



Teri Dyes

GUIDE TO

DYEING SILK

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INTRODUCTION

Dyeing silk is very rewarding... silk in the right environment will both readily take in dye and retain its natural lustre. Stunning colour effects can result.

To get the **best results** it will be important to apply the **correct process** to the silk you are using. Be sure that you are reading the right pages!

N.B. Dyeing silk **fabric** requires a somewhat different strategy from dyeing silk **thread/yarn** which in turn is slightly different from dyeing silk **fibre**.

ABOUT THIS BOOKLET

Most of the material in this basic guide was compiled and tested by Murray Mackay, now an independent dyeing contractor in Christchurch, but formerly of Teri Dyes. It is his skills and experience that are reflected here, and Teri Dyes is indebted to him. Additionally, ideas submitted by some silk-dyeing clients of Teri Dyes, especially Mary Berwick, have also been incorporated into this first edition.

Some of this booklet is written after reference to *A Complete Guide to Silk Painting* by Susanne Hahn and published by Search Press.

Teri Dyes will welcome offers of constructive feedback, corrections and ideas for the future... see our *Contact Details* below.

DISCLAIMER

NB Every care has been taken with the guidelines, however they must be tested and adapted to suit your own requirements and dyeing conditions

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SECTION 1: DYEING SILK FABRIC

GENERAL PRINCIPLES AND POINTS TO NOTE:

Silk fabric can be dyed using the same basic methods as are used for dyeing wool. However there are some modifications that need to be made to achieve the best results when dyeing silk.

Caution: Silk does not take kindly to being overheatedif external heat is being used; it must be controllable and controlled.

Never heat silk above 90°C

Caution: Dyeing lengths of silk fabric evenly is one of the most difficult results to achieve. Especially if using the hot process, the silk tends to cling together and create pale patches and great care has to be taken to ensure that the silk does not get dark patches where it touches the hot bottom of the pot. (Dye uptake is greater at higher temperatures).

Caution: Make allowance for shrinkage of the silk fabric during dyeing. For example, if you want to end up with 2.2 metres you may need to start with 2.4 metres. Shrinkage will vary between different types and grades of silk.

PREPARATION OF SILK FABRIC

Before immersing or painting silk fabric with dye you must ensure that the silk does not contain any size or dressing and will not shrink unduly. Clean fabric is important in achieving satisfactory results. If in doubt it is best to wash the silk first. The following procedure is recommended for washing.

- Hand wash in lukewarm water using a detergent for fine fabrics. Pre-washing silk with Imerol XND is ideal.
- Rinse in warm water
- Squeeze out gently (do not wring out) and roll in an absorbent towel.
- Iron fabric initially on silk setting (or if there isn't one, on wool setting). Use a hotter setting if iron drags because of dampness.

Hot or Cold: CHOOSING BETWEEN THE HOT PROCESS AND THE COLD PROCESS FOR DYEING SILK FABRIC:

Choose **Hot Dyeing** if your main intention is to simply **change the colour** of the silk fabric from single colour A to a single colour B.

Choose **Cold Dyeing** if you want to end up with gradations of a single colour, or to use more **than one colour** ... patterned or irregular.

For Hot Dyeing

- you will need a large enough **vessel** (for criteria see page 5) to thoroughly immerse the fabric in dye solution, and
- you will have to **heat** the vessel and its contents to near boiling, and
- you will need an **Acid Dye** and
- you will need **acid**: either 30% Acetic Acid or White Vinegar (which is approx 5% Acetic Acid so use five to six times as much.)

For Cold Dyeing

- you will need a suitable frame (see page 8) for stretching out the pre-wet fabric **and**
- a work space at which you can spread dye about and
- have ready-to-go made up solutions (see mixing guide page 8) of **Fibre Reactive** dyes, [Acid dyes can be used for cold dyeing but wash fastness will not be as good unless they are steamed.] and
- one or more **brushes** (see page 8), and
- a way of providing heat to fix the dyes in the dyed fabric (e.g. by steaming, wrapping... see pages 10)

CONSIDERATIONS BEFORE YOU START HOT DYEING.

Immersion in Hot Acidic Water for Colour Change:

Things to watch out for: when dyeing silk fabric a number of precautions need to be taken to achieve an even colour:

- The first is to start with lukewarm instead of hot water to allow the dye more time to spread evenly through the fabric before it fixes.
- For the same reason the dyepot needs to be heated more slowly than when dyeing wool, with frequent stirring to avoid hot spots on the bottom of the pot.
- The fabric must be clean and free from size, e.g. as on page 3

You will need to know **how many grams** of fabric you are dyeing in order to calculate how much dye powder, how much acid and how much water you will need.

Vessel/Dyepot: For Hot Dyeing you will need a vessel that

- Is big enough to allow at least 2 litres of fluid for every 100g of silk fabric: having even more room in the dye pot lessens the chance of creasing
- Can be used to heat the dye solution to near boiling
- Will not interact chemically with the acidic dye solution: stainless steel is best, enamelled steel okay, copper okay for dark colours but not for light ones, aluminium (like many preserving pans) is ok but it may never be the same again and will likely slightly affect the colour of fabric achieved; cast iron is not suitable at all.

Have on hand an immersible **thermometer** covering the range up to say 20-120 °C. Kitchen shops often sell them.

Follow the step by step guide on the next pages to change the colour from A to B.

HOT DYEING OF SILK FABRIC.

NB Every care has been taken with the guidelines, however they must be tested and adapted to suit your own requirements and dyeing conditions

- 1 Clear your workspace. Choose & prepare your dye (page 8), organize your dyepot (page 5), tongs/wooden rod strong enough to lift the fabric, a temporary holding bowl preferably with a lid (e.g. a tray, board) to conserve heat, and a thermometer.

Step by step guide: For every 100 gm of fabric

(Multiply/divide up the measures to suit the quantities of your fabric)

Easy Measures for Dye for every 100gm silk fabric:

For pale shades use 1/4 teaspoon, for deep shades use a heaped teaspoon

- 2 To a minimum of 2 litres of water at **35-40°C** add 4ml **30% Acetic Acid** per litre of water. For each 2 litres of water used add 1 ml of **Lyogen MF**.
- 3 Add fabric (previously wet) and leave 15 minutes without heating. This is to ensure the acid is well dispersed through the silk before the dye is added
- 4 After 15 minutes remove silk from dye bath and add the right amount of well dissolved dye (see page 8 for tips on dissolving dye)
- 5 Return silk to dye bath taking care to ensure creasing is kept to a minimum
- 6 Leave for 10 minutes without heating, stirring occasionally
- 7 Remove silk from dye bath and heat solution to about **55°C**.
- 8 Return silk to dye bath taking care to ensure creasing is kept to a minimum
- 9 Leave for 10 minutes without heating, stirring occasionally.
- 10 Remove silk from dye bath and heat solution to about **70°C**.
- 11 Return silk to dye bath taking care to ensure creasing is kept to a minimum

- 12 Leave for 10 minutes without heating, stirring occasionally
- 13 Remove silk from dye bath and heat solution to about **85-90 °C**.
- 14 Return silk to dye bath taking care to ensure creasing is kept to a minimum
- 15 Leave until dye bath cools down. This helps ensure any remaining dye is absorbed by the silk.

Then Either

- 16 1st Rinse – Warm with Imerol XND or other suitable detergent
- 17 2nd Rinse - Cold
- 18 Dry gently

Or

- 16a A hot soapy wash followed by a warm rinse to which a little vinegar has been added, then a final rinse in tepid water. Remove excess water and iron dry with a reasonably warm iron.

Tips for Improving the Evenness of Colour

- Using extra water will give the silk more room and reduce the creasing in the pot... but takes more heating
- Watch out for twisting. Sometimes, when dyeing a length of fabric it can form twists and tangles which stop the dye penetrating if they are too tight. To avoid this, lift the fabric out periodically and straighten it out, especially in the earlier stages of dyeing.
- Do include the Lyogen MF as per step 2 on page 6.

If dyeing very **pale colours** leave the acid out of step 2 on page 6 and add it at step 10. This allows the small amount of dye present to be taken up more evenly before the acid is added to fix it.

***NB** failing to take the fabric out while the temperature of the dye solution is raised (steps 7,10 and 13 above) means that some of the fibre will at times be hotter than other parts and so that hotter part may well take up more dye.*

COLD DYEING OF SILK FABRIC

Use cold dyeing when you want to apply more than one colour, or get variations within one colour, or you simply don't want to manage a hot pot process.

For Cold Dyeing, we recommend

- 1 A **suitable frame** to stretch the fabric over before applying the dye. Wooden frames that are soft enough to take pins easily are the best. Use drawing pins, notice board pins or three pronged pins. Cover the edge of the frame with masking tape (plastic types are recommended) to avoid staining the silk with any colour which has previously penetrated the frame. Fasten the corners first and then the sides ensuring that there are no stretch lines across the fabric. The pins should not be opposite each other and should be 5-8 cm apart.
- 2 One or more **suitable brushes** or other instruments for applying the dye: Any type of brush can be used, although bamboo brushes are said to be the ideal. A variety of sizes and shapes permit the painter to cover large areas quickly or paint fine detail as necessary. The painter can also use whatever suitable materials they have at hand. For example large areas can be painted quickly using cotton wool rolled into a ball and held with a clothes peg.
- 3 **Prepared Dyes:** Dissolves the required **Fibre Reactive Dyes** in water.
 - For powders, first paste with a little cold water and then add hot water with stirring.
 - For granules add hot water directly while stirring.
 - One teaspoon of dye per 500mls of water provides a good stock solution that can be kept for some months (Keep in a sealed bottle in a cupboard).
 - Dilute your dye to the required strength and add 1 ml of 30% Acetic acid to each 100 ml of dye solution. (5 ml of white vinegar can be used instead).

The dye is now ready for use.

STEPS IN COLD DYEING

- 1 Ensure that the fabric is clean (see preparation page 3). Stretch the silk fabric on a suitable frame, see page 8, #1.
- 2 Make ready the dyes that you are going to use; dissolved in water and with acid added, see page 8, #3.
- 3 Apply the dye solution(s) in the patterns and to the parts of the fabric you choose, using brushes or other instruments, see page 8, #2

*In the end the method of application of the dye is a personal thing,
and there are no real rules.*

Special effects

Different effects will be obtained when cold dyeing silk if the fabric is dyed when it is already wet than if dye is added to dry fabric. E.g. the divisions between applied colours will be sharper (less bleed) when applied to fabric that is dry.

Many special effects can be obtained with water or alcohol spotting and adding salt crystals to the silk after painting. Colours will also blend together differently if painted onto wet or dry silk. Gutta can also be used to separate colours. To learn more about the special effects that can be achieved it is recommended that you consult a book on silk painting. These are available in most libraries.

Preparing to fix the dye

After painting silk fabric it is allowed to dry. If salt has been used to create special effects on fabric it is brushed off. The fabric is rolled in a layer of newsprint or absorbent paper (preferably a double layer), or clean cotton fabric (this can be washed afterwards and reused) so that no part of the silk comes into contact with another. Avoid creases and make sure that the silk does not extend beyond the paper.

FIXING THE DYE with heat, using one of the following

Ambient heat

Seal the wrapped dyed fabric in plastic (black is best) and leave in a warm place for at least 48 hours, turning to promote even heat from time to time

Microwave

If it is a small piece of fabric, seal the wrapped dyed fabric with a sheet of plastic (gladwrap or microwave plastic is suitable) and microwave for 2 minutes on 3/4 power to fix the dye. You will probably need to adjust this to suit your own microwave and the quantity of fabric you are dyeing. A number of short heating bursts on a medium setting are safer than one long one on a high setting.

NB for safety, always have a cup of water in the microwave.

Steam Fixing

Steaming is perhaps the most common method of heat fixing cold dyed silk of fabric (and silk fibre or yarn) after painting. It improves the intensity/depth of the colour and the wash fastness of the dye. Steam fixing ensures a special lustre, not evident with other methods of fixing.

NOTES ON STEAM FIXING OF COLD-DYED SILK FABRIC

Equipment

Specialised steaming equipment can be purchased. This is expensive and would only be worthwhile if steaming a large volume of big pieces regularly. For smaller pieces many items of common household equipment can be used. Woks, saucepans, large boilers and pressure cookers can all be used. Whatever is being used, the important thing is to place some sort of rack in the vessel to hold the article being steamed above the level of the water in the bottom

Steaming

Place the rolled up pieces on the rack in the steamer and cover with additional paper or material and then a layer of foil to ensure that no condensation from the lid drips through the silk. The actual time will depend on the amount and type of silk being steamed and the type of dyes used.

A rule of thumb guide: test for yourself, with your equipment

For a kilogram or more of dyed fabric, steam for at least 40-60 minutes. A minimum of 20 minutes for 100g-200g Fibre reactive dyes will fix more quickly than acid dyes. After steaming wash the silk and iron it dry to get rid of any creases.

SECTION 2: DYEING SILK THREADS AND YARNS

Use Fibre Reactive Dyes and Base Solution

For cold dyeing a special mixture of chemicals is used to assist the dyeing process: **Wool & Silk Base Solution**, sometimes known as Chemical Water. You can make your own, using the recipe on the back page of this booklet or you can buy it inexpensively from e.g. Teri Dyes. The mixture typically contains **Urea** to swell the fibres and so speed up the penetration of the dye and **Acetic Acid** to promote the fixing of the dye. A levelling agent **Lyogen** is added to assist in achieving even dyeing. Wool & Silk Base solution once made up will keep for many months.

Dyeing Procedure

1. Dilute the Teri Dyes **Wool & Silk Base Solution** with an **equal** quantity of water, or use your own solution. Use a small quantity of this to paste the dye powder to a smooth slurry and then dilute the dyes to working strength with more of the solution. Once mixed, the dyes start reacting, so this solution must be used within 2 hours to get maximum colour development.
2. Soak the hanks of thread in warm water. Squeeze out the excess water and lay the threads on a paper towel
3. To dye the threads with a combination of colours, use a brush or dropper bottle to apply the dye (or use any other method that suits your purpose)
4. Roll the threads in a paper towel and seal with a sheet of plastic (gladwrap or microwave plastic is suitable).
5. Apply heat to fix the dye, using, for example the following methods:

6. **Either** microwave for 2 minutes on 3/4 power to fix the dye. You will probably need to adjust this to suit your own microwave and the quantity of thread you are dyeing. A number of short heating bursts on a medium setting are safer than one long one on a high setting.

NB for safety, *always have a cup of water* in the microwave.

Or the wrapped threads can be left in a warm place for 24-48 hours before washing off.

After fixing, **wash** the threads thoroughly to remove any unfixed dye. Start with cold water and increase the temperature to hot. It may take some time to wash all the excess dye out, particularly for darker colours.

SECTION 3: DYEING SILK FIBRE

Every care has been taken with the following recommendations; however they must be tested and adapted to suit your own requirements and dyeing conditions

Easy Measures for Dye... for every 100gm silk fabric use 1/4 teaspoon dye powder for pale shades, but for deep shades use a heaped teaspoon.

HOT DYEING (Exhaust Dyeing)

Use either **Acid Dyes** or **Fibre Reactive Dyes**

Pre-scour the fibre with Imerol XND, or suitable detergent in warm water. Clean fibre is important.

For every 100 gm (dry weight) of pre-scoured fibre

- 1 Use **2 litres** of warm water (35°C - 40°C) to which has been added **10 mls of Acetic Acid 30%** (or 50 ml white vinegar) and well dissolved **dyestuff**
- 2 If an even colour is required add 1 ml of Lyogen MF when using Acid Dyes or 1 ml Lyogen FN when using Fibre Reactive Dyes. For very pale to pastel colours it can also help to add 5-10 grams of sodium sulphate powder (Glaubers Salts).
- 3 Add **pre wet clean fibre** and heat slowly to a **maximum dyeing temperature 80°C - 90°C**, stirring regularly. (The more stirring, the more even the dyeing will be, but also the fibre will be more prone to felting.) Hold at this maximum 80°C - 90°C **for 40 minutes for pale**, or **60 minutes for deep** shades or until water is clear.
- 4 Cool down for 30 minutes, or until cold.
- 5 1st Rinse – **Warm** use either Imerol XND or another detergent which has been designed for fine fabrics to remove any unfixated Dye.
- 6 2nd Rinse – **Cold** to remove the detergent.
- 7 Dry gently.

COLD DYEING

Silk *sliver* can sometimes be difficult to dye, as the dye will not penetrate through the mass of the sliver readily. This problem can be overcome by soaking the sliver in a detergent such as Imerol or Teric overnight before dyeing

- Soak the fibre; overnight if need be, in a solution of Imerol
- Brush, paint or otherwise apply the pre-prepared dye solution(s) (as on page 12) onto the damp fibre

Fix the dye using any of the three methods (ambient, microwave or steam) described for fixing cold-dyed silk fabric on page 10, 11

For small quantities of fibre, plastic wrapping works very well, as does microwaving. Note however, that steaming will best increase the lustre of dyed silk fibre.

PREPARATION OF BASE SOLUTION

To make 1 litre of for cold dyeing of silk*

- 100 grams Urea
- 10 mls Acetic Acid 30% (or 50 mls of white vinegar)
- Mix urea with sufficient hot water to dissolve.
- Add Acetic Acid

Make up to 1 litre with cold water

This solution is ready to use and will keep for some months

* If intending to use the Base Solution for wool or other animal fibres, as well as for silk, add 8 mls Leonil KS-C or of Irgapadol P when making up 1 Litre. They are not needed if using the Base Solution just for silk.

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Teri Dyes sells a full range of Acid Dyes for hot dyeing silk and a full range of Fibre Reactive Dyes ideal for Cold Dyeing Silk.

ACID DYES: indicative colours only, ask for a coloured pricelist.

S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11
S12	S13	S14	S15	S16	S17	S18	S21	S24	S25	L1

FIBRE REACTIVE DYES: indicative only, ask for a pricelist.

R4	R3	R7	R8	R10	D13	D11	R17
D3	R5	D15	R9	R11	R15	R16	R18
R2	R6	D7	D16	R12	R13	R14	

Also avail

-  Fibre Reactive Black & 14 shades Procion MX Fibre Reactive Dyes
-  Glaubers Salts, Urea, Soda Ash, Imerol XND, Acetic Acid Leonil KS-C