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Tropical Products Institute

Rural Technology Guide 2

Pad-batch dyeing of plant fibres



Pad-batch dyeing of plant fibres

**AJ Canning, C G Jarman
and S Mykoluk**

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Are you a craft worker?



Do you make craft goods from plant fibres ?

Yes ? Then this book will help you. It tells you about a new way to dye called Pad-batch dyeing.

You need a special type of dye called 'Cold reactive' for Pad-batch dyeing. Dylon Cold and Procion MX are the right kind. It may sometimes cost you a little more money to use these dyes but we think you will find that they are worth the extra cost. They will give you bright fast colours but you must use them properly.

The pages with photographs on this side of the book show you how to use this new method. The pages on the other side are for your instructor or those interested in more detailed instructions. When you are sure that you know how to use the pad-batch dyeing method you can use the

poster to remind you of the steps to follow. Pin it up near your work bench.

Before you start dyeing look at the photographs and read the left-hand pages and make sure you know what to do.

Introduction

This guide describes a new method of dyeing plant fibres which are to be made into hats and handbags and other craft work. The pages on this side of the book are intended as a guide for the instructor and extension worker to help him introduce the method to craft workers. We hope the booklet will also be of use to the craft dyers and workers themselves so we have designed the left-hand pages specially for them. The left-hand pages describe the method in photographs with short, clear instructions. The right-hand pages give more information and will help extension workers and instructors to understand and explain the method.

The method is called 'pad-batch' dyeing. It is so-called because the material is first dipped into the dye solution to 'pad' it with dye, then it is put into a plastic bag to stop it from drying so that it can 'batch'. Padding wets the outside of the fibre with dye mixture and during batching the dye soaks into the fibre and becomes fixed.

The method is easy to use and needs only simple, cheap equipment. It gives bright colours which fade only slowly and which do not run easily. It is a good method for dyeing yarn and cloth because even the fibres on the inside become dyed. It can also give attractive and unusual effects if many different colours are used; this is called 'space dyeing' and is described on pages 48 to 50.

Pad-batch dyeing needs special dyes called 'reactive' – these dyes form a very strong link with the fibre substance – this is why they do not run easily. With this method you must use 'cold' reactive dyes such as Procion **MX** and Dylon **Cold** and they must be used in a particular way.

In the pad-batch method, the dye is dissolved in water, and bicarbonate of soda is added to fix it to the fibre. The dye solution should be kept cold and used before it is 2 hours old because it loses strength. Most of the dye becomes firmly fixed to the fibre but the dye which does not fix must be thoroughly washed out of the fibre, otherwise the colour will run when the fibre is wetted.

If you want to introduce pad-batch dyeing make certain that your craft workers have the **right kind of plant fibre**, the **right kind of dye** and the **right kind of soda**. Above all make certain that they understand our instructions **before** they open the dye. This is because cold reactive dyes lose strength if they are not used properly. If this happens the colours will be weak because the unfixed dye will be washed out of the dyed fibre.

Cold reactive dyes are sometimes more expensive to use than other dyes but they give better quality colours, and if our instructions are followed carefully the dye will not be wasted and the colours will be good. We are going to describe the most economical method of using cold reactive dyes. Even if reactive dyes sometimes cost a little more to use, the good quality colours and interesting designs should get a better price.

For more information on the dyeing method, and on other dyes which can be used on plant fibres contact your local craft organisation or write to the Tropical Products Institute at the address given at the back of this guide.

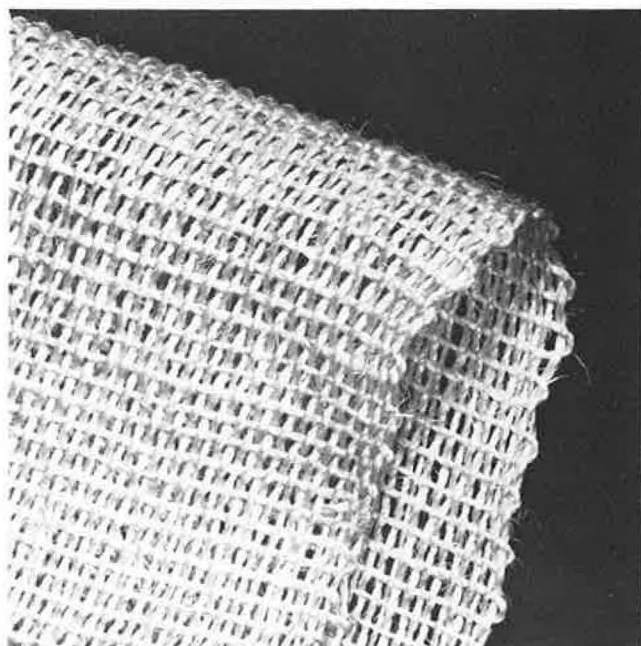
What you can dye



1. You can dye fibres like sisal.



2. You can dye yarn or string made from sisal.



3. You can dye some sorts of cloth made from sisal. You have to be careful. Ask your instructor.

Materials you can dye

1. You **can** dye fibres made from the leaves or stems of plants such as : sisal, manila (abaca), fique, henequen, aloe, hemp, jute, kenaf. You can also dye coir (coconut fibre) and cotton.
2. You **can** also dye the above fibres after they have been twisted or spun into yarn or string.
3. You **can** dye cloth or craft goods made from these fibres, but care must be taken not to damage them.

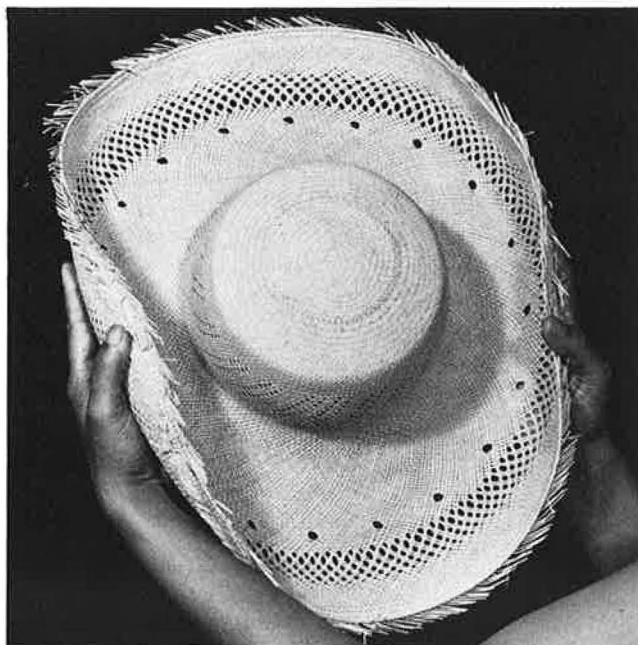
What you cannot dye



4. You **cannot** dye palm leaves.



5. You **cannot** dye other leaves or straws and grasses.



6. You **cannot** dye hats or other things made from straw.

Materials you cannot dye

4. You **cannot** dye palm leaves, palm leaf strips or articles made from them.
5. You **cannot** dye panama-type materials such as jippi-jappa, iraca straw and toquilla ; pandanus, straws and grasses.
6. You **cannot** dye articles made from the above materials because reactive dyes cannot get through the skin of leaves to colour them.

Taking your material



7. Take five hundred grams of your material. This is the amount of fibre the craft worker has in the picture. Choose material that is all the same colour. Light coloured material will give you the best results.

Taking the material

7. **Take 500g or 1 lb of fibre, yarn or cloth.**

Our instructions are for dyeing 500g (or 1 lb) of material. We chose this amount of material because most craft workers will have nothing larger than a 10 litre (2 gallon) bucket and a 10 litre bucket will hold the right amount of water to wash unfixed dye from the 500g of material.

The dye mixture must be used within 2 hours. Craft workers who are new to this method will find it difficult to dye 500g (1 lb) of material in less than 2 hours. Experienced dyers who can work quickly can use more ingredients to make up more dye mixture. Slow workers should not dye more than 500g (1 lb) at once. They can then mix fresh dye and repeat the process. Make sure the fibre has been well cleaned.

Choose pure white, or near-white, fibre so that you get bright colours after dyeing.

The fibre you use must be all the same colour because you cannot hide the colour differences with dye. If your fibre is creamy or light brown you can still use it, but you will not get such bright colours as you get from dyeing white fibre.

The dye you need



8. You can use cold reactive dyes such as :

1) Dylon Cold dyes with the letter A in front of the number.

or

2) ICI dyes called Procion MX.

Hot water dyes are no use for this method of dyeing.

The right kind of dye

8. **Choose a Procion MX or Dylon Cold or similar dye**

You must always use a cold reactive dye such as ICI Procion MX or Dylon Cold. Dylon Cold dyes have the letter A in front of the shade number. You can buy Procion **MX** dyes from :

Keegan Brico Tetley Chemicals Ltd
55-57 Glengall Road
London SE15 6NQ
England

They prefer to sell them in drums, each containing 25 kg (about 55 lb) of one colour ; but with orders for several colours they will consider selling the dyes in tins each containing as little as 1 kg (just over 2 lb) of dye. You may be able to get Procion MX dyes from your local ICI agent also.

Dylon **Cold** dyes are sold in three sizes : 6 grams [about one fifth of an ounce (0.2 oz)], 30 grams [about one ounce (1 oz)] and 500 grams [about 1 lb]. You can get them from :

The Export Manager
Dylon International Ltd
Worsley Bridge Road
Lower Sydenham
London SE26 5ND
England

You may find that you can get them from your local shop also.

Choose your colour from a dye shade card. It is best to make your own shade card from fibres which you have already dyed. However, if you have not used these dyes before, the dye manufacturer's shade cards are a guide. You should be able to get these from Dylon Ltd and your ICI agent.

Small tins of dye can be bought if you are only dyeing small quantities of fibre but for larger quantities you will save money if you buy larger tins.

Do not open the tin until you are ready to start dyeing. You must **always** keep your dye in a closed airtight container until you need it because moisture in the air will slowly spoil the dye.

Things you need



9. Get these things before you start:

Bicarbonate of soda (sodium bicarbonate)
Washing-up liquid (or washing powder)
Teaspoon
Jug
Bucket
Stick
Plastic bag
Rubber gloves
Scissors (or any sharp tool)
Water – make sure you have plenty, at least fifty litres (eleven gallons)

Never use ordinary (washing) soda (sodium carbonate)

Never use caustic soda

Never use vinegar

Never use salt

Items needed

9. **Collect these items together before you start**

Bicarbonate of soda (also known as sodium bicarbonate). You should be able to buy it at your local general store or at a pharmacy.

Never use ordinary (washing) soda (sodium carbonate) or the packets of powder which are sold specially to fix cold dyes: with our method they cause the dye to lose strength rapidly.

Never use caustic soda with cold reactive dyes.

Never use vinegar (it will destroy your bicarbonate of soda).

Never use salt (it will spoil the shade).

Washing-up liquid, Lissapol N, or washing powder. Only use washing powder if you cannot obtain a liquid detergent such as washing-up liquid or Lissapol N. Do not use soap because it will make your colours dull. Lissapol N is available from Keegan Brico Tetley Chemicals Ltd (see address on page 11), usually in 40 gallon (about 180 litres) drums, or possibly from your local ICI agent.

Water. Make sure that a supply of clean water is available; at least 50 litres (11 gallons) will be needed – see page 52.

Teaspoon to measure the ingredients.

Jug, bottle or similar container which holds 500 ml (about 1 pint) to measure the water.

Enamelled or plastic bucket or bowl or large earthenware pot glazed inside to hold your dye solution. Do **not** use containers with bare iron, aluminium, copper, zinc or galvanising inside.

Stick or rod to stir the dye. A wooden stick will absorb some dye so you must use a new one for each different colour. Do **not** use an iron, aluminium, copper or zinc rod.

Strong plastic bag large enough and

strong enough to hold your wet material without bursting. The bag must not have any holes.

Pair of rubber gloves to protect your hands.

Sharp-pointed object, such as a pair of scissors, for opening the small tins of Dylon **Cold** dyes.

Getting ready to make the dye mixture



10. Put on your rubber gloves.



11. If you are using the smallest tin of Dylon **Cold** dye take it out of the paper and pierce it open.

Getting ready to make the dye mixture

10. Put on your rubber gloves

Safety note: you can dye without gloves on your hands but we strongly advise you to use them. They will stop your hands from becoming coloured and the skin from being irritated.

11. If you are using the smallest tin of Dylon Cold dye pierce its lid with, for example, the sharp point of a pair of scissors or a knife. Never hold the tin in the palm of the hand whilst using scissors or a knife.

Safety note: do not breathe in the dust from the dye powder.

It is best to use the whole of the small Dylon tin, but you could save some of the powder by immediately putting it in a small dry **airtight** container (screw top jar or small closed plastic bag). You can obtain deep shades by using less water; use more water and more bicarbonate of soda for pale shades (see pages 17 and 21). If you are using larger tins of dye turn to the next page.

Controlling the shade



12a. If you are using a large tin of dye take off the lid and open the bag of dye inside. For pale colours take half a teaspoonful of dye or less.

For deeper colours take one heaped teaspoonful of dye. If you want even deeper colours ask your instructor.



12b. As soon as you have taken out the dye, close the bag (in the tin) with a knot and put the lid back firmly on the tin.

Controlling the shade

12. **If you are using a large tin of dye you must first decide if you want a light or dark colour.** If you want dark colours you will need to use more dye than for light colours (see table on page 21). Most Procion MX and Dylon Cold dyes dissolve quite easily and you can use up to 2 heaped teaspoonfuls of dye (or 2 small tins) in 500 ml (1 pint) of water. However, some of the dyes are difficult to dissolve and you should not use more than 1 heaped teaspoonful of the following :

Procion Yellow MX-GR

Procion Scarlet MX-G

Procion Red MX-G is very difficult to dissolve and you should not use any more than half a teaspoonful in 500 ml (1 pint) of water. If you want exactly the same depth of colour each time you must use exactly the same amount of dye and water. Use the same teaspoon each time to measure your dye. Make sure the spoon is absolutely dry before dipping it into the stock of dye powder. The strengths of individual dyes are different so make your own shade card.

When you have decided how much dye you need remove the lid and open the bag of dye. Take the dye out of the bag and immediately close it with a knot. Replace the lid firmly on the tin or the dye will spoil.

Making the dye mixture



13. **Either** put the dye from the small tin **or** a teaspoonful of dye from the large tin into your empty bucket.



14. Take one heaped teaspoonful of your bicarbonate of soda (for paler or darker colours ask your instructor how much to use).

Making the dye mixture

13. Either

Pour the contents of the smallest tin of Dylon Cold dye into the bucket.

This is 6 g (0.2 oz) or about 1 teaspoonful of dye. For light colours you need less dye. If you have dye left over put it into an air-tight container. A small closed plastic bag or small screw cap bottle will do, but it must be dry.

Or

If you are using a larger tin of dye **empty the dye you have measured from your teaspoon into the bucket.** Make sure that you have replaced the lid firmly on the dye tin.

Make sure you have the right kind of bucket. Bare metal will spoil the dye and will be spoilt by the soda.

14. **Measure 1 heaped teaspoonful of your bicarbonate of soda.** Do not use any other type of soda and do not use the packets of powder sold specially to fix cold dyes. These do not work well with our method because the dyes will lose strength too fast.

Making the dye mixture



15. Put the bicarbonate of soda into the bucket.



16. Fill your jug with five hundred millilitres (or one pint) of clean cold water.

Making the dye mixture

15. **Put the teaspoonful of bicarbonate of soda into the bucket which contains the dye.** You must use bicarbonate of soda or the dye will not fix to the material. Never use less bicarbonate of soda than dye. With pale colours you must use more bicarbonate of soda than dye. The table below shows you the amount to use.

For this amount of material and water		Take this amount of dye and bicarbonate					
Material (grams)	Water (millilitres)	Pale colours (teaspoonfuls)		Medium colours (teaspoonfuls)		Dark colours (teaspoonfuls)	
		Dye	Bicarb	Dye	Bicarb	Dye	Bicarb
250	250	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	1	1
500	500	$\frac{1}{2}$	1	1	1	2	2
1000	1000	1	2	2	2	4	4

Never use hot water or your dye will spoil.

Never add water to your dye until you are ready to start dyeing.

The dyes need at least 1 heaped teaspoonful of bicarbonate of soda in each 500 ml (or 1 pint) of dye mixture before they start to fix properly so **Never** use less.

16. **Fill your 500 ml (1 pint) jug or bottle with clean cold water.** Rainwater is best since it is almost pure, but you can use tap water. If you cannot obtain either of these see note on page 52. It is best to measure out the water exactly each time you dye some material so that your colours are not deeper or lighter. If you use less water with the same amount of dye and the same amount of bicarbonate of soda you will get darker colours. This is a good way to get darker colours when using the smallest Dylon Cold tins. With less dye mixture you will not be able to dye so much material. You can use the same amount of dye with more water and more bicarbonate of soda to dye paler shades. You will be able to dye more material but

you will have to work extra quickly if you are to use all the dye mixture within two hours.

Making the dye mixture



17. Pour the water into the bucket which contains dye and bicarbonate of soda. Work quickly because you must use this dye mixture in the next two hours.

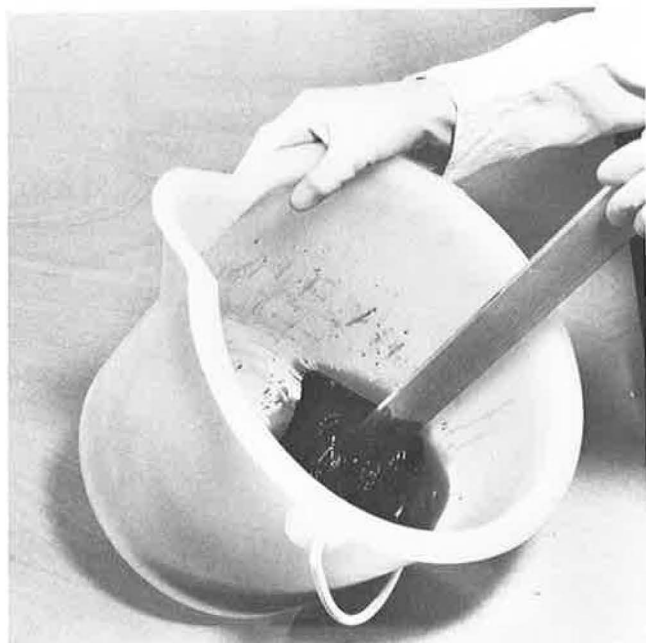


18. Take one teaspoonful of washing-up-liquid or washing powder and put it into the bucket.

Making the dye mixture

- 17. Pour the water into the bucket containing the dye and bicarbonate of soda.** Work quickly from now onwards since you must try and use the dye up in the next 2 hours. Any dye you have left over will have lost strength ; it will dye your material lighter. You must use this older dye as described on page 45.
- 18. Measure out 1 teaspoonful of your washing-up liquid or Lissapol N or washing powder and put it into the bucket containing the other ingredients.** This ingredient helps the dye mixture spread evenly over the material.

Making the dye mixture



19. Stir the mixture in the bucket with a stick. Do not use a metal rod. You can now start dyeing. Start straight away because your dye mixture is losing strength.

Making the dye mixture

19. **Stir the contents of the bucket with a stick or rod until all the dye and bicarbonate of soda have dissolved.**

Do not use a metal rod because it may spoil the dye. Some metals cause some dyes to lose their colour. Your dye is now ready to use. Use it immediately, otherwise it will lose strength and give weak colours.

Padding



20. Take a handful of material and roll it up.



21. Dip the material into the dye in the bucket. Make sure it is covered with dye. If you are dyeing **fibre** count five slowly while you



hold it in the dye. If you are dyeing **yarn** or **cloth** count sixty while you hold it in the dye.

Padding

Padding is the wetting of material with dye solution. The padding method described here is for producing material dyed with a single colour; if you want to use several colours see page 48.

20. You cannot wet all your material at one time. **Take a handful of your material, shake it loose then roll it up.** This handful must not be too big or your dye solution will not completely cover it; but do not make it too small or you will not be able to dye all your material in the time available. It is also best to dye yarn or cloth in small pieces; but you can dye long lengths, part at a time, without cutting them.

21. **Dip the material into the dye in your bucket. Make certain that the material is completely covered with dye.** Start counting seconds by saying 'one and two and three . . .' **slowly.** If you are dyeing loose fibre, count **up to 5** then take it out. If you are dyeing yarn or cloth leave it in the dye until you have counted **up to 60**; this gives the dye time to wet it thoroughly. Do not leave the material in the dye for longer than stated, because the dye mixture will lose strength.

Padding



22. Take the material out of the bucket. Squeeze it almost dry.



23. Put the material into the plastic bag.

Padding

22. **Remove the material from the dye solution and wring it out gently,** just hard enough to stop it from dripping. If you are dyeing small pieces of cloth (which wringing will damage), shake the dye from the cloth and let it run back into the bucket (so it is not wasted).
23. **Put the wrung material into your plastic bag to stop it from drying.** The plastic bag will keep the material wet so that the dye soaks right into it and fixes properly. The bag must not have any holes, otherwise it will not keep the material wet.

Padding



24. Dye more handfuls of material and put each one into the plastic bag. **Stop** dyeing when you have been using the dye mixture for two hours. You will have some material left over. Do not throw away the dye which is left over: we explain to your instructor how to use it on page 45. If you cannot use it at once you will have to throw it away. Do this by pouring it down the drain or on to the soil. Keep it off your crops and away from food and drinking water.

Padding

24. **Take another handful of material and repeat the wetting and wringing process.** Take care that after you have wrung this material, it is **just as wet** as the first handful or it will be a different shade. Then put it into the plastic bag with the first. **Continue wetting and wringing more handfuls of material until :**

- 1) you have run out of material ; or
- 2) you have so little dye left that you cannot completely wet even small amounts of material ; or
- 3) you have been using the dye mixture for **2 hours.**

You should not continue dyeing after your dye mixture is 2 hours old because the mixture has lost strength and it might give you paler shades. Leave any dye mixture in your bucket until you have closed your plastic bag. The instructions on page 45 tell you how to use it.

Batching



25. When you have put all the wet material into the bag, close the open end with a knot.



26. Store the bag in a shady place. Leave it there for **not less than two days** but **not more than three days**. You can now use any dye mixture that is left for space dyeing or for making pale colours. Ask your instructor.



27. After two to three days open the plastic bag and take out the material.

Batching

25. **When you have put all the material you have wetted into your plastic bag, close the open end with a knot or string** (to make it airtight). This will keep the material wet.
26. **Store this bag of wet material in a shady place to batch for at least 2 days but not more than 3 days.**
The dye will soak into each fibre during batching ; most of it will fix in 2 days and a little more in 3 days. **Do not** batch for more than 3 days because the colour will not become deeper, and the material may go mouldy. If you have any dye left turn straight away to page 45.
27. **After 2 to 3 days batching, open the plastic bag and take out the material.**

Washing

First cold wash



28. **Either** hold the material under a tap until the water draining from the material is free from colour **or** follow step 29.



- 29a. Wash the dyed material in clean **cold** water in a bucket.

Washing

First cold wash

Wash the dyed material in clean cold water to remove any loose dye.

28. **Either**

Hold the material under running water from a tap, until the water draining from the material is free from colour. You will need to rinse the material only once in running water.

Or

29a. If you **do not have** a piped water supply, **fill your bucket with clean cold water, rinse the material in it and pour the coloured water away.**

Washing



- 29b. Empty the bucket and fill it again with clean water. Keep on washing the material in clean **cold** water until the water remains clean.

Hot soapy wash



30. Put the material into the bucket. Pour in **very hot** water (not boiling) until the material is completely covered. Add two teaspoonfuls of your washing-up liquid or washing powder.

31. Stir the material in the hot soapy water for about fifteen minutes.

Washing

29b. **If you are rinsing your material in a bucket of water refill the bucket each time you wash the material. Repeat the washing in fresh cold water until the water remains clean.** This cold wash will not wash out the loose dye from inside the material ; this dye will run, so **you must wash the material more thoroughly** as follows :

30. **Hot soapy wash**
You **must always** wash your dyed material in hot, soapy water at this stage to remove loose dye which has not fixed to the material.

30a. **Either**

If you are using a plastic bucket

Put the material into the bucket.
Fill the bucket with **very hot** water (not boiling water or the plastic will melt).
Add 2 teaspoonsful of washing-up liquid or Lissapol N, or 1 teaspoonful of washing powder.

Or

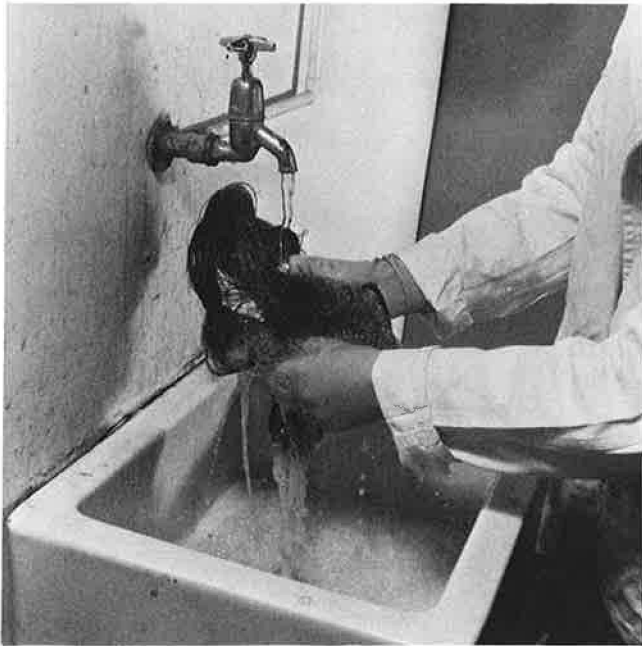
30b. **If you are using an enamelled iron bucket or bowl** or similar container which you can heat directly

Put the material into the bucket.
Cover the material with cold water.
Add 2 teaspoonsful of washing-up liquid or Lissapol N, or 1 teaspoonful of washing powder.
Put the bucket on the stove or fire so that the water boils.
(Do not heat a plastic bucket like this).

31. **Stir your material in the hot soapy water in the plastic bucket (or boil it in the enamelled bucket) for about 15 minutes.** This hot wash will remove much of the dye which has not fixed inside the material.

Washing

Second cold wash



32. **Either** hold the material under a tap until the water draining from the material is free of coloured soapy water **Or** follow step 33.



- 33a. Wash your material again in clean **cold** water.

Washing

Second cold wash

Wash the material again in clean cold water.

32. Either

Wash the material under a tap with running water.

Or

33a. Wash the material in clean cold water in a bucket.

Washing



- 33b. Keep on washing in fresh **cold** water until the water remains clean. You have now washed enough unfixed dye from the material to keep most of your colours good. Red and dark shades of other colours may still run. Ask your instructor how to stop this. If you are making children's toys, you may have to wash even more. Ask your instructor what to do.

Washing

33b. **Repeat the washing in fresh, cold water until the water remains clean.**

For ordinary craft work this is all the washing you need, but some colours will still bleed a little (ie. lose colour and cause stains when wet). If this happens you must not use the material to make children's toys. This is because children may put the toys in their mouths and get poisoned by the dye.

If you make children's toys, or other things that babies and children may play with, you must wash your material more thoroughly. Go back to step 30 and repeat the wash in hot soapy water and the cold rinses to remove more of the unfixed dye. Repeat this washing and rinsing until the colour no longer bleeds. You will not remove the fixed dye so it is safe to wash your material many times. Reds, and deep shades of other colours bleed most so it is a good idea to wash these colours again.

If you want to save time and trouble by not having to wash your material so much, you can use a special chemical, Matexil FC-PN, to fix the dye. We tell you how to use this on page 51, but do not use it for children's toys.

Drying



34. Hang your material in the **shade** to dry. You can now use your material for craft work.

The rest of this book is for your instructor. It tells him how you can use up the dye mixture you had left over after padding. It also tells him about a special chemical, Matexil FC-PN, which you can use to stop your material losing colour and causing stains when it is wet.

Drying

34. When you have finished washing your material (in cold, hot soapy, and cold water) **hang it in the shade to dry.**

Do not hang the material in strong sunlight ; this may fade the colour. You can use the material for craft work as soon as it is dry.

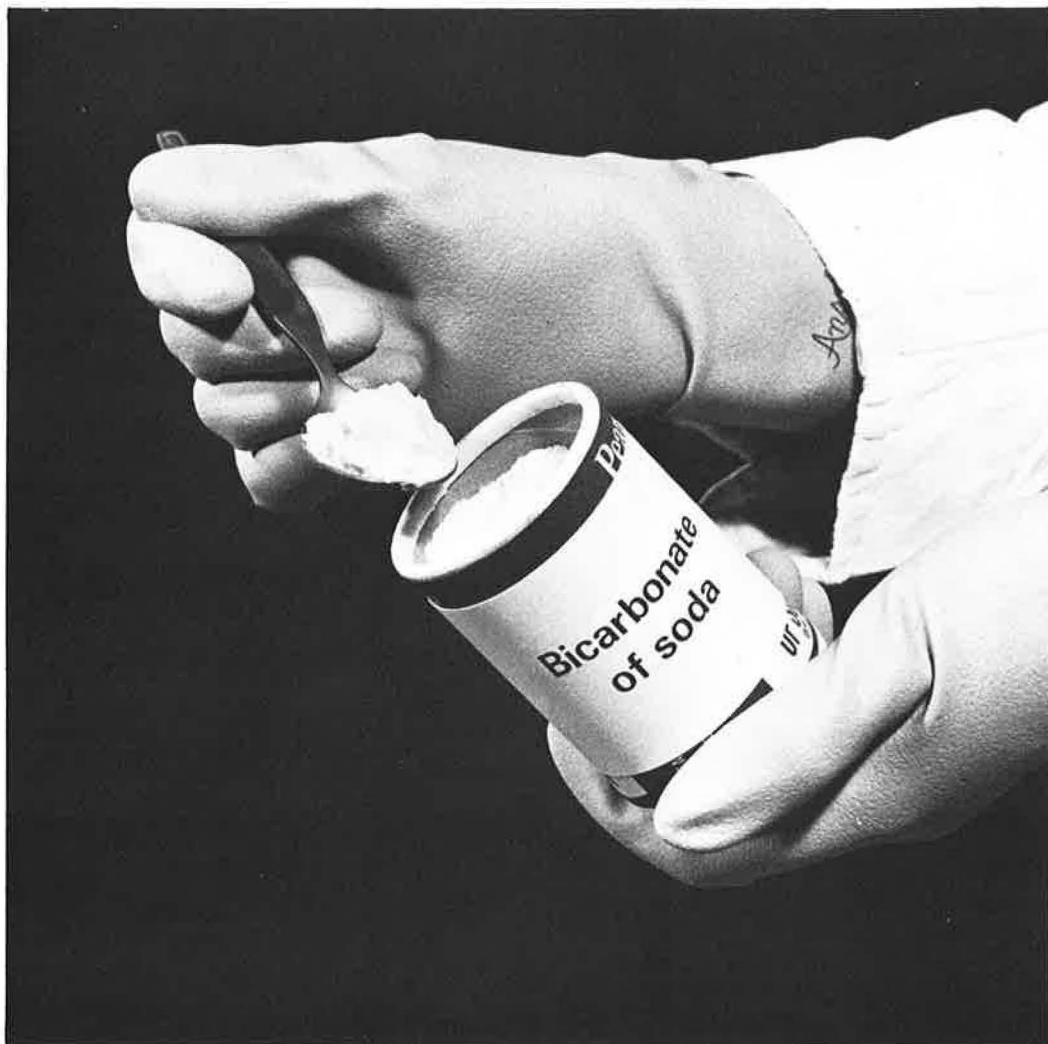
What to do with unused dye mixture

If you have dye mixture left over in your bucket after padding your material you can use it up to make pale colours (see pages 46 to 47) or for space dyeing (see pages 48 to 50). You must use this dye mixture immediately after you have put away your plastic bag of material for batching (see pages 31 to 33) because the dye becomes weaker as the mixture becomes older.

Making pale colours with unused dye mixture

On page 21 we told you that you can dye pale colours by using more water and more bicarbonate of soda in your dye mixture. Another way of making pale colours is to use left-over dye mixture.

The method is as follows:

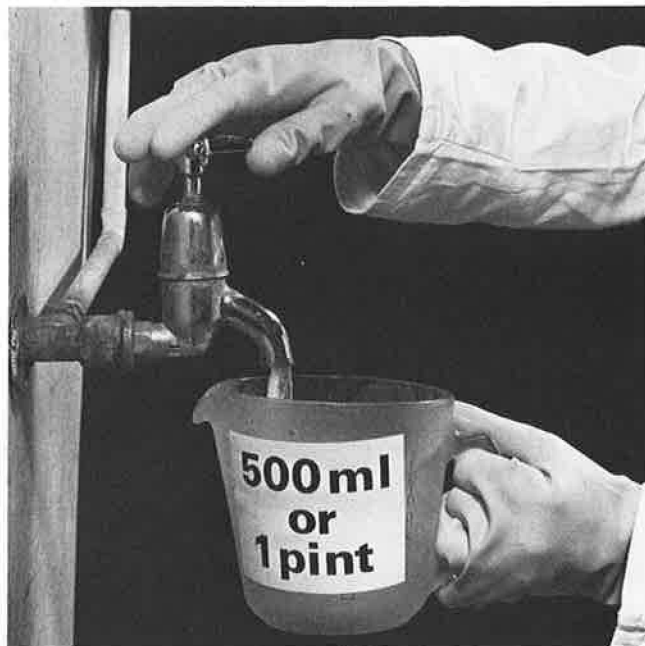


1. Take 1 heaped teaspoonful of bicarbonate of soda. You must have at least 1 heaped teaspoonful of bicarbonate of soda in each 500 ml (1 pint) of water, otherwise the dye will not fix properly.

Making pale colours with unused dye mixture



2. Put the bicarbonate of soda into your clean 500 ml (1 pint) jug.



3. Fill the jug with 500 ml (1 pint) of clean cold water and stir the mixture until the bicarbonate of soda has dissolved.



4. Add 1 teaspoonful of washing-up liquid or Lissapol N or washing powder and mix well.



5. Pour the mixture into the bucket of left-over dye and mix.

You can now start dyeing. Follow the instructions exactly starting from step 20, and finishing at 34, using a clean plastic bag. You have another 2 hours in which to use this dye.

Space dyeing

If you have followed our pad-batch dyeing instructions correctly your material will be dyed to the same colour all over. This is because your material was covered completely with dye mixture during padding (see pages 26 to 31). However, you can make some interesting designs by covering only parts of your material with dye mixture. With yarns this is called space dyeing. When you space dye yarns there are spaces between the coloured parts along the length of the yarn. These spaces can be filled with other colours so that the yarn is dyed in several separate colours : space dyed yarns make very interesting and unusual designs after they are woven into cloth. You can also get similar effects from weaving fibre dyed in the same way.

You can use the same methods to make colour designs on cloth, but the designs you get by dyeing cloth will be different from those you get by weaving different coloured yarns or fibres.

Space dyeing is best done when different mixtures of several colours are at hand. With left-over dye you will only have one colour :

do not save this until you have others.

Either work with friends who are using different colours, or make up small amounts of fresh mixtures. You will not waste any dye in the space dyeing process. You will need to experiment with the method since you will not see the effect immediately.

We suggest you try the following method which is almost the same as pad-batch dyeing.

1. Make up your dye mixture exactly as we tell you in steps 10 to 19 **for pad-batch dyeing** (see pages 14 to 25). If you have some unused dye mixture from pad-batch dyeing use this as one of your colours. Space dyeing is a good way of using up this unused dye ; but you must use it before it loses strength.

Space dyeing



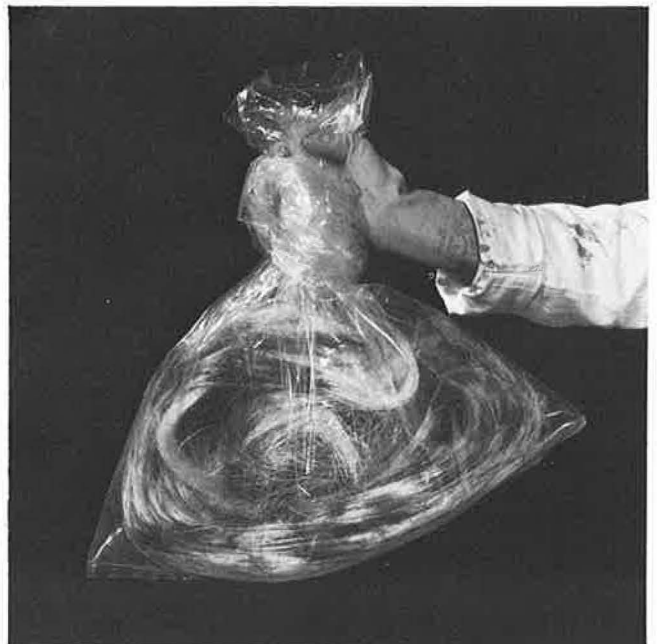
2. **Spread a plastic sheet on your table.**
This is to protect the table from the dye mixture.



3. **Put your material on the plastic sheet and sprinkle the dye mixture onto the material.** If you want more than one colour repeat this with other dye mixtures.



4. **Put your dyed material in a clean plastic bag.**



5. **Close the open end of the bag and leave it in a shady place for 2 to 3 days.**

Now follow the instructions exactly as you did before for pad-batch dyeing starting at step 27 and finishing at step 34.

Space dyeing

Instead of splashing dye mixture onto fibre, yarn or cloth you could paint it on with a brush.

Another way to space dye is to dip different parts of your material into different dye mixtures.

If you make colour designs on cloths by painting the dye onto the cloth you might want to try the special kit sold for this purpose. This uses Dylon cold dyes and you can get it from Dylon International Ltd (for address see page 11). This kit may help you to get sharper patterns but you will have to use the dye mixture **very quickly**.

Matexil FC – PN

Matexil FC-PN is a special chemical which fixes dye in material dyed with reactive dyes. You can use it to save yourself time and trouble. Matexil FC-PN is a harmful chemical. It will irritate the eyes and skin, and should be kept away from the mouth. Provided it is handled carefully there are no harmful effects but do not use Matexil FC-PN on fibre for children's toys since the chemical may harm them.

If you want to use this treatment you can buy Matexil FC-PN from Keegan Brico Tetley (Chemicals) Ltd (see page 11 for address). It is sold as 'Fixing Agent – PN' in tins containing 1 lb or as Matexil FC-PN in lots of 60 kg (132 lb). You should be able to get Matexil FC-PN from your local ICI Agent also.

Before you use Matexil FC-PN

1. **Decide if you need to treat the material.** If your material loses dye when it is wet it will stain other materials – especially woollens. To test this wrap a piece of the material in wet, white wool for about 3 to 4 hours to see if the material stains the wool badly. You do not need to treat the material if the stain is barely visible.
2. **If the colour bleeds badly (makes heavy stains) wash the material again in hot soapy water and rinse it** (see page 38)

Treat the material with Matexil FC-PN as follows :

1. Put into your empty bucket enough cold water to cover the material you wish to treat [500 ml (1 pint) for 500 g (1 lb)].
2. For each 500 g (1 lb) of material (dry weight), measure out 1 to 2 teaspoonfuls of Matexil FC-PN.

Safety note: be careful with Matexil FC-PN. You must not get it in your eyes or mouth, or on your skin. If you do, immediately wash any splashes away with a lot of cold water. If splashes go into your eyes, wash them away and consult a doctor (take the container with you).

3. Put the Matexil FC-PN into the bucket and stir.

4. Put the wet, dyed material into the solution in the bucket and stir it round well.
5. Leave the material in the cold mixture of Matexil FC-PN for about 3 hours. Stir it round continuously at first, and then often. You can treat the material more quickly if you use warm water with the Matexil. Pour the Matexil into the bucket. Add 250 ml (or $\frac{1}{2}$ pint) of cold water and then add 250 ml (or $\frac{1}{2}$ pint) of boiling water. With warm water it is even more important to stir well at first.
6. Remove the material from the Matexil and wash it in **cold** water.
7. Hang the material in the shade to dry and throw away the used Matexil mixture down the drain or onto the soil. Keep it off your crops and away from food and drinking water.

Water

Water used for dyeing should be clear and colourless. It does not matter if you cannot get clear water because it is easy to strain off any cloudiness. It will also clear if it is left standing in a deep container for a few days. If you can get only water which is coloured, dye a small amount of material to see if the water spoils the colour. The water cannot be used if the dyeing is not good because it is difficult to remove colour from the water.

The best water to use is rain water. Rain water is almost pure but it may be a little cloudy. Water from taps, wells, lakes, streams and rivers can be used for pad-batch dyeing, but this is not pure – even if it is clear and free from colour. You should not use ordinary soap with this water because the water will become cloudy and make the dyed colour dull. However, it is safe to use detergent soaps.

Water from deep wells or from taps is better than that from rivers, lakes, streams, springs, and shallow wells since it is clear and free from colour. The water from still lakes, springs and shallow wells will be clear, but it might be strongly coloured. Flowing water such as rivers and streams will be coloured and cloudy.

A filter for water

A filter to remove cloudiness from water can be made from : a piece of cloth, some small stones, some fine sand and a barrel. The barrel is partly filled with small stones, enough to just cover the outlet at the bottom, and a cloth is laid over the top of the stones. More stones are then put into the barrel to make a thin layer of stones over the cloth. A thin layer of fine sand is spread over these stones, then another layer of stones is spread over the sand. More layers of fine sand and stones are added until the barrel is almost full. The filter is then complete.

The cloudy water is poured into the top of the barrel and the cloudiness is strained out as the water passes through the sand. Clear water is collected at the bottom of the barrel, but it is best to throw away the first part collected. This will have washed the stones in the bottom of the barrel and will not be very clean.

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