

## **Acetaminophen/Paracetamol developer**

(Put those expired Acetaminophen tablets to good use!)

Hi,

Recently I developed film and paper using Acetaminophen tablets. I would like to share my experiences here.

It is quite well known that para-aminophenol(pAP) and Acetaminophen are close relatives.

Actually there is a "Rodinal like" formula that uses Acetaminophen tablets as the main ingredient. Acetaminophen can be obtained by adding an acetyl group to the amino part of the pAP. Acetaminophen is called Paracetamol in several parts of the world.

It is also widely known that it is possible to remove the acetyl group by means of hydrolysis. A strong solution of sodium hydroxide removes the acetyl group. This results in formation of Sodium Acetate and p-aminophenol in solution.

Here is the procedure for making the developer using Acetaminophen:

1. Crush about 6 acetaminophen (500 mG) tablets and dissolve the powder in a small quantity of water. There will be some precipitate left.
  2. Add some sodium sulfite to the above solution and dissolve it.
  4. Now slowly add a few flakes of Sodium Hydroxide while stirring. You will notice that the undissolved acetaminophen powder will now dissolve. Sodium Hydroxide is very caustic, so be very careful with this stuff.
  5. Close the bottle and shake a few times, and leave it for a few hours. I leave it for a day.
  6. The liquid turns pinkish after a few hours(or a day). This indicates formation of pAP. A small quantity of pAP might have oxidised as well. The sulfite reduces this.
  7. Dilute with water to get working strength solution (750ml to 1 liter)
  8. Add a few drops of saturated solution of Potassium Bromide solution. Without this, there will be some fogging.
- This can now be used as a good warm tone paper developer.  
I got very nice warm tones on Ilford MG Warm tone fiber paper.

This also works very well as a film developer when diluted quite a bit. I have developed 35mm as well as 120 rolls.

Additional notes:

1. One can use a strong solution of sodium hydroxide instead of using flakes directly. I had a 15-20 percent solution that was easier to handle. Sodium carbonate did not work. Alkali hydroxide seems to be necessary.
  2. Adding some Hydroquinone makes this into something like Kodak's pAP developer, giving nice warm tones. (Kodak DK-93?)
  3. If, instead of alkali, strong hydrochloric acid is used, perhaps we can get pAP-hydrochloride. However, I have not tried it.
  4. The molecular weights are as follows: pAP 109 pAP hydrochloride (approx) 145 Acetaminophen 151
  5. Other "Rodinal like" preparations have 20 grams of pAP-hcl in 400 mL of stock solution. That is, 0.05 grams of pAP-hcl per millileter. 400 ml of working strength developer at 1+40 dilution will have 0.5 grams of pAP-hcl. Since the molecular weights are very close, one 500mG tablet of acetaminophen can be comfortably used for one roll of film.
  6. pAP oxidizes easily. Storing the solution in small bottles to exclude air.
  7. The print developer is perfect as a one-session developer. I have stored the diluted developer in a bottle and used it after a few days. When I do this, I add some sodium sulfite to prevent it from oxidation.
  8. Approx 2-3 grams of Acetaminophen is required in print developer per liter.
  9. It still needs to be fine tuned so that the least necessary amount of Hydroxide is used so that the pH is kept as low as possible. Perhaps a Rodinal like "titration" can be carried out. I have not tried this.
  10. The tablets contain some other material (starch, etc) in addition to the main ingredient, acetaminophen. This did not seem to make any difference in the developer. I did not filter the solution to remove it.
  11. I used tablets that were lying around in a bottle -bought 8 years ago. They worked perfectly well. It appears Acetaminophen does not get oxidised as easily as pAP.
- Please post your experiences if you try this developer.  
Any other suggestions/comments welcome.

Credits: Wilco Oelen of Netherlands, who has greater knowledge of chemistry than I do, did lot of the experimentation that resulted in this. My sincere thanks to him.

Also thanks to several others who had answered some of my old posts regarding Acetaminophen based developers.

-Sreenath

©2006 PhotoKB.com Privacy Policy -Terms of Use

This website includes both content owned or controlled by PhotoKB.com as well as content owned or controlled by third parties.