
PISCOL

THE CREOLE DEVELOPER



Piscol - The Creole Developer

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Introduction

Following a modest but powerful worldwide trend of photographic developers made out of homemade and affordable ingredients, we have created a recipe to develop black and white film with pisco (a Chilean brandy). We chose a commonly consumed brand, a “Capel 35°”, to emphasize the affordability of the required elements and after two months of research and experiments, we can deliver, through this document, a formula that grants a complete grayscale if the film is correctly exposed. We hope over time to add new native liquors and local spices to share this process and its results that we have called The Creole Developer.

History of Piscol

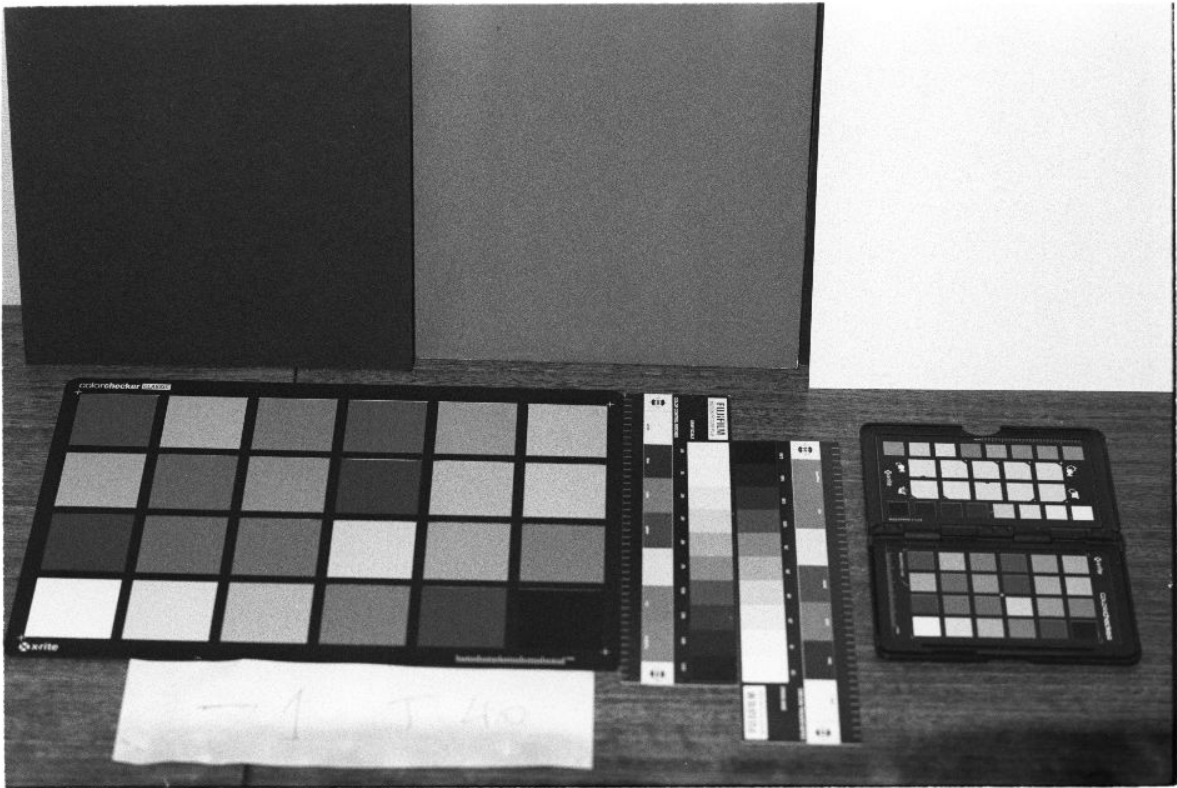
We conducted a process of inquiry about similar experiments in countries like Germany and the United States, which sought to develop photographic material with daily life ingredients. The first approaches to these new processing techniques were made in 1995 by Professor Dr. Scott Williams and his students from the Technical Photographic Chemistry class at the Rochester Institute of Technology (RIT) through an exercise to identify non-traditional developers.

They made mixtures tests based on coffee and tea, and then developed a formula that contained water, coffee and agents to control the pH: sodium bicarbonate and potassium hydroxide. The published paper by the RIT* acknowledges that they used Kodak Tri-X Pan 35mm black and white negative and that the development time was 25 minutes at a temperature of 85° Fahrenheit (29.4 ° Celsius), with reversal shaking method every 30 seconds. Over time variations of this formula were developed known under the name "Caffenol" and “Caffenol-C” which included ascorbic acid. Years later emerged a red wine-based homemade development, the "Wineol", and in an effort to continue with this linguistic predisposition "Piscol" was born. After researching for recipes and contemporary formulas made with various ingredients and liquors around the world (such as potatoes, curry, rum and whiskey), we decided to follow the mixtures order, but adjusted their values according to the alcoholic degrees of pisco and the amount of developing solution to be generated depending on the film format.

* <https://people.rit.edu/andpph/text-coffee.html>

Piscol # 6

After five work sessions that began on June 19th, 2018 in Santiago de Chile, which included everything from obtaining blank images to only points of light in the results, we finally achieved presentable images with the *Piscol* formula #6. There, however, we still did not reach a grayscale with the highlights notoriously separated, as can be seen in the following image:



Nevertheless, we could already see the contribution of pisco in terms of texture, granulation, which we see affected in a "velvety way", a texture that can be better appreciated in random images that we photographed in Santiago city (examples with no digital processing):

Detail of the sky area of frame developed with Piscal # 6:





The first Piscal registered - Piscal # 7 (July 23, 2018)

After more tests and errors, and several adjustments made to the mix, which included changes in the temperatures (when mixing and developing), agitation and quantity of elements in the mixture, we managed to make the first formula that in almost all aspects can be compared to a developer made with manufacturer chemicals. Here is a brief summary of the steps taken to achieve the Piscal # 7, the first Piscal formula that granted a good element homogenization, thus avoiding different types of spots that we had previously obtained on the films, also reaching an almost complete grayscale. This was the first Piscal formula registered.

In a first experimentation stage, we made a pH measurement of the pisco, which gave an orange pH (pH 6 approx) and we also measured it once the sodium carbonate was added, which detonated a strong green color (pH 10 to 12 approx). The greenish color corresponds to a more alkaline pH value (due to the effect of sodium carbonate, an alkaline reaction substance that increases the speed of development).



Piscal Formula # 7

- 600 ml of Special Double Distilled Capel 35° Pisco
- 14.4 gr. of Ascorbic Acid (Vitamin C)
- 60 gr. of anhydrous sodium carbonate

Film to develop: Ilford FP4 Plus 125 ASA

RESULT

Exposure

Camera: Contax 645AF

Lens: Carl Zeiss Planar 80mm

Emulsion: Ilford FP4 Plus 125 ASA

Format: 120

Aperture: f 8

Shutter: 1/60 of a second



Image scanned at 4000 dpi with Nikon Coolscan 9000ED scanner with no digital processing.

Comparison Tests

In order to compare our Piscol developer with a normal developer to see the differences between the two, we made a comparative development. For this, we exposed the same material, under the same light conditions and we developed them the same day.

ID-11 Development (comparison)

Here is an example of the result with ID-11 Normal development, made according to the manufacturer's instructions at 20 degrees Celsius (in this case, with a 1 + 0.2 solution, so the development time was 9 minutes).



Normal ID-11 development. Negative scanned at 4000 dpi with Nikon Coolscan 9000ED without digital processing.

Piscol Development (comparison)

Here is an example of the result with Piscol development made with the Piscol formula # 7:



(Both negatives scanned at 4000 dpi with Nikon Coolscan 9000ED scanner with no digital processing.)

Exposure

Camera: Contax 645AF - Lens: Apo-Makro-Planar 4 / 120mm

Lighting: 1000W Incandescent Tungsten

Aperture: f 4.5

Shutter: 1/60 of a second

Regarding the density of the negative and the appropriate separation and differentiation between each shade of gray, it can be seen that it was quite a successful development in that sense, finally obtaining the full grayscale with Pisco. However, we noticed an anomaly that we have called "brushstrokes" and that we think could be related to the amount of sodium carbonate used, since it crystallizes quickly and creates a thick mud, not like the ascorbic acid, which when poured into the warm pisco dissolves easily and quickly. According to information collected in the forum www.photrio.com, this "brushstrokes" phenomenon was first observed in the 50s and called "Bromide Drag" (bromide drag), and described as "streaking" by Dr. Scott Williams in the mid-90s. This occasional phenomenon has been reported with the FP4 Plus and HP5 Plus emulsions and would not happen with more recent emulsions such as Ilford Delta. It is worth emphasizing that in the development with Pisco these brushstrokes only became evident when developing 120 film format, not so when developing 35mm with the same formula, and mixing and shaking techniques.

Perfecting the formula

After obtaining excellent results with the Pisco # 7 formula we decided to try to improve some details about its manufacture to solve some elements mixture problems, for example, the accumulation of waste at the end of the containers, residues that evidently stained the negative. Since the ascorbic acid dissolves quite well, it was clear that the problem was the sodium carbonate. Therefore, we decided to cut it by half, after checking that the alkaline level reached with only half of it was enough. We also decided to raise the pisco temperature a bit more before adding the elements, and finally, and what seems to be crucial, we changed the mixing method. Basically, we accelerated the way we stirred the pisco in the container, making it constant and more agile, also going both ways, and combined this with adding the powder elements in a slower and smoother way. These simple changes, which we modified in the experiments carried out at the surroundings of the Universidad del Bío-Bío, turned out to be key to obtain a completely homogeneous, cleaner, clearer mixture that is much easier to add to the development tank, and to use the whole mix with no built-up at the bottom. There, in Concepción, the Pisco # 8 formula was born, which was tested again at the University of Concepción Student's Federation.

Here are the steps to reproduce this formula, which grants a perfect grayscale for Ilford FP4 Plus, both on Capel and 1733 pisco, along with an optimization of resources.

Pisco # 8 Formula

- 600 ml of Pisco Capel 35 ° Especial
- 14.4 gr. of Ascorbic Acid (Vitamin C)
- 30 gr. of anhydrous sodium carbonate

RESULTS

Exposure

Camera: Contax 139 Quartz, Format: 135 with Carl Zeiss Planar 85mm lens
Aperture: f 4 - Shutter: 1/60 of a second



Exposure

Camera: Contax 645AF, Format: 120 with Apo-Makro-Planar 4 / 120mm lens
Lighting: 1000W Incandescent Tungsten
Aperture: f 8 - Shutter: 1/15 second



Exposure

Camera: Contax 139 Quartz

Lens: Carl Zeiss Distagon 25mm

Emulsion: Ilford FP4 Plus 125 ASA

Format: 135



The minimum of resources

In order to optimize resources and reach a formula that has only the strictly necessary ingredients for the Creole Development, and also to ensure absolute control over the so-called "brushstrokes", we made a second sodium carbonate reduction, reaching the following formula:

- 600 ml of Special Double Distilled Capel 35° Pisco
- 14.4 gr. of Ascorbic Acid (Vitamin C)
- 20 gr. of anhydrous sodium carbonate

Step by step: Replicating Pisco

The first thing we did was gathering all that is necessary to develop the film as if it were a development with chemicals: Tank and reel, thermometer, chronometer, pocket weight scale, containers, universal pH indicator paper, etc.



Mixing Process:

- Step 1: Put the pisco in a container with measurements (600 ml)
- Step 2: Heat water in the kettle and put it in a container to make a bain-marie with the pisco until it reaches 30 degrees Celsius
- Step 3: Slowly add vitamin C stirring with a wooden palette
- Step 4: Added the sodium carbonate to the mixture stirring slowly with a wooden pallet (make sure it didn't drop, if so, make it rise to 30 degrees Celsius again)
- Step 5: Introduce the mix into the film developing tank and development begins

Developing process and Intermediate Washing:

- **Step 1:** Once the mixture is in the tank, shake it for 30 seconds on a table with the tank positioned at 45-degree angle, and then let it rest. From here on agitate 10 seconds every 1 minute and 50 seconds
- **Step 2:** Shake for 10 seconds when the timer is at 02:20 minutes, again at a 45-degree angle, and then let it stand
- **Step 3:** Shake gently for 10 seconds when the timer is at 04:20 minutes, again on a table at a 45-degree angle, then let it stand
- **Step 4:** At the end of the 5 minutes time wash the tank with the "fountain" technique on the bathroom sink. Let the water run for 8 minutes.

Fixation and final wash process:

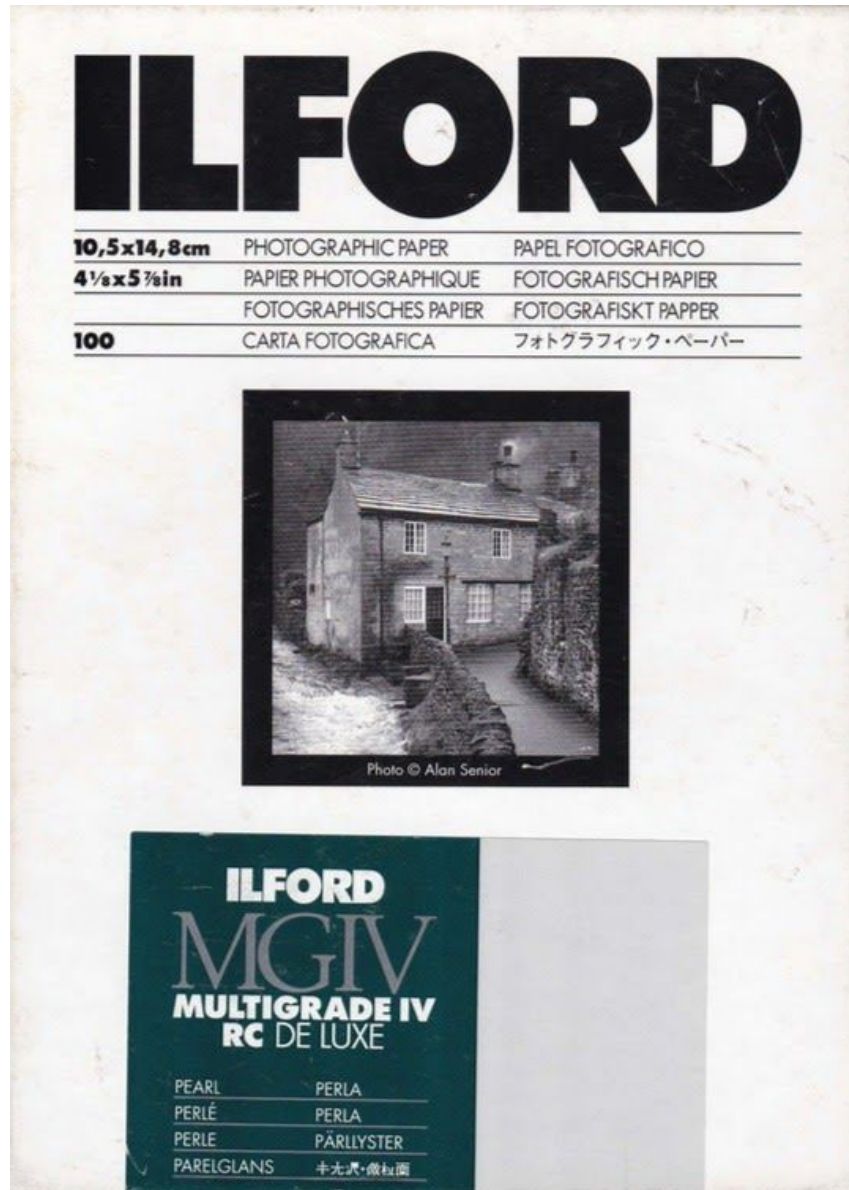
- **Step 1:** Prepare hardener fixer for film, plates, and papers for general use (Kodak). Dissolve the powder fixer in water following the manufacturer's instructions.
- **Step 2:** Introduce the fixer at room temperature and shake the first 30 seconds with the tank resting on a 45-degree angle on the table, then let it stand. Shake in the same way for 5 seconds every 25 seconds to complete 8 minutes total
- **Step 3:** Final washing with "fountain" technique for 8 minutes
- **Step 4:** Dilute a drop of shampoo for children (neutral pH) with water and let it act for 30 seconds, then remove from the tank without rinsing
- **Step 5:** Hang the film from the bathroom curtain and let it dry for an hour with the door closed

Tip: It was convenient to cut two 5 liter water bottles, and filled one with cold water and ice, and the other with hot water, to easily and quickly raise and lower the temperature of the mix.



Piscol Prints

The first prints made with the same mixture of Piscol # 7 were printed through the same steps that would normally be followed, replacing the Kodak Dektol developer chemical with Piscol, enlarging a 120 negative with Durst M605 enlarger (with Rodenstock Apo-Rodagon 50mm optic) and using Ilford Multigrade IV RC DeLuxe Pearl paper, size 10.5 x 14.8 cm.



RESULT

Exposure: 5 seconds, f 5.6

Filtering in enlarger: None

Development time: 56 seconds



We also made a print on ARISTA orthochromatic Litho film:



RESULT

Exposure: 5 seconds, f 5.6

Filtering in enlarger: None

Development time: 56 seconds



Note: This image shows the Litho still wet. We did observe that Litho has a coloring that changes from greenish/brown to brown/sepia once the Lith is dry. It remains unknown where this color shift comes from in a Lith that should respond in black (without any dominant color) and transparency.

Prints made with Pisco on plastic-based photo paper should consider a white border on each side before exposing on the enlarger, since pisco residues may leave a small brown frame on all edges. This dye appears almost at the moment of contact with the developer and accentuates its color once the copy is dry. These stains are not presented on fiber-based photo paper.



Detalle de las manchas de Piscol en los bordes del papel fotográfico a base de plástico.



Here are some photographs where the negative was exposed indoors with daylight, with 1000W Tungsten lighting (and with silver support reflector), and developed with the Piscal formula # 9. We used two medium format cameras, a Rolleiflex 6008i and a Contax 645AF (images retouched in Lightroom where the black and white levels, and contrast were adjusted).







Conclusions

After two months of sustained research we can conclude that:

- 1- It is possible to obtain good development results using the Pisco developer with Ilford FP4 Plus Black and White Negative, exposed in Daylight (125 ASA) and incandescent tungsten (100 ASA). In addition, it is possible to obtain a good print quality with Orthochromatic Litho film and Black and White photo papers using the Pisco developer.
- 2- In the case of the Ilford FP4 Plus film developed with Pisco, you get an exposure latitude of at least 6 stops.
- 3- A higher gamma is observed than if developed with the normal process recommended by the film manufacturer (ID-11 or D-76).
- 4- The D-Min (Density of the base plus the fog) is greater in the case of the development with Pisco in comparison to a normal development with ID-11.
- 5- When Lith is developed, warm shades are obtained with the Pisco developer, while the negative film Ilford FP4 Plus developed with Pisco produces a negative without any color dominant.
- 6- By using pisco instead of water it is possible to replicate the Pisco formula anywhere where there is access to pisco without depending on the water's quality or additives, thus standardizing the process.
- 7- It is possible to reuse the Pisco solution to make prints on paper (after developing a negative). The useful lifespan of the solution is at least a couple of hours, however, it is highly recommended to reuse it quickly. When the developer solution has no longer a pisco-scent, the effectiveness of the developer has been exhausted.
- 8- When developing 120 film we have had more problems of "brushstrokes" and fogging on the negative compared to smaller film formats. Although we still do not know exactly why this happens, it is possible that it is related to the emulsion's surface versus the amount of developer solution, so we recommend exceeding the amount indicated by the manufacturers of the developing tanks for the "rotation shaking", and instead guided by the measures indicated for the inversion method even when the shaking method of the Pisco development is by rotation as indicated above.
- 9- Regardless of the quality of each result, in which gradients of continuous grays, total resolution of the grayscale, medium gray, and high level of detail (with potential for miniatures formats) and an excellent reproduction of textures are observed, we noted that the FP4 Plus film composition, both its emulsion and its support, seem to have adequately supported the non-traditional photographic development of Pisco, as it did not present serious anomalies (except for the occasional phenomenon described as "brushstrokes") during or after Pisco development process (at least in the short term).
- 10- In the case of FP4 Plus film (exposed as 100T or 125D), the normal development time with developer Ilford ID-11 (compensated for 27 degrees, according to the Ilford table) is 5 minutes 15 seconds, which almost matches with the development time of this same emulsion with Pisco: 5 minutes at a temperature of 27.5 degrees Celsius.
- 11- Most commercial developers use a combination of chemicals known as Metol and Hydroquinone (MQ) or Phenidone and Hydroquinone (PQ) which are toxic and polluting. In this context, Pisco is friendlier to the environment.

APPENDICES

Suppliers (in Chile)

Photographic film Ilford FP4 Plus: Laboratorio Fotográfico JPF, Photonew (photographic supplies stores)

Pisco: liquor stores of the country

Ascorbic acid, sodium carbonate and paper universal pH test: Distribuidora Científica Limitada, located at Amador Neghme 03639, Module 15, La Pintana, Santiago de Chile, phones: 225555985 - 225555933. (As an alternative, ascorbic acid can be purchased in capsules filled with powder in pharmacies)

Laboratory items (tank, thermometers etc): JPF Laboratory, Freestyle Photo

Color charts / Gray Scales: B & H Photo, Frame24 Ltd

Pocket weight: Tobacco shops

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Check-List of utensils and ingredients

Exposed Ilford FP4 Plus film

Pisco

Ascorbic acid (powder)

Sodium carbonate anhydrous (powder)

Thermometer for Photography (Jobo, Paterson ...)

Pocket Weight

Calculator

Wooden palette for stirring

1 Liter plastic bottle, with measurements (Jobo brand)

Development tank (with spiral compatible with 135 and 120 formats)

Film changing bag or film changing tent to load film

Universal pH indicator paper

2 plastic bottles for bain-marie (cold and hot)

Fixer

Film clip set for hanging negatives