THE TUNG OIL industry needs a rapid, yet accurate, procedure whereby tung fruit arriving at the mill and ground tung kernels being processed in the mill can be analyzed for oil content. In our endeavor to develop such a method, we have tried to use inexpensive laboratory equipment and to limit the manipulations as far as possible without sacrificing accuracy. It is our belief that this method, with slight variation in the technique and with suitable density-oil curves, could be utilized on other oil seeds. Therefore, this method will probably be of interest to workers in other fields of vegetable oil technology.

The principles of this method are quite simple, and well known. A weighed portion of ground tung kernels are reground with an accurately measured portion of a high-density solvent of low vapor pressure. The solution of oil in the solvent is filtered off, and its density determined by means of a pycnometer. Reference to a density-per cent tung oil curve or table gives the per cent of tung oil in this solution. The per cent of tung oil in the tung kernels and tung fruit is then calculated from an appropriate equation.

Acetylene tetrabromide, the solvent used in this procedure, was chosen because of its excellent oil-solvent properties, high density, low water solubility, and low volatility at room temperature. The density of the acetylene tetrabromide (s-tetrabromoethane) is adjusted to 2.933 at 25°C, if it is not that already. This is done by adding acetylene tetrachloride, if its density is too high, or an especially pure grade of acetylene tetrabromide if its density is too low. However, a manufacturer of this solvent has offered to supply it at the required density.

The acetylene tetrabromide is added to the ground tung kernels from a five-milliliter pipette. This pipette must be accurately calibrated as to the weight of acetylene tetrabromide that it delivers, and the weight of acetylene tetrabromide that it delivers is determined at room temperature in a two-milliliter Gay-Lussac specific gravity bottle standardized as to volume.

The triturated tung kernel–solvent mixture is poured into a 6-mm. accurate 60°-angle funnel fitted to a one-inch Pyrex test tube having a side arm for suction. A 25-mm. perforated porcelain filtering disc is placed in the funnel and a 27-mm. filter paper is cut and placed on the disc. Suction is applied at the side arm of the test tube, a water pump provided with a suitable trap being a satisfactory source of vacuum. The triturated tung kernel-solvent mixture is poured on the filter paper and the solution is filtered off with suction. The density of the filtered solution is determined at room temperature in a two-milliliter Gay-Lussac specific gravity bottle which has been carefully standardized as to volume.

**METHOD**

*The laboratory sample of 25 or 100 fruits is weighed and carefully separated into hulls, shells and kernels. The separated components are weighed and the percentage of each is calculated. The undried tung kernels are ground twice in a “Russwin” food grinder, type No. 1, using the sixteen-tooth cutter. The ground kernels are thoroughly mixed and a five-gram sample of the ground kernels is accurately weighed on an analytical balance sensitive to at least 1 mg. The weighed sample is transferred to a four-inch mortar; two grams of fine sea sand, reagent grade, is added and the contents are ground with a pestle until intimately mixed. Five milliliters of acetylene tetrabromide is added with a pipette which has been carefully calibrated as to the weight of acetylene tetrabromide that it delivers, and the tung kernels are then triturated vigorously with the acetylene tetrabromide and sand for five minutes. The mixture is then allowed to stand for ten minutes, after which the trituration is repeated. A 65-mm. accurate 60°-angle funnel is fitted by a cork into a one-inch Pyrex test tube having a side arm for suction. A 25-mm. perforated porcelain filtering disc is placed in the funnel and a 27-mm. filter paper is cut and placed on the disc. Suction is applied at the side arm of the test tube, a water pump provided with a suitable trap being a satisfactory source of vacuum. The triturated tung kernel-solvent mixture is poured on the filter paper and the solution is filtered off with suction. The density of the filtered solution is determined at room temperature in a two-milliliter Gay-Lussac specific gravity bottle which has been carefully standardized as to volume.