

## WHAT IS THE QUALITY OF THE PANCREATIN ON THE MARKET?\*

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To answer such a query satisfactorily would require a knowledge of the subject not readily obtainable by a single individual, for the quality of pancreatin offered to a large manufacturing establishment where an analytical laboratory is maintained would doubtless differ from that offered to a small consumer who is known to have no facilities for testing the product. A case in point which illustrates the necessity for some kind of a careful supervision of purchases and at the same time emphasizes the ingenuity and lack of principle of a seller of pancreatin, was recently observed by me.

A sample of pancreatin was offered to a manufacturing pharmacist who maintains no analytical department and by him submitted to me for examination. The customary tests were applied of determining its peptonizing power upon milk and its converting power upon starch. The unusual condition was observed of a sample which possessed a high diastatic power in converting starch and a low peptonizing power upon milk. It was further noticed that an unusually large proportion of the material remained undissolved by water and upon a closer examination, both physically and microscopically, revealed the fact that the article in question consisted partly of powdered malt. This, of course, had the effect of raising the starch converting power and as this test is sometimes the only one applied, and as the appearance of the material in the small sample submitted was normal, the producer of this spurious product was simply taking a chance, probably counting upon no thorough examination of the sample being made.

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DETECTION OF CANE SUGAR IN HONEY.†

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By the above query I suppose is meant the detection of *added* cane sugar in honey for it is an established fact that sucrose normally exists in cane honey to the extent of as high as 8 percent, which is the maximum amount permitted by the standards of the U. S. Department of Agriculture.

There are no color reactions or simple chemical tests for the differentiation or distinction of any of the sugars and these are detected only by inferential tests based either upon the reducing power before and after inversion or by the optical activity under similar circumstances. As sucrose is chemically the same whether normally existing in the honey or in the shape of cane or beet sugar and as it is

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the amount rather than the actual presence which decides the genuineness of the article, the only tests of value are the quantitative tests, even were qualitative tests possible, which they are not.

The best method for the determination of cane sugar is by the use of the polariscope and the use of an algebraic formula in connection with the figures obtained for the optical rotation before and after inversion, observations being made at the same temperatures.

By inversion, of course, is meant the hydrolysis of sucrose which, when heated with diluted acids, is converted into dextrose and levulose, the levulose being in excess and the mixture of the two resulting sugars therefore possessing a levorotatory power in contradistinction to the dextrorotatory power of sucrose.

As honey consists largely of invert sugar (from 50 to 80 percent), and as invert sugar is readily prepared from cane sugar in large quantities, it seldom happens that such a clumsy method of adulterating honey as by the addition of cane sugar direct is practiced, when it is possible to convert the same sugar into invert sugar and thus simply add a sugar which is normally present in the honey. Invert sugar, like sucrose, is the same chemically, whether existing naturally or prepared artificially from sucrose, and it would be impossible to detect added invert sugar in honey were it not for the fact that in the process of inversion by any of the artificial methods, a small amount of furfuraldehyde is produced, and as furfuraldehyde is never present in genuine honey and as it can be detected in very minute amounts and with as great certainty as is the case with formaldehyde, it is customary to apply a test for the presence or absence of furfuraldehyde before deciding whether a honey is or is not genuine, even if the proportions and kinds of sugars are normal.

Such a test was years ago devised by C. A. Browne,\* and is as follows:

Test 5 cc. of a 1 : 1 solution of the honey in distilled water, in a test tube with 2 cc. of aniline acetate reagent (freshly prepared for the test by mixing 5 cc. of aniline and 5 cc. of water and adding just sufficient glacial acetic acid to make a clear solution), allowing the reagent to flow into the tube gently so as to form a separate layer upon the honey solution. If the tube be then gently agitated so as to slightly but not entirely mix the two layers a red ring or zone will be produced at the point of contact if furfuraldehyde be present, indicating the presence of added invert sugar.

Unfortunately this test is not infallible for when pure genuine honey is heated (as for instance, in the process of clarification when heat is sometimes used), furfuraldehyde is also formed and the test is of no value therefore unless applied to honey which has been known to never have been heated.

In conclusion I would say that it is not possible to detect cane sugar in honey in the sense of a qualitative test; that, as cane sugar is normally present in small amounts, its quantitative determination, preferably by means of the polariscope, becomes necessary; that the form in which sugar is added usually is that of invert sugar which can be readily detected in honey which has never been subjected to heat.

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\*U. S. Dept. of Agriculture Bureau of Chemistry Bulletin 110, p. 68.