THE APPROXIMATE DETERMINATION OF COMMERCIAL GLUCOSE IN FRUIT PRODUCTS.

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THE quantitative determination of commercial glucose in fruit products is of much importance in ascertaining their values commercially, as well as to the official chemist.

The method[1] adopted by the Association of Official Agricultural Chemists for the determination of commercial glucose requires, in addition to a polariscope, facilities which in a small laboratory quite frequently will be found lacking.

Since the soluble solids of fruits in most cases consist largely of sucrose and invert sugar, the approximate quantitative determination of commercial glucose in fruit products can be effected by calculating from the soluble solids and the invert polarization of a sample at the laboratory temperature.

The soluble solids are determined by calculating from the specific gravity of a solution of the product under examination, ascertaining from a table[2] the percentage by weight of solids corresponding to the specific gravity of the sample.

The normal weight of the sample (26.048 grams for the Schmidt and Haensch polariscope) is then clarified, inverted, cooled to the laboratory temperature, made up to 100 cc. and polarized in a 200 mm. tube.

Let a = Percentage of total solids.

b = Polarization in sugar degrees, taken algebraically.

x = Percentage of glucose.

y = Percentage of sucrose and invert sugar.

Then after inversion, assuming that 1 per cent. of commercial glucose causes a rotation of $+1.75°$ and 1 per cent. of invert sugar a rotation of $-0.34°$, at a temperature of 20°, we have:

$$X+y=a$$

$$\text{and } 1.75\, x - 0.34\, y = b$$

$$\text{Whence, } x = \frac{0.34\, a + b}{2.09}$$

Thus a fruit juice containing 70 per cent. of total solids and polarizing $+18°$ after inversion contains approximately 20 per

[1] U. S. Dept. Agr., Div. Chem. Bull. 65, p. 48.

[2] Loc. cit. Table VI.

cent. of commercial glucose. Another fruit juice containing the same amount of solids and polarizing —5° after inversion contains approximately 9 per cent. of glucose.

At 22° the formula becomes $x = \frac{0.33\ a+b}{2.08}$, and there is a decrease of one in the second decimal of both numbers for each rise of 2° in the temperature.

LOS ANGELES, CAL.

AN IMPROVED CONDENSATION APPARATUS.

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FOR some years the earlier form of distillation apparatus, consisting of a copper tank through which the worm of the still passes, has been undergoing modifications and several very satisfactory types have been described which substitute for the condensation tank suitable piping so fitted that the worms pass through the pipe and are thereby constantly subjected to water under pressure.

We have recently designed and constructed a bank of stills, the arrangement of which is different from anything the writers have seen, and which is illustrated by the accompanying working drawings.

The apparatus consists essentially of three parts. The condensers, the support for the flasks and the battery of burners. For the condensers we use inch pipe for the water jackets, and three-eighths pipe for the connection from one jacket to the next. For the top and bottom of the water jacket, ordinary pipe fittings are used, one inch T's with a $\frac{3}{8}$-inch opening. To form a water-tight joint between the water jacket and the block-tin condensing tube, we use an ordinary packing box which is shown at Fig. III in the drawing. It is a brass cup, which fits into the end of the T, which in turn forms the end of the water jacket. B is the jam nut to press the packing against the block-tin tube shown in broken section. The tops of the cup and jam nut are made hexagonal so that they may be turned with a monkey wrench. By studying the drawing at Fig. II, A, it will be noticed that the water jackets are supported by placing a T in the centre of a water jacket tube. This is accomplished by using two short lengths of inch pipe instead of one long length as in the other water jackets.