QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES
DIVISION OF PLANT INDUSTRY BULLETIN No. 609

IODINE VALUE—REFRACTIVE INDEX CORRELATION FOR QUEENSLAND GROWN SOYBEAN SEED

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SUMMARY

Iodine values and corresponding refractive indices were obtained from varieties of *Glycine max* grown in Queensland, and a regression equation was derived for estimating iodine value from the measured refractive index.

I. INTRODUCTION

In previous papers (Price 1967; Haydon 1969) a correlation has been found between iodine value and refractive index for Queensland grown linseed oil and sunflower oil. This correlation has proved to be a rapid and reliable method for determining iodine values.

This investigation was carried out to see whether similar useful information could be obtained for soybean (*Glycine max*) seed oil. Oil samples from seeds grown at Emerald, in Central Queensland, and Walkamin, in northern Queensland, were analysed.

II. MATERIALS AND METHODS

Samples.—The seeds comprised 71 samples from an irrigated time-of-planting trial in the Emerald district and five samples from a variety testing trial at Walkamin Research Station. The 76 samples were analysed for refractive index at 25°C and for iodine value. Seeds were pressed in a hand-operated laboratory hydraulic press at 4,000-5,000 lb/ sq in. and the oil stored in glass tubes until required.

Iodine value.—The iodine value was measured using Wijs' method. Iodine monochloride reagent was prepared according to the method described by Mehlenbacher (1960, p. 319). The glacial acetic acid used was free of reducing substances. Distilled chloroform was used as the solvent for the oil samples.

Sodium thiosulphate solution (0·1N) was prepared and standardized according to the method in the "Official Methods of Analysis of the Association of Official Agricultural Chemists" (Association of Official Agricultural Chemists, 1965, p. 803).

The samples were analysed in duplicate and each result was used in the statistical analysis.

Refractive index.—Refractive indices of the oil samples were determined at 25° ± 0·1°C. The refractometer used was an Abbe type with water-jacketed prisms, and was readable to four decimal places. The samples were read in triplicate, and again each result was used for statistical analysis.

III. RESULTS AND DISCUSSIONS

Statistical analysis, by the method of least squares, of all the values of refractive index and corresponding iodine value established the regression line as:—

Iodine value = 112·476 + 5622·97 (R.I. −1·4700), where R.I. is the refractive index.

This equation is quite satisfactory for the rapid estimation of iodine values ranging from 113 to 140, which correspond to refractive indices ranging from 1·4701 to 1·4749.

Refractive indices measurements have

Standard deviation = $4 \cdot 0404 \times 10^{-4}$

Coefficient of variation = $2 \cdot 7 \times 10^{-2}\%$

Using this equation for prediction, the iodine values would have

Standard deviation = 1·899

Coefficient of variation = 1·472%.

The precision of the regression equation itself can be shown as follows:—

For a refractive index of 1·4730, the corresponding iodine value is 129·3 ± 3·8, ($P = 0 \cdot 95$).

For a refractive index of 1·4722, the corresponding iodine value is 124·7 ± 3·9, ($P = 0 \cdot 95$).

By using this equation, a rapid indication of iodine value can be obtained from the more quickly and easily measured refractive index.

IV. ACKNOWLEDGEMENT

Thanks are due to the Biometry Branch for the statistical analysis.

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(Received for publication November 30, 1971)

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