

Caffenol 101

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The spirit of caffenol is to provide a method of developing film in the absence of access to commercially-produced developers. This is especially useful for photographers traveling abroad, or ones that find themselves out of reach of a traditional darkroom. Additionally, film developed in caffenol takes on distinct physical properties, such as heavier grain, lower contrast, and, occasionally, a distinct brown color.

1 In Practice

Caffenol is used as a general replacement for the developer in film processing, with stop, fix, and washing steps performed as usual. The best practice for mixing the solution is to start with water at the desired temperature, then add each component one at a time, stirring each gently until completely dissolved before adding the next one. Let the solution stand at room temperature for 10-30 minutes, then use immediately. Caffenol does not store well.

All the components can be found in most standard American corner stores. Access might be different abroad, but in general, it shouldn't be impossible to source the basic components. Caffenol, both used and unused, is safe to dispose of down the drain, though consumption is not recommended.

As of this writing, there is still no drugstore solution for a fixer and hardener replacement; sodium thiosulfate is a simple compound that might be accessible through a chemical supplier, and a 15% solution works fine. Used fixer should be disposed of responsibly, as it contains silver nitrate that should not be poured down the drain.

In general, the recipes noted here work best with lower speed films, as higher speed films tend towards underdevelopment. Longer development times may result in grittier film and deeper staining of the emulsion; this can be forced as a desired effect.

1.1 Components

Sodium Carbonate — Na_2CO_3 . Commonly called washing soda, used as a laundry booster. Arm & Hammer Washing Soda works perfectly fine for the job. In order to minimize the presence of additives, washing soda should be water-free/anhydrous, appearing as a gritty powder. In the absence of washing soda, it's possible to produce some from baking soda by spreading baking soda in a shallow pan and broiling for half an hour.

Ascorbic Acid —Vitamin C. Ideally, use pure powdered form, which can be found in health food stores or pharmacies. Failing that, drugstore tablets of vitamin C will work; try to get uncoated tablets if possible. Tablets should be crushed into fine powder. In a real pinch, orange or lemon juice could be a passable substitute, while rose hips are a traditional source of vitamin C.

Coffee —Get the cheapest instant coffee you can find. The darker and stronger the better.

Water —Distilled water is ideal; tap water is an acceptable substitute.

1.2 Recipes

Working solutions referenced in the development chart:

Solution	Sodium Carbonate	Ascorbic Acid	Coffee
C-M	54 g/L	16 g/L	40 g/L
Delta-STD	24 g/L	20 g/L	45 g/L
Swamp	50 g/L	10 g/L	37.5 g/L

1.3 Development

Development times that produce reasonable results:

Film	Solution	Time (at 20°C)
Ilford FP4 125 ISO	C-M	12:00
Ilford HP5 400 ISO	C-M	9:00
Kodak TXP 320 (200) ISO	Delta-STD	10:00
Kodak TMAX 50	Swamp	13:00

2 In Theory

The active ingredient in caffenol is *caffeic acid* ($C_9H_8O_4$), which bears a large similarity to *catechol* ($C_6H_6O_2$), the active ingredient in most commercial black and white film developers. Coffee on its own will not provide a stable developing environment due to its acidity, thus the washing soda is added to raise the pH of the solution (in the event that some citrus juice is used as a vitamin C substitute, a larger amount of washing soda is likely needed to counteract the acidity). Ideally, developer should be around 8-9 pH. Vitamin C acts as a contrast control agent, with more amounts resulting in higher contrast.

Suggested reading: <http://people.rit.edu/andpph/text-coffee.html>

3 Resources

These are sites I have referenced in my own experiments:

- <http://www.caffenol.org/recipes/> for the basic recipes
- <http://caffenol.blogspot.com/2010/08/recipes.html> more recipes
- <http://www.caffenol.org/film-development-chart/> development times for different films
- <http://caffenol.blogspot.com/> for general inspiration
- <http://www.caffenol-cookbook.com/> if you like your resources in book format