

light yellow to a dark brown. This solution should be rejected if the full therapeutic effect is desired.

R̄	
Adrenalin Inhalant	℥ ii
Menthol	gr. x
Petrolatum Liquidum q.s. ad.	℥ i
M. ft. Nebula.	
Sig. Spray nose and throat night and morning.	

Adrenalin Inhalant has as one of its chief ingredients adrenalin, which is not soluble in mineral oils. This prescription if compounded as it is written will precipitate if allowed to stand. However, this difficulty may be overcome by replacing the Liquid Petrolatum with a fixed oil such as olive oil.

In conclusion, if the physician persists in prescribing any of the above prescriptions he should be informed not to write for an alkaline solution containing epinephrine hydrochloride that would last longer than twenty-four hours.

In the first prescription containing epinephrine hydrochloride and Dobell's Solution—if several days' supply is desired—the physician should prescribe each in separate solution, or replace the alkaline Dobell's Solution with some acid solution.

The second prescription being a different type can be dispensed by replacing the solution of epinephrine hydrochloride with a solution of epinephrine nitrate, which will make a clear solution with the silver nitrate.

There are two alternatives in the third prescription, first to replace the sodium borate with boric acid, or, second, to dispense two separate solutions if an alkaline solution is desired.

The difficulty in the last prescription may be overcome by replacing the Liquid Petrolatum with either olive oil or expressed Oil of Almond.

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FLAVORING QUALITIES OF VANILLA TINCTURES.*

BY HAYWOOD M. TAYLOR AND R. A. KONNERTH.

There are many factors that enter into the preparation of a vanilla tincture of the highest flavoring qualities. The proper selection of the beans, the curing and drying of the beans and their treatment in process, together with subsequent aging and storage, all play an important part and should be given due attention. Believing that a summary of the literature on this subject is of sufficient interest to justify it we have made an exhaustive search and report it briefly in the following pages. For those who may be interested in going into the subject in more detail, an extensive bibliography is appended. For obvious reasons we have not adopted all of the recommendations made in the published literature in our experimental work as we were only interested in a comparison of the tinctures prepared from various beans and from different combinations of beans.

* Section on Practical Pharmacy and Dispensing, A. PH. A., Philadelphia meeting, 1926.

VANILLA BEAN.

1. *Selection of the Bean.*—C. P. Campbell (1) reports that Mexican beans give the best results, with Bourbon next and Tahiti beans last, and all authorities agree with this classification though some claim that under the proper conditions Bourbon beans give equally as good an extract (2). Blends of the two also give excellent results. Tahiti beans should never be used except in the cheaper extracts, and when used they require 10% more alcohol in the menstruum.

2. *Curing the Beans.*—The process (3) of curing vanilla beans as at present carried out is a long drawn out process and subject to many variations. Frank Rabak (4), U. S. Department of Agriculture, recommends curing the beans under standardized laboratory conditions according to the following method: The beans are immersed in water at 80° C. for a period of ten seconds at intervals of one half minute, for three successive times. They are then wrapped in woolen blankets and allowed to sweat for twelve days, after which they are wrapped in wax paper, and allowed to dry for twelve days. They are then well wrapped, placed in tight containers and allowed to dry for two months. This process gives a bean of exquisite aroma—deep brown color and fine texture. The extract made from these beans is far superior to that made from the ordinary cured bean.

3. *Drying the Beans.*—Schlotterbeck and Dean (5) have found that a better extract is obtained if the beans are first dried. This is best done by chopping the beans very fine with vertical knives and then spreading the chopped beans in thin layers on shelves in a small room through which a current of air at 50° C. is drawn. The loss of vanillin is negligible.

THE PREPARATION.

4. *Reducing to a Fine Powder.*—To obtain maximum extraction it is necessary that the beans be finely powdered. The temperature should be kept as low as possible during grinding. Vertical knives should be used to chop the beans as they cause no rise in temperature. After chopping, the beans are dried to constant weight and then powdered by means of water-cooled steel rollers.

5. *The Menstruum.*—Probably the best menstruum is either a 60% alcohol or 20% glycerin with 50% alcohol. When sugar is used it should be added to the percolate because it produces a cloudiness when mixed with the beans. Glycerin should be added to the menstruum because it serves to increase the color. Alkali may be added to the menstruum, but it is objectionable in that it is injurious to the odor and flavor of the extract, though it increases the color tremendously (6). Wilson and Sale (7) have tried out other solvents, such as isopropyl alcohol, ether, acetone and carbon tetrachloride but from a standpoint of aroma and flavor they recommend a neutral 65% alcohol. The preliminary removal of the oily matter in the beans is not recommended.

6. *Method of Extraction.*—There are numerous methods of extraction in use, the principal ones being (a) maceration and subsequent percolation, (b) the circulatory displacement method, (c) fractional percolation, (d) pressure, (e) agitation, (f) agitation after maceration, (g) hot percolation. Of these the circulatory displacement (8) method is probably the most satisfactory. The beans are suspended just below the surface of the menstruum. As the constituents of the beans are extracted the density of the menstruum increases—it sinks to the bottom

of the container and forces fresh menstruum up thereby setting up convection currents. The beans may be percolated afterward. The extraction is about complete in 3 months but the flavor continues to improve the longer the maceration is allowed to continue. In no case should the temperature be allowed to rise above 60° C.

7. *Aging and Curing the Extract.*—Some investigators contend that the flavor of vanilla extract is due to the vanillin and vanilla resins, others think it due to the vanillin and secondary compounds as alcohols, aromatic aldehydes and esters and that the resins merely serve as fixatives. If this view is true the aging is merely physical and is best done in glass or porcelain lined steel tanks.

Others hold that the aging is a chemical reaction between the various alcohols, acids, aldehydes, etc., present and the oxygen of the air. Such a process can best be carried out in unpainted porous oaken barrels.

All are agreed, however, that aging is necessary and that it should be carried out for not less than one year.

8. *Color of the Extract.*—The color of the extract varies under different conditions. An increase in alcoholic content of the menstruum up to 65% gives an increase in color. Dry beans give a much deeper color than moist ones. Glycerin and alkali increase the color when added to the menstruum.

9. *Effect upon Metals.*—Vanilla extract exerts an extensive action upon metals, such as copper, zinc, nickel, monel metal, lead and aluminum. It has very little action upon tin and none on gold or silver.

10. *Requirements of the Baking Trade.*—DeGroote reports that true vanilla extract will not withstand the demands of the baking trade. At the temperature of the oven it bakes out too readily and some more concentrated product must be used. A preparation fulfilling the necessary requirements generally consists of oleoresin of vanilla, vanillin, coumarin, alcohol and glycerin. Its composition will depend upon the price at which it is to be sold.

EXPERIMENTAL PART.

Our experimental work involved the preparation of vanilla tinctures made according to the N. F. IV and prepared from Mexican beans, Bourbon beans and mixtures of these in various proportions. The resulting tinctures were allowed to age for a period of six months before the experiments were carried out. The experiments consisted of submitting various samples of the tinctures to various individuals who tried their flavoring strength and quality on such preparations as vanilla syrup for soda fountain purposes, flavoring for cake icings, puddings, candy, etc. The reports from the effects of the flavoring have indicated that the tincture prepared from pure Bourbon beans gives the most satisfactory and fragrant flavoring to preparations, which require heating. In preparations which were not subjected to heat the most fragrant and pleasant flavor was imparted by a tincture prepared from a mixture consisting of 40% of Mexican beans and 60% of Bourbon Vanilla Beans.

CONCLUSION.

The fundamental point of interest that we want to bring out in this paper is the fact that one type of vanilla tincture will not flavor all preparations with

its maximum strength and fragrance of flavor. In order to obtain the most desirable results it is advisable to use two types of tinctures. The tincture prepared from pure Bourbon vanilla beans is best suited for the flavoring of preparations subjected to heat, such as puddings, cakes, candy, etc. For the flavoring of preparations not subjected to heat treatment the most desired results are obtained by flavoring with a tincture prepared from a mixture of 40% of Mexican and 60% of Bourbon Vanilla Beans.

The compound tincture of vanilla, official in the N. F. III, containing coumarin and vanillin as basic flavoring agents and containing no extracts of vanilla beans is frequently employed as a substitute for the vanilla bean tincture. The quality of the flavor imparted by this type of preparation surely leaves much to be desired and does not compare with the quality of the flavor imparted by a tincture prepared from the vanilla beans.

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A PHARMACEUTICAL STUDY OF SYRUP OF FERROUS IODIDE (1840-1927).

BY CATY J. BRAFORD AND H. A. LANGENHAN.

(Continued from p. 437.)

NO. III. PRESERVATION OF SYRUP OF FERROUS IODIDE.

To find a satisfactory procedure for the preservation of **Liquor Ferri Iodidi** has been a problem with which the pharmacist has been working for a long time. As early as 1839 Frederking¹ suggested the use of saccharine material. The following year Proctor² published a paper in which he outlined the experiments he had performed with sugar of milk, manna, cane sugar, honey and "uncrystallizable" sugar. In 1841 Dupasquier³ used "syrup of gum" to make his preparation more stable. Beral⁴ added simple syrup. This experimentation probably led to the introduction of the **Syrupus Ferri Iodidi** into the U. S. P. of 1860.

Although the Syrup was more stable than the Liquor had been, the pharmacists still found it difficult to keep this preparation unchanged. Maisch⁵ was an early worker who presented a theory of the decomposition. He considered that a solution of ferrous iodide was decomposed not only by light but also by the action of the atmospheric oxygen in the bottles that were only partly filled and frequently opened. He thought that the oxidation of the iron and liberation of iodine were hastened by the action of light. He found that when an altered solution was transferred to air-tight bottles, completely filled and exposed to direct sunlight, it resumed its transparency and the original color was completely, or at least par-

* A non-corroding alloy of nickel, copper, cobalt and iron.—EDITOR.

¹ Frederking, *Am. J. Pharm.*, 58, 289 (1886).

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³ Dupasquier, *Jour. de Pharm.* (1841); through *Am. J. Pharm.*, 58, 289 (1886).

⁴ Beral, *Am. J. Pharm.*, 13, 74 (1841), from *Jour. de Chem. Med.*

⁵ Maisch, *Ibid.*, 27, 218 (1855).