

Another practitioner made the surprising statement that he "had not experienced the fermentation referred to." This led us to study the keeping qualities of chalk mixture. We found that the mixture really does not decompose very rapidly; and, as the acid formed by the fermentation is neutralized by the chalk, the only change evident on standing is a progressive lessening and final loss of sweetness. There is no doubt, however, that the preparation now official contains good culture media for microorganisms, and is to that extent unhygienic.

Much to our surprise, we discovered that the saccharin-containing mixture was not as permanent as we had hoped. Especially when kept exposed to sunlight for quite some time, it developed an offensive odor reminding one somewhat of hydrogen sulphide or of illuminating gas, with progressive diminution and final loss of cinnamon flavor. Protected against light it does not decompose readily. As, however, the manner of keeping the mixture cannot be controlled after it has left the pharmacist's hands, the formula is not a satisfactory one.

There is little doubt that some other less reactive flavoring oil could be found that might be used instead of the cinnamon and would yield a permanent preparation. We have prepared saccharin-sweetened chalk mixture with anise water, fennel water and peppermint water, and so far have not noted any decomposition. The time for observation has not yet been sufficiently long to enable us to vouch for the absolute permanence of these preparations. However, we have little doubt that, should the use of saccharin as a sweetening agent be desired, a suitable flavoring could be found.

#### CONCLUSIONS.

1. The now official chalk mixture is objectionable because of its carbohydrate content.
2. A mixture from which the fermentable ingredients are eliminated, and in which saccharin is used as a sweetening agent is objectionable because of a decomposition that occurs, especially under the influence of sunlight, which results in the substitution of an offensive flavor for that of cinnamon.
3. Some other less reactive flavoring oil than that of cinnamon would have to be used if saccharin were to be employed as the sweetening agent.

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#### SOME INCOMPATIBILITIES OF ASPIRIN.\*

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In the report of the Scientific Section of the American Drug Manufacturers' Association for the present year is given a list of some incompatibilities, or supposed incompatibilities, of Aspirin. Some of these have been chosen for experimentation.

Acetylsalicylic acid is a compound which is broken up by a large number of agents. Water is perhaps the most common. The usual method of estimating the amount of decomposition is to determine the amount of free salicylic acid. The method of testing is to dissolve a given weight of aspirin in a little alcohol and then dilute with water to a certain volume and add a solution of ammonium ferric alum.

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\* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., Cleveland meeting, 1922.

The coloration is in proportion to the free salicylic acid. "New and Nonofficial Remedies" allows not over 0.1 percent of free salicylic acid. In making this test the color should be observed at once as it increases decidedly in a few minutes. This indicates the quickness with which aspirin hydrolyzes. In fact, in making compressed tablets, if water is used to granulate the powder there is an increase in the free salicylic acid.

The statement has been made in pharmaceutical journals that a permanent solution of aspirin can be made by dissolving it in a solution of an alkali citrate. The citrate aids solution, possibly by the formation of the alkali acetylsalicylate and citric acid, but it does not prevent hydrolysis. The violet color with a ferric solution may not show at first, because citric acid and citrates interfere, but after standing for a time the color will be developed.

In the following experiments aspirin was triturated dry in a mortar with an equal weight of various chemicals. Small amounts of aspirin with citric acid, oxalic acid, tannic acid, and tartaric acid do not give a perceptible odor of acetic acid for a month, and cannot be tested for salicylic acid with an iron solution because the acids interfere with the color. There may, however, be some decomposition, and probably is. It is not improbable that acids in drug extracts may cause some hydrolysis in the course of time.

Sodium citrate seems to cause some decomposition. Although the test for salicylic acid with iron is negative, the odor of acetic acid is quite marked after standing for a couple of weeks.

Potassium acetate when triturated with aspirin gives a slightly sticky powder which has a dirty white color. This becomes granular and acquires quite a perceptible odor of acetic acid in a day or two. An iron solution gives a deep violet color.

Sodium phosphate when rubbed with aspirin gives a soft mass, almost liquid. The acetylsalicylic acid may combine with one atom of sodium, breaking up the molecule and liberating the water of crystallization. A marked odor of acetic acid is soon noticed and iron solution gives a violet color.

Borax acts similarly to sodium phosphate. It gives a mass and an odor of acetic acid and a violet color with ferric salt. Using dried borax, a mass is not obtained.

When lead acetate and aspirin are rubbed together the mixture becomes slightly damp at once and a strong odor of acetic acid is noticed. The reaction proceeds until a mass is formed which, on standing, separates into liquid and solid portions.

Hexamethylenamine when first triturated with aspirin gives a slightly damp powder which becomes sticky and, in a few days, forms a greenish yellow almost liquid mass. A slight odor of formaldehyde is noticed and, later, a marked disagreeable odor is produced. A solution of a ferric salt gives a deep violet color.

Antipyrine gives a sticky mass at once when rubbed in a mortar with aspirin and in a few minutes when mixed on paper with a spatula. The mass assumes a yellowish color which becomes darker and forms a hard crystalline solid. It gives a deep violet with an iron salt.

Phenol gives a liquid but the following apparently cause no change: Salol, menthol, thymol, phenacetin, ammonium chloride, phenolphthalein, magnesium sulphate.

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### MEDICINAL CHARCOAL.\*

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The question has been asked, "Is charcoal, when in the moist condition, of any therapeutic value?" This is a question very difficult to answer and impossible to prove by chemical experiments.

Let us first consider the various charcoals and their physical properties. Let us take the two types of wood charcoal, that from soft wood and conversely that from hard wood, and examine a sample of each under the compound microscope. The hard wood charcoal shows a granular structure, while the soft wood exhibits a fibrous structure. No matter how fine the particles of each, the same difference of structure will be apparent. For internal administration we would therefore prefer the soft wood charcoal, not that there is any inherent virtue in soft wood more than there might be in hard wood, but because it is more palatable.

The United States Pharmacopoeia describes charcoal as prepared from soft wood and finely powdered, and states that it should contain not more than 7.5 percent of ash. Samples from various sources have been examined by the writer and found to contain from three to twelve percent of ash. But the ash content really has nothing to do with the medicinal properties of charcoal. The two essential factors are palatability and absorption. The latter term is probably more correctly called adsorption, since it is the disappearance of immense quantities of a gas into small particles of charcoal, caused by the adhesion of the gases to the very extensive internal surfaces which the charcoal possesses.

We can prove by chemical manipulation that dry charcoal will absorb gases to a very high percentage. But charcoal when administered internally becomes moist by the presence of liquids in the stomach and also by the natural secretion of the gastric fluids. Now after admixture of the charcoal with these fluids, will it absorb gases due to fermentation or putrefaction of the stomach contents?

An apparatus was set up as follows:

A cylindrical jar (fitted with a small opening at the bottom to allow admission of air) filled with sodium-calcium hydrate, connected through a thistle tube with stopcock to a flask, which leads through a bulb condenser to a U-tube partly filled with concentrated sulphuric acid, and connected to another U-tube, containing calcium chloride, the latter tube leading to another U-tube, the first half of tube containing calcium chloride and the other half containing copper sulphate on powdered pumice. These series of U-tubes as described were connected to a Midvale absorption tube containing sodium hydrate asbestos, according to the formula by J. B. Stetser. This Midvale tube is fitted with an entrance and exit tube, the latter leading to a U-tube the first half containing calcium chloride and the other half containing sodium-calcium hydrate and connected to a suction pump.

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