# Plant Fibers That Can Be Processed By Hand Beating or In a Blender
## *and make great paper by themselves*

There are as many recipes as there are papermakers! Many who are more experienced have learned to judge the stages of fiber processing by eye and feel. Once you have been making paper from plants you will gain a sense, as well. Keep in mind if you are experimenting with an unknown fiber start with the mildest caustic first. Try soda ash before lye (caustic soda).

***Remember to always add the caustic to the water,* not the other way around, slowly shaking the granules into the liquid. Don't just dump it in.** ***If you add water to the caustic it can explode in your face.***

In my experience, there are two methods of determining how much caustic to add to the cooking pot. One technique asks for a percentage by weight of the dry fiber: with soda ash, the rule of thumb is 20% of the dry weight; with lye, 9% of the dry weight. The second technique calls for a measured amount of caustic added per measure of water, such as 1 tablespoon of soda ash added to every quart of cooking water (or 10 grams of lye to every liter). This is particularly useful when your fiber source is green and you cannot measure the dry weight. You can also measure the pH of the alkali in the cooking water. It should be between 10 and 11.

After cooking, rinse completely (sometimes it may take up to 8 changes of water) until the water is clear or the pH is neutral (between 6 and 7), or until fiber feels unslimy.

Please note that there is a big difference between how hand pounding separates the fibers and the way a blender cuts the fiber shorter and shorter. If it is at all possible, choose to process the pulp by hand beating, resorting to a blender if necessary.

Many papermakers vary the length of time of blending to allow for fibers of different lengths in the vat. Many different results can come from the same hand-beaten or blended pulp as you vary sheet-forming techniques, pressing methods, and how you dry the final sheet. Generally, the stronger the press, the stronger the paper. Restraint drying (brushing the pressed sheet onto a board, Formica, or glass) controls the shrinkage of the fiber and also gives you stronger results.

By all means, EXPERIMENT! And have fun! -Catherine Nash (Tucson, Arizona)

| Plant name | Part of plant used | How prepared | Caustic | Cooking time | Processing | Results | Contributor | Notes |
|---|---|---|---|---|---|---|---|---|
| Gampi [Wikstoemia diplomorpha] | Bast | Soak overnight | Soda ash, 20% of fiber's dry weight | 4 hours | Beaten by hand with a mallet, restraint dried on a board | Tan sheet, lustrous, strong and rattly | Catherine (Arizona) | Glossiest of the three Japanese bast fibers: difficult to cultivate, only gathered in the wild, little insect damage so has been used historically for poetry, sutras, and important documents. |
| Kozo (paper mulberry) [Brousssonetia Papyrifera] | Bast | Soak overnight | Soda ash, 20% of fiber's dry weight | 4 hours | Beaten by hand with a mallet, restraint dried on a board | Strong and rattly | Catherine (Arizona) | Longest of the three Japanese fibers: used for products requiring paper of especially high strength (paper clothing, woven paper (shifu), umbrellas, stencils, etc. |
| Mitsumata [Edgeworthia Chrysantha] | Bast | Soak overnight | Soda ash, 20% of fiber's dry weight | 4 hours | Beaten by hand with a mallet, restraint dried on a board | Pale tan sheet, lustrous, strong and rattly | Catherine (Arizona) | Shortest of the three Japanese fibers: creates a flexible sheet with a dense surface, used for letters, calligraphy, Japanese bank notes. |
| Daphne [Daphne Bholua] | Bast | Soak overnight | Soda ash, 20% of fiber's dry weight | 4 hours | Beaten by hand with a mallet, restraint dried on a board | Pale tan sheet, lustrous, very strong and rattly | Catherine (Arizona) | The paper plant of Nepal |
| Pineapple | Leaves (winter retted) | Soak overnight | Lye (caustic soda), 9% of fiber's dry weight | 4-6 hours | Beaten by hand with a mallet, restraint dried on a board | Grey and brown Flecked, strong and rattly | Catherine (Arizona) | |
| Iris | Foliage (fresh or dried) | Soak overnight | soda ash, 20% of fiber's dry weight | 3.5 hours | Cut into 1” pieces and blend | Strong, fibrous sheets | Catherine (Arizona) | |
| Banana | Foliage (fresh or dried) | Cut to about 8” before cooking | Soda ash, 1 TB./quart H2O | 3-4 hours | Blend | | Frances (Florida) | |
| Papyrus | Stalks, fresh or dried. | Cut to about 8” before cooking | Soda Ash, 1 TB./quart H2O | 3-4 hours | Blend | | Frances (Florida) | |
| Pandanus (screw pine) | Leaves (fresh or dried) | Cut to about 8” before cooking | Soda ash, 1 TB./quart H2O | 3-4 hours | Blend | | Frances (Florida) | |
| Giant selloum (philodendron family) | Foliage, stems, and/or sheath (fresh or dried) | Cut to about 8” before cooking | Soda ash, 1 TB./quart H2O | 3-4 hours | Blend | | Frances (Florida) | |

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| Palm | Leaves (fresh or dried) | Cut to about 8" before cooking | Soda ash, 1 TB./quart H2O | 3-4 hours | Blend | | | Frances (Florida) |
| New Zealand flax | Leaves (fresh) | Cut to about 8" before cooking | Soda ash, 1 TB./quart H2O | 3-4 hours | Blend | | | Frances (Florida) |
| Purple dracaena | Foliage (fresh or dried) | Cut to about 8" before cooking | Soda ash, 1 TB./quart H2O | 3-4 hours | Blend | | | Frances (Florida) |
| Green dracaena | Foliage (fresh or dried) | Cut to about 8" before cooking | Soda ash, 1 TB./quart H2O | 3-4 hours | Blend | | | Frances (Florida) |
| Fakahatchie grass | (Fresh or dried) | Cut to about 8" before cooking | Soda ash, 1 TB./quart H2O | 3-4 hours | Blend | | | Frances (Florida) |
| Cattail | Foliage (fresh or dried) | Cut to about 8" before cooking | Soda ash, 1 TB./quart H2O | 3-4 hours | Blend | | | Frances (Florida) |
| Torch ginger | Foliage, stalks (dried) | Cut to about 8" before cooking | Soda ash, 1 TB./quart H2O | 3-4 hours | Blend | | | Frances (Florida) |
| Plumosa Palm | Bark (dried) | Cut to about 8" before cooking | Soda ash, 1 TB./quart H2O | 3-4 hours | Blend | | | Frances (Florida) |
| Eucalyptus | Foliage and bark (dried) | Cut to about 8" before cooking | Soda ash, 1 TB./quart H2O | 3-4 hours | Blend | | | Frances (Florida) |
| Day lily | Foliage (dried) | cut to about 8" before cooking | Soda Ash, 1 TB./quart H2O | 3-4 hours | Blend | | | Frances (Florida) |
| Gladiola | Stalks (fresh) | cut to about 8" before cooking | Soda Ash, 1 TB./quart H2O | 3-4 hours | Blend | | | Frances (Florida) |
| Chrysanthemum | Stalks (fresh) | cut to about 8" before cooking | Soda ash, 1 TB./quart H2O | 3-4 hours | Blend | | | Frances (Florida) |
| Cattail | Heads | Strip fluff | Soda ash | 1 hour | Blend for 30 seconds | | | Gin (Kentucky) |

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| Early spiderwort [Tradescantia virginiana] | Stalks | Harvest in August (not before or it will be too tender); cut stalks in 1-2" lengths | Soda ash | 2 hours | Blend (briefly to retain larger pieces for paper with "character", longer for finer paper) | | Gin (Kentucky) | Strip leaves and seedheads off and discard (be sure to remove ALL seedheads, as the seeds are quite large and make bumps in the paper) |
| Umbrella sedge [Cyperus strigosus] | Leaves and stems | Cut to 1" lengths | Soda ash | 1 hour | Blend for 30 seconds | | Gin (Kentucky) | |
| Kentucky bluegrass [Poa pratensis] | Leaves | Cut to 1inch lengths | Soda ash | 45 minutes for spring grass, 1 hour for fall grass | Blend for 15-20 seconds | | Gin (Kentucky) | |
| Velvetleaf [Abutilon theophrasti] | Bast | Strip from stalk without steaming and cut in 1" lengths | Soda Ash | 1 hour | Blend for 20 seconds | | Gin (Kentucky) | |
| Field thistle [Cirsium discolor] | Bast | Steam and strip from stalk | Soda ash | 1 hour | Blend for 2 Minutes | | Gin (Kentucky) | |
| Celandine poppy [Stylophorum diphyllum] | Seed stalks and leaves | Cut to 1" | Soda ash | 30 minutes | Blend for 20 seconds | | Gin (Kentucky) | WARNING: Keep hands away from any mucus membrane after handling this plant. |
| Jacob's ladder [Polmonium reptans] | Stalks | Strip off most leaves and all seed pods, cut to 1" lengths | Soda ash | 45 minutes | Blend for 30 seconds | | Gin (Kentucky) | |
| Gray's sedge [Carex grayi] | Leaves | Cut to 1" lengths | Soda ash | 1.5 hours | Blend for 30 seconds | | Gin (Kentucky) | |
| Lemongrass [Cymbopogon citratus] | Leaves | Cut into 1" lengths, discarding the knotty base | Soda ash | 1.5 hours | Blend for 15 seconds | | Gin (Kentucky) | |
| Blue fescue [Festuca glauca] | Leaves | Harvest in mid to late summer; cut into 1" lengths | Soda ash | 1 hour | Blend for 30 seconds | | Gin (Kentucky) | |

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| Grass mats (that are used by sunbathers) | | Cut into 1" lengths. Soak in washing soda and water for one week | Washing soda | Cook at rolling boil for 4 hours (or until the stocks smush under pressure between thumb and fore-finger.) | Spray with a pressure hose to start to separate the fibers, blend 30-45 seconds | Very strong and thin | Kristy | Buy the ones that are damaged for less. I can write on them or run them thru the printer, using as inserts for cards and stationary paper. |
| Canary Reed Grass | | | | | | | | Kristy |
| Scripus | Outer sheath not the reed itself | | | | | | | Kristy |
| Milkweed | Entire plant, including stems, leaves, etc., dry | Soak overnight | Soda ash | Until it begins to blend easily | Blend | dark brown and quite fibrous | DJ (Michigan) | |
| Milkweed | Bast | Remove bast before cooking: Pull the plant out by its roots and chop off roots. Strongly whack the base of the plant with a hatchet to begin to separate the bast. Pull bast off of the inner core | Soak overnight. soda ash, 20%of fiber's dry weight | Until it begins to blend easily | Blend | | DJ (Michigan) | Harvest after the leaves have dropped off (around late October in MI): wait until the monarchs are done with the plant. Shake some of the fibers in a jar of water to see if the fibers separate and determine if it was cooked long enough |

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| Yucca | Leaves (dry) | Tear up, soak overnight, | Caustic solution (10 grams to every litre of water) | 1 hour | Blend for about 30 seconds. | Very thin sheets, translucent cream with lighter and darker threads, sometimes "leaf skin" showing in them. | Toni (Sydney, Australia) | Growing wild by the road |
| Kenaf | | Cut into short lengths, soak overnight | Caustic solution (10 grams to every litre of water) | 4+ hours | Blend | | Toni (Sydney, Australia) | |
| Bamboo | Stems (about 1cm thick), young green | Crush with a mallet and cut into short lengths. Soak in water with a few tablespoons of soda ash for a few days. | Caustic soda | 2 hours | Cut the long strands into short pieces and blend | Lovely smooth creamy/yellow paper | Di (tropical climate) | Older, thicker bamboo needs to soak and/or cook for longer...Seems to make a weaker paper, darker in color but easy enough to pulp in the blender if cut into short pieces so as not to tangle around the blades |

**General notes from Frances:** For the last 3 years, I have been using Arm&Hammer Washing soda, at the same ratio as soda ash. I find that there is no difference in the cooked fibers. Safety is also a factor for me. As far as blending, in the beginning I was interested in the beauty of the individual fibers, and blended to thin. In the last year, I have experimented more with blending less in order to make paper with larger pieces of fiber.

**General notes from Gin:** Since all blenders are different, blending times listed are just guidelines.