of course, if there is not need to wash out your fabric, then don't. If you can still work with the slightly stiff sized fabric, then go ahead and do so, it will continue to cure as you work, as it sits in the procrastination pile, or as it dangles from a hook in your closet.

Here are a few examples of how I have used the properties described above:

As the soymilk cures, it shrinks, hardens, and *remembers* the state in which it is cured. So if you are careful to store it wrinkle-free until it is fully cured, you will have what amounts to a perma-press length of yardage. So, too, if you store it away pleated, you will wind up with a very close to permanently pleated piece of silk.

Since the soymilk acts as a binder, if you have exquisite indigo textiles you have collected from Nigeria or Laos, and find that they have a tendency to crock, simply work in a coat of soymilk to glue the wayward particles to the fiber, allow to cure, and not more blue arm pits!

If you are preparing liturgical banners or wall quilts, consider adding a final coating of soymilk to help reduce light damage. I normally do this after the last washing up my fabric, but before construction takes place. Soymilk in seams takes longer to dry and may sour.

Consider carefully the properties I have outlined and you will come up with all sorts of additional uses to suit your textile needs.

Oh, yeah! The recipe…

- Soak one-quarter cup of dry soybeans in two cups of water until swollen (about and hour)
- Rinse thoroughly
- Place swollen beans in a blender and fill four-fifths of the way up the beaker with fresh water
- Grind on liquefy until the water turns a very turbid pale milky-yellow
- Pour the slurry through a old handkerchief or scrap of sheeting squeezing all the liquid out into a bowl

- Check the consistency–you're aiming for something close to 2% milk or a little thicker. Add plain water to dilute if necessary

That's it! You're ready to go!