
DYEING INSTRUCTIONS

INDIGO FROM GUADELOUPE

Organic bath

These processes and instructions were improved and adapted to the very high content in indigotin of this indigo, and low quantity needed to create deep shades.

As for the other natural indigos, you can dye many kind of fibers and create shades from light blue to deep and marine blue. The shade will depend on your bath, on the quantity of indigo and number of immersions into the bath.

EQUIPEMENT AND VESSELS

It is better to use stainless steel, enamel or plastic containers, high and narrow, large enough to well immerse your fibers and prevent any contact of your bath with air in order to avoid indigo oxydation. Dyeing in a basket or a grid at the bottom of the tank avoids the contact of fibers with non-solubilized compounds, for a better uniformity.

It is recommended to wear gloves when handling and a mask when weighing the indigo and lime.

FIBERS PREPARATION

Weigh the dry fibers before rinsing.

The preparation of the fibers is essential for a good result.

For cellulosic fibers (cotton, linen, hemp...), use a hot soap bath with a little washing soda.

Heat the bath up to 60-90°C (= 140-194°F) for 30-60 min. Then rinse the fibers with clear water.

For wool and silk, use a hot soap bath at 60°C (= 140°F). Then allow to cool down, then rinse the fibers with clear water.

THE INDIGO BATH

Indigotin, the main dyeing molecule of natural indigo is not water-soluble. It needs to be converted from an oxidized form (blue pigment, insoluble) to a reduced form (amber-yellow, greenish yellow, with other natural indigos) which will allow to fix on fibers before being again oxidized (by the oxygen of air).

The indigo from Guadeloupe has a very high content in indigotin. In any case, a larger quantity of reducing agent will be needed than for other natural indigos and the appropriate conditions of reduction will be obtained through the balance reducing agent / lime.

GRINDING AND PREPARING THE INDIGO PASTE

The reduction step will better operate if all indigo grains are in contact with the reducing solution, thus, it is better to use a fine powder.

Prepare the indigo paste by mixing :

- 1 part of indigo;
- 1 part of alcohol (methylated spirit can be fine) – optional but recommended for a better wetting of indigo particles;
- 1-2 parts of hot water.

Well homogenize until getting a smooth paste. Grinding the paste with a mortar is the best but you can only crush the grains against the tank walls. A pot with marbles will also work.

PREPARATION & REDUCTION OF THE INDIGO VAT

Prepare a container large enough with hot water around 50°C (= 122°F).

Using a basket or a grid at the bottom will avoid the contact of your textiles with non-reduced materials.

Prepare the ingredients as follows :

Natural vat with fructose syrup - ingredients

For a 5 liters (1.3 gall.) tank	Dark shade*
Water around 50°C	5 L
Indigo in powder (then prepared as a paste)	10 g
Fructose syrup**	172 g**
Hydrated lime	80 g

* For a medium shade, you can use these quantities for a 15-20L bath.

**Fructose syrup at 70 % fructose, e.g. respectivelyt **120 g of crystallized fructose.

For dyers familiar with the ratios of ingredients (like 1:3:2 for instance), **this optimized vat is using ratios of 1:12:8 for any kind of natural fibers. A well-reduced vat has an amber yellow color.**

The size of bath and quantity of ingredients may be adapted according to the fibers and shade. However, for a good reduction, it is important to follow the information below regarding the ratios of ingredients.

Preparation of the vat :

A/ Slowly pour the indigo paste into the tank with mild water.

B/ Add the fructose syrup, then lime IN THIS ORDER while slowly mixing.

C/ Gently homogenize the vat (avoid including air into the solution). The final volume of the bath may then be adjusted with water in order to have enough volume for your textile. Be aware that any dilution will also lighter the colours. The pH must be around 11 (pH 9 for wool).

D/ Allow at least 1 to 2 hours, ideally 1 night for the reduction process to complete. The temperature must be around 40°C (= 104°F) before dyeing. So it is recommended to prepare the indigo dyebath the day before dyeing. In this case, you can start your bath with around 2/3 of the final volume and adjust the volume with hot water (to be added very slowly) just before dyeing for a dyebath at mild temperature.

When the reduction of vat is fine, the **pH must be set around 9 for the proteinic fibers** (with white vinegar, with a solution of acetic acid or hydrochloric acid... or with lime or lime water). For the cellulosic fibers, a pH around 11 is fine.

As mentioned above, a well-reduced solution will not have necessarily a greenish-yellow colour, as for other natural vats, but slightly orange to reddish orange or reddish color depending of the ratios used (see below).

The **optimized ratios recommended above are 1:12:8**. This was developed to get good conditions of reduction and a limited height of lime sludge into your vat. With these ratios **a well-reduced vat has a slightly orange color** (not necessarily greenish-yellow as for other vats).

For cellulosic fibers, others vats will work with ratios of 1:24:8 (reduced vat slightly orange as well), 1:12:12 (reduced vat reddish-orange) or 1:24:16 (reduced vat reddish). The two last ones will contain a higher height of lime sludge.

For proteinic fibers, after obtention of good reducing conditions, it will be important to lower the pH of bath to 10 or slightly lower to avoid damages to the fibers. In this case, a ratio with less lime will be preferred (i.e. 1:12:8 or 1:24:8).

DYEING

Keeping your bath at 40°C or heating to this temperature at least 1h before dyeing (after a slight homogenization) will provide you better results.

The fibers must be previously rinsed in mild water and wrung out before the dyebath.

Immerse the fibers very slowly into the bath. Avoid any bubbles or air and any contact with the sediment at the bottom of the tank (as previously mentioned a basket or grid may be helpful).

Keep the fibers into the bath for **around 5 to 7 min** (longer if your bath is at room temperature) with a gentle homogenization by hand.

Slowly remove the fibers from the bath (to allow draining into the tank), wring them out, then expose to air or under a waterflow (use gloves). The fibers will turn to the blue colour under the effect of the oxygen.

It is then recommended to rinse your textile into a bath of water with 1-2 tea spoons of white vinegar that will neutralize the alkaline dyebath.

That may be a good option to let the fabric to dry completely to allow a good oxidation of the indigo (considered as complete after 24 h min of exposition to air).

Then rinse with clear water, then wash again with mild soap until the rinsing water be clear.

For darker shades, the fibers can be dyed again (always humid) into the same bath or in a more concentrated dyebath. Conversely, it is possible to make the colour lighter by dyeing into a less concentrated bath.

Tips :

- This indigo provides its best results with a bath around 40°C, for proteinic but also for cellulosic fibers (35-50°C e.g. 95-122°F);
- For wool dyeing, a pH of 9-9.5 is better (11-11.5 for the other fibers).

TAKING CARE OF YOUR ORGANIC INDIGO BATH

Your organic indigo bath can be kept for a long time while frequently checking it and adjusting the level of ingredients if necessary. You may need to add some fructose syrup, lime (or lime water) or indigo (enrichment) to set up again proper reduction conditions (see the color of bath described above). In any case, when adding ingredients, it is recommended to heat the vat around 40°C, to gently mix the vat while including the ingredients, and let the new conditions to establish (at least for 20 min).

When not used for a long time, a gentle mixing of the bath (everyday or every two days) will contribute to its good condition.

WASHING

Dyed fabrics should be washed with soap and rinsed well until the water becomes transparent.

TAKING CARE OF YOUR TEXTILES IN NATURAL DYEING

In order to preserve your textiles in natural dyeing, we recommend :

- To wash your fabrics at maximum 40 ° C.
- To avoid washing powders (which contain bleaching agents that will quickly fade your color) and bleach. Your textiles can be washed with soap nuts (without bleach that is sometimes recommended), with washing balls or with a liquid soap.
- To dry your fabric away from direct sunlight.