

## INDIGO + FRUCTOSE

### reduction vat

First, it is important to scour your fabrics well before dyeing with indigo.

- Recipes for scouring wool and cellulose fibers are here:  
<https://forestsandmeadows.com/washing-and-scouring-natural-fibers-copy>

### Preparing indigo + fructose vat

#### Main ingredients:

- 1 part indigo
- 2 parts lime
- 3 parts fructose
- water

#### Additional ingredients:

- vinegar
- laundry detergent

1. The strength of indigo-fructose vat is expressed as grams of indigo per liter of water in the vat. For example, 10 g indigo per 1 liter of water is very strong and at the beginning, it will be easy to produce deep blue colors. 2 g indigo per 1 liter of water is a weak vat and it would be suitable for light and medium shades of blue. In the beginning, I would recommend using 5 g indigo per 1 liter of water. So for example, you will have 10 liters of water, 50 g of indigo, 100 g of lime and 150 g of fructose (1 part indigo, 2 parts lime, 3 parts fructose). Also, I would recommend using 5 g indigo per 1 liter of water (or less) if you are working with wool, because stronger vats are more alkaline, which can damage your wool.

2. Heat water to 80-90C. Keep ~10% of water for later, and pour the remaining water (90%) into your vat bucket. It can be a strong plastic bucket with a lid or stainless steel pot with a lid.

3. Pour some hot water over the indigo. Stir and mix very well. If you have, you can use a big mortar and pestle to grind it until the indigo liquid is a very smooth paste. Ideally, grind indigo and water with a

pestle for a long time, until you see tiny purplish spots appearing on the surface. Pour it into your vat bucket. Hot water should already be in the main bucket.

4. Pour hot water over fructose, and stir well. Add to the main bucket with indigo.

5. Pour hot water over the lime, and stir well fast. It won't fully dissolve in water, but that's okay. Be careful as lime is a very fine powder and can be irritant if inhaled. I advise you to wear a face mask and gloves while handling it. Add to the main bucket with indigo.

6. Stir indigo vat for several minutes. Blue foam should appear and liquid will start changing its color. Cover with a lid and leave for ~1 hour. By this time the liquid should be brown, amber or dark yellow. It is ready to dye, but wait until it's cool enough so you won't burn your hands and fibers. If your vat is cloudy at the beginning, then stir again and wait. Sometimes it takes 2-4 stirring and waiting rounds until it's ready.

Dyeing process:

7. Before dyeing, soak your scoured fibers in warm water for at least 30 minutes (with exceptions for katazome and other similar techniques). Remember to tie your yarn skeins loosely to ensure even color.

8. Keep in mind that lime is not water soluble so on the bottom of your bucket there is a layer of undissolved sludge with lime and indigo. The stronger your vat is, the more sludge there is. It is important to keep your fibers from touching it, as it can result in uneven, grayish, greenish colors, and damaged fibers. That's why it's always better to have a bigger bucket and have more space to work without agitating the sludge. If touched, it will rise to the surface and you will have to wait until it settles down.

9. Take the fabric out of the soaking water, squeeze it, and slowly, gently dip it into indigo. Massage cellulose fabrics while dyeing to ensure even color. Make sure that all fiber is fully submerged. Indigo attaches to the surface of fibers quickly and it might be challenging to create even color at first, so I would recommend practicing with some test fabrics and yarns. Wear gloves if you don't want to have blue hands :) Keep fabric in the vat for 2-10 minutes.

10. While dyeing, make sure that you do not agitate or splash the dye as it adds oxygen. For indigo, it's important to keep oxygen out of the dye to maintain a healthy vat.

11. Take the fabric out of the vat, and carefully squeeze it close to the surface.
12. Let it oxidize (turn blue) for several minutes.
13. Gently rinse in clean water to remove excess indigo.
14. Leave it to fully oxidize for 30 minutes.
15. Repeat the dyeing-rinsing-oxidizing process at least one more time. More dips create darker colors and better-quality of the dye.

Finishing dyed textiles:

16. When all dyeing is finished, neutralize alkalinity with acid. Use ratio of 10-15 ml of white vinegar to 1 liter of water. Prepare enough vinegar water for your fibers to be fully submerged. Add fibers and keep for 15-30 minutes. Proceed to washing.
17. Gently rinse in water with neutral liquid detergent.
18. Rinse in fresh water. Keep changing water until it is clear.
19. In order to create a better quality product, finish washing with heating. Add fibers to a pot with clean water and gently heat to 60-70 C for wool and higher for cellulose. Heat for 30-60 minutes. During this process indigo particles bond together. The ones that are already attached to your fibers will attach better and go deeper into the fiber. The ones that are not properly bonded with your fabric will separate and go into the water, so it will be easier to wash them out.
20. If your simmering water turns blue, repeat the washing process.

#### Maintaining the vat:

1. When an indigo-fructose vat is created, it usually works fine at room temperature. But if you have the option, heat it to 30-35C before working.
2. At the beginning you will have the darkest blues. Then with each dyeing some pigment will adhere to your fabrics and the vat will produce lighter and lighter shades until it stops giving a blue color. It's best to plan accordingly - start with darker shades and leave the lightest shades for the end. It can take several months to use up all pigment, depending on how much you are dyeing and how big is your vat.
3. If the vat got too much oxygen and instead of yellowish it started to look more blue, then it is best to heat to 40C, add some fructose, stir well, cover it with a lid, and leave for a few hours.
4. Stir the vat well after each dyeing session, and cover with a lid. Whenever you are not dyeing, keep it covered.