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AMARANTH AS A SUBSTITUTE FOR CUDBEAR WITH IMPROVED METHODS IN THE PREPARATION OF SOME N. F. GALENICALS.*

BY S. W. MORRISON.

In the past, cudbear has been the favored coloring agent for pharmaceutical preparations because it is of vegetable origin, reasonably cheap and compatible with most substances. It is not, however, the ideal agent as it is variable in color, it hinders filtration; the color changes in acid and alkaline solutions and the color fades.

In seeking to find a more desirable coloring agent, amaranth was tried. Amaranth is a synthetic organic dye which has been in use for many years and in 1906

* Section on Practical Pharmacy and Dispensing, A. PH. A., Madison meeting, 1933.

was accepted by the Department of Agriculture for meeting the requirements of the Pure Food and Drugs Act.

It has been reported by H. Fühner in the "Handbuch of Experimental Pharmakologie," 1 (1923), 1199, to be inert physiologically. Four-gram doses were administered repeatedly to dogs with no effect. The urine was not colored by the dye when given orally but did show some color when amaranth was given intravenously. Intravenous injections produced no effect on the dogs.

Amaranth has many advantages over cudbear. It is a definite chemical compound which is never variable in color, it does not slow the filtration of solutions in which it is used and is cheaper than cudbear. It is readily obtainable through the wholesale drug or chemical companies in 10-Gm. bottles at 50 cents or in larger packages at $7.60 a pound. The cost of amaranth required for coloring is only one-half as much as the cost of cudbear for the same preparation. Amaranth is permanent in color under ordinary conditions and does not change color in weak acid or alkaline solutions. For convenience and greater accuracy in handling amaranth, a 1% solution in 15% alcohol was used. The solution is stable under ordinary conditions and keeps indefinitely.

The directions for the manufacture of Alkaline Aromatic Solution, N. F. have given some trouble, due to the cudbear in the formula. The powdered cudbear, when added to the solution as directed, hinders the filtration tremendously. The cudbear itself has been found to vary greatly in quality and color. The use of Tincture of Cudbear in place of the powdered form would be a great improvement. The solution was prepared according to the N. F. V directions except that no cudbear was used and only 3.5 Gm. of magnesium carbonate was used for clarification. Four cc. of 1% solution of amaranth was added and sufficient distilled water to make one liter. The solution was then filtered. Filtration was rapid and a crystal clear solution was obtained. The amaranth gives a brilliant red color while the cudbear produces a less desirable bluish red color.

COMPOUND ELIXIR OF PEPSIN, N. F. V.

The present formula and directions for the manufacture of Compound Elixir of Pepsin are unsatisfactory. Cudbear hinders filtration and the high percentage of glycerin in the elixir, likewise, lengthens the time required for filtration.

The following changes in the formula are recommended:

> Dissolve the pepsin and lactic acid in 500 cc. of distilled water. Dissolve the oil of orange in the alcohol and add 4 cc. of 1% amaranth solution. Mix with the pepsin solution and filter. The solution filters very quickly. Add the glycerin to the clear filtrate and sufficient distilled water to make one liter of elixir. Mix.

This method eliminates the two-hour delay necessary when cudbear is used. The solution will remain clear after adding the glycerin and the entire elixir may be completed in a very short time.

ELIXIR OF THREE BROMIDES, N. F. V.

The chief difficulty in the manufacture of this elixir has been due to the cudbear. It has hindered filtration, and some cudbear on the market often imparts only a light pink color to the elixir when made according to the N. F. V directions.

It is apparent that the amount of cudbear must be increased or else the tincture of cudbear should be substituted.

Amaranth was used in place of cudbear and eliminated all the difficulties. The elixir was prepared as directed in the N. F. V except that 4 cc. of the 1% solution of amaranth was substituted for the cudbear and the elixir was filtered immediately. Filtration was rapid, there was no delay, due to extraction of color and the color was always uniform and free from the less desirable bluish red color.

Red Aromatic Elixir, mouth wash and Compound Syrup of Phosphates may likewise be made with amaranth in place of cudbear or fuchsin. The use of amaranth might also eliminate the use of cochineal solution and carmine solution.

There has been some doubt concerning the permanency of amaranth. To determine the stability of the color, alkaline, neutral and acid solutions were prepared. Alkaline Aromatic Solution, N. F. V was made with cudbear as directed and another portion was made with amaranth. Likewise, Elixir of Three Bromides, N. F. V and Compound Elixir of Pepsin N. F. V were prepared with both cudbear and amaranth. Mouth wash, N. F. V was also made and colored with amaranth.

The degree and intensity of color of each preparation was determined by comparison with colored glass slides using the Lovibond tintometer. In order to match the color of the cudbear in alkaline solutions it was necessary to use a dilute solution of indigocarmine with the colored glass slides.

The galenicals were then placed in 3 fl.-oz. flint glass, tightly stoppered bottles, and placed on a shelf near a south window where they were kept for 5 months exposed to bright diffused light.

After standing 5 months, the intensity of color of each galenical was determined again with the tintometer.

The solutions were then placed in direct sunlight where they were exposed to the intense sunlight for 22 hours during the period of June 1st–16th, and only at midday. After this severe test the colors were again checked on the tintometer.

The following table gives the results of the experiment.

DEGREES OF COLOR WITH THE TINTOMETER.

	Thickness of Cell.	At Time of Mfg. 1/6/33.	5 Mo. in Bright Diffused Light. 6/5/33.		22 Hrs. Direct Sun-Light. 6/20/33.		% Loss of Color after Entire Exp.
Liq. Arom. Alk. with amaranth	1/16″	2.2		2.0	1/8″	3.6	18%
Elix. Brom. Tri with amaranth made 12/20/32	1/16″	2.0	1/8″	4.0	1/8″	4.0	None
Elix. Brom. Tri with amaranth made 1/6/33	1/16″	1.6	1/8″	3.2	1/8″	3.2	None
Elix. Pepsin Co. with amaranth made 12/12/32	1/8″	1.2	1/4″	2.5	1/4″	2.3	8%
Elix. Pepsin. Co. with amaranth made 1/5/33	1/16″	8.0	1/16″	7.6	1/16″	7.0	12.5%
Elix. Pepsin. Co. with amaranth made 1/6/33	1/16″	5.0	1/16″	4.6	1/16″	3.5	31%
Liq. Arom. Alk. with cudbear made 12/20/32	1/16″	5.0	1/8″	3.2	1/4″	2.6	86%
Elix. Brom. Tri with cudbear	1/2″	4.6	1/2″	3.0	Changed to orange		Approx. 40%

Elix. Pepsin Co. with cubear made 12/20/32	1/8"	2.3	1/4"	3.0	1/4"	2.4	48%
Elix. Pepsin. Co. with cudbear made 1/5/33	1/16"	2.6	1/16"	2.4	1/8"	4.0	24%
Elix. Pepsin. Co. with cudbear made 1/6/33	1/8"	2.2	1/8"	2.2	1/4"	3.0	31%
Lavat. Ori with amaranth	1/8"	1.5	1/8"	1.5	Changed to orange		

In no case did the preparations colored with amaranth show any loss of color after standing 5 months exposed to bright light. Those colored with cudbear did show a loss of color.

After exposure to direct sunlight, Compound Elixir of Pepsin colored with amaranth (an acid solution) showed a slight degree of fading (8–31%), but practically none in the alkaline solutions (0–18%). Amaranth is most stable in the alkaline solutions.

The cudbear faded considerably more than the amaranth and is more stable in the acid solutions than in alkaline. Loss of color in acid solution was 24–48% while in the alkaline solutions the per cent loss of color was 40–86%.

In preparations lightly colored with amaranth the fading is apparently more rapid than when amaranth is present in greater amounts. The amaranth tends to change to an orange-red color on exposure to direct sunlight, but there is no change under ordinary conditions. The mouth wash showed the greatest change in color but only after exposure to direct sunlight.

There may be some restrictions on the use of amaranth in certain states, because it is a so-called coal-tar dye but those pharmacists who are permitted to use it will find amaranth a great improvement in the manufacture of the galenicals discussed.

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SOME USEFUL PRESCRIPTIONS FOR THE DENTAL PROFESSION.*

BY A. O. MICKELSEN.[1]

The professional rating of pharmacy is maintained and advanced through unceasing efforts in research, education and practice of professional pharmacy in the retail field. Because merchandizing occupies such an important part in maintaining the business, the struggle to advance pharmacy on a high professional plane is no small task. It is so easy to shift the technical professional work to a few who see the advantage of professional business and accept instead just the selling of professional products. This should be discouraged. Compounding of prescriptions and useful formulas must be retained in the average retail store if pharmacy is to advance or maintain its professional rating. The following quotation may well apply to the practice of professional pharmacy: "In a country rich in gold observant wayfarers may find nuggets on their path, but only systematic mining can provide the currency of nations." (F. Gowland Hopkins.) Applying the

* Section on Practical Pharmacy and Dispensing, A. PH. A., Madison meeting, 1933.

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