

Dyeing with Indigo/woad

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The blue dyestuff in woad is chemically the same as indigo, though you tend to get a paler and more greeny-blue from woad. It is one of the most permanent dyestuffs – that is why there are so many blue plants in old tapestries (yellows tend to be less light fast). The indigo used to dye modern jeans is still chemically the same, although made synthetically rather than being extracted from *Indigofera tinctoria* (which does not grow in this country).

Indigo is a “vat” dye. The blue dyestuff is insoluble in water. To get it to dissolve, you add ammonia (to make the solution alkaline) and a reducing agent (sodium dithionite, “spectralite” or colour run remover – or ferment it with bran and urine). This is then left (without disturbing it) so that the chemical reacts with the indigo, to produce a yellow-green solution. The yarn/fabric to be dyed is first rinsed in water with a small amount of alkali, e.g. ammonia, added, then squeezed out and added carefully to the vat (trying not to add too much air). When the yarn is removed from the vat and shaken in the air, the oxygen in the air oxidises the yellow back to blue indigo.

Woad is a biennial – the first year it grows leaves and produces blue dyestuff; the second year it produces yellow flowers a bit like a cabbage plant. Plant it in March, so it will produce lots of leaves by June-July. The dyestuff is in the leaves, but if you just harvest them and dry them, the enzymes in the leaves will break the dyestuff down, so you have to extract the dye from the leaves as quickly as possible after they have been picked. The simplest way is to break up leaves into a saucepan of boiling water, a few at a time, keeping the water boiling. 1-2 minutes after the last addition of leaves, strain off the straw-coloured liquid, which will contain the dye, and throw away the leaves (you can get a pale purple-brown from these with alum mordant). Cool the liquid quickly to room temperature, then add a few drops of alkali (ammonia or washing soda solution). It should change to a stewed Indian tea colour. Aerate the liquid (e.g. tip from one bucket to another, or beat with a whisk), and you should get a thick blue-green soup of indigo. You can use this for dyeing immediately, or concentrate it for later. [Leave it to settle (adding a small amount of acid will help), then discard the top liquid, and retain the blue “sludge” – which will keep for years (but may get smelly if not in the freezer).] This “sludge” is the indigo.

Making an indigo vat from woad extract After aerating the liquid as above, once the froth appears blue, you can proceed to making an indigo vat. Start reheating the liquid, to about 50-60°C (hand hot). Sprinkle about 1 teaspoon of sodium dithionite, or slightly more of “spectralite” or Dylon colour run remover over the surface, and allow to stand until the solution changes to greenish blue with a blue scum on the surface (the indigo is now reduced). This generally takes longer than I expect – and stirring should be avoided as it may introduce air!

Making a vat from indigo powder or concentrated woad You can use the “sludge” from woad extract as above, or natural or synthetic indigo, made into a paste with a small volume of water. The quantities of chemicals obviously depend on the amount of indigo in the solution to begin with – the following recipe was for 100 ml (4 tablespoons) concentrated woad extract, with 500 ml (½ pint) water. Add about a tablespoon of ammonia and about half a flat teaspoon of sodium dithionite, or slightly more of “spectralite” or Dylon colour run remover in a small dye pan. Warm, stirring gently occasionally until the solution has changed to a greenish yellow with a blue scum (the indigo is now reduced). This generally takes longer than you expect! At the same time warm enough water for the yarn to be dyed in a bigger pan, adding a salt spoonful of sodium dithionite and a teaspoonful of ammonia (a tall narrow pan is better than a wide shallow pan to reduce the surface area). Heat to 50-60°C, then gently tip the indigo solution into the dyebath, trying not to introduce air. You now have an indigo vat. Make

sure it remains greenish yellow while you are dyeing.

[An alternative method of making a vat is to start by adding washing soda solution or ammonia to the dyebath, then sprinkle in indigo or add woad extract, stir gently, then sprinkle 1 tsp sodium dithionite or spectralite over the surface and gently stir this in. Wait until the indigo has reduced (usually 20-30 min) – the dyebath will be greenish yellow with a blue scum. Fibrecrafts suggest making a paste with indigo powder (7g synthetic or 25g natural) and spectralite (25g) in water, leaving this to stand and then adding 500 ml water with soda ash (150g) and leaving to stand for about an hour. Then make this up to the volume required with hand hot water, add ½ teaspoon spectralite, cover, and leave for half an hour. When I tried this, I used too much washing soda, and rotted the wool!]

Dyeing with an indigo vat While using an indigo vat, you want to avoid introducing oxygen into the dyebath. Wet yarn or fabric thoroughly in warm water with a dash of ammonia, making sure all air is squeezed out. Push this down the side of the pan, and stir the vat gently to spread it out evenly in the pan. After 5 min, remove it and allow it to oxidise (turn blue) in the air, trying to avoid letting drips splash back into the dyebath (they add oxygen). If you want a darker colour, repeat the dipping, removing the yarn or fabric before the blue colour starts to disappear. (This works best if there is not too much dithionite in free in solution - not always easy to regulate). Finally, remove the dyed yarn or fabric, wring it out well, and leave it to oxidise for at least 10 minutes (I usually leave it longer). Wash thoroughly in soap and water. You will probably be able to dye several batches, and if the solution is no longer yellow-green or deep green, you may be able to revive it by reheating with more alkali and dithionite.

When you have finished with the dyebath, it should be thoroughly aerated, to oxidise all the remaining dithionite, before being disposed of – dithionite is toxic!

Polygonum tinctorium This can be grown in the UK, but only in a good year, as it is not hardy. Young leaves are collected like tea (two and a bud), and frozen (to deactivate the enzymes), thawed, then dried and powdered. This gives a black powder which can be used like weak indigo. Alternatively you can use the woad method with fresh leaves.

Books: For more information I would recommend Gil Dalby's *Natural Dyes - fast or fugitive*, and Jenny Dean's *The Craft of Natural Dyeing* - both give a good introduction.

Supplies: Try Fibrecrafts – www.fibrecrafts.com – they produce an indigo dye kit and also supply “spectralite” (thiourea dioxide) – or just look on the Internet under natural dyes (Twist Fibre Craft Studio is another site I found which looks possible)