stabilizing effect on unhydrogenated or hydrogenated cottonseed oils is similar to the previously observed ineffectiveness of adding tocopherols (18) or concentrates of vegetable oil antioxidants (19) to vegetable oils. An investigation of the nature and action of the antioxidants present in sesame oil forms the subject of another communication in this series.

Summary

Data and information have been presented with respect to the extraction, processing characteristics, and the chemical and physical characteristics of oil obtained from white sesame seed.

Extraction of sesame seed with hexane yielded a crude oil low in free fatty acids and in color. The oil was refined with caustic soda under a variety of conditions with low losses and bleached with comparatively small quantities of several bleaching earths each of which produced a light-colored oil.

Data have been presented on progressive changes which occurred in the composition, stability, plasticity, and refractive index of the fat during selective hydrogenation of the refined and bleached oils.

Sesame oil hydrogenated to shortening consistency exhibited extremely high stability when tested by the accelerated active oxygen method. This stability confirms previous suggestions that sesame oil contains one or more antioxidants of greater activity than those present in most of the other vegetable oils of commerce.

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Lespedeza Seed Oil

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Introduction

LESPEDEZA has become one of the major crops of the southern states. Rather large quantities of the seed are harvested annually. The 1948 crop in North Carolina alone is estimated at 36 million pounds (1). Possibly because of its recent growth to such production no data are available in the literature on the isolation or characterization of the oil from this seed. Not only the potential availability, but also the fact that as a member of the *Leguminoseae lespedeza* seed oil might resemble soy bean oil, creates an interest in this oil. The present investigation was therefore undertaken, and we wish to report at this time preliminary data on the isolation and characterization of lespedeza seed oil.

Experimental

Seed Used: The seed used in this study was 1948 crop of the Korean variety obtained from open stock in the Farmers Exchange, Carrboro, N. C. The seed are small, black ovals about $\frac{1}{16}$ inch in length and are covered with a light tan hull.

Extraction: The seed were prepared for extraction by grinding in a ball mill. No attempt was made to separate the hulls prior to extraction. The seed sample, 100 g., were placed in a 1-qt. porcelain ball mill containing 50 steel balls, $\frac{3}{8}$ inch in diameter, and rotated at 100 R.P.M. for four hours. The seed were crushed to a fine powder by this treatment.

Various solvents were used in extraction of the powdered seed to determine which was most effective. The sample to be extracted, 10.0 g., was extracted for three hours in a Soxhlet extractor. The sample was then removed, crushed in a mortar and pestle, and returned for an additional hour of extraction. The solvent and extract were evaporated in a tared evaporating dish on a steam bath to give the weight of extracted oil. Data with the four solvents used are given in Table I. The crude oil is a yellow-

TABLE I

Extraction of Lespedeza Seed With Various Solvents

Solvent	Per cent oil extracted
Diethyl ether	11.7
Petroleum ether, 60-90°	11.7
Hexane	11.5
Tetrachloroethylene	11.1

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green color, has a grassy odor, and deposits a wax-like gel on standing.

Properties of the Oil: Using the crude oil and following standard procedures (2, 3) the data given in Table II were obtained.

TABLE II

Chemical and Physical Properties of Crude Lespedeza Seed Oil

Property	Value
Specific gravity (15.5°C.)	0.924
Refractive index (25°C.)	1.4739
Solidification point (°C.)	—15 to —20°
Iodine number (Wijs)	147.20
Acid number	21.00
Saponification number	148.95
Unsaponifiables (%)	5.60
Drying time (hours)	4.75

The crude oil dried to a tacky film in 36 hours at 32°C. Addition of 0.05% cobalt naphthenate reduces the drying time to 4.75 hours.

Purification of the Crude Oil: A weighed sample of the oil was dissolved in six volumes of 60-90° petroleum ether and refluxed for 15 minutes with 0.4 g. of activated carbon per gram of oil. The solution was filtered through infusorial earth and centrifuged to remove sediment. Evaporation of the solvent gave 95% recovery of a light yellow, non-cloudy oil, n_D^{25} 1.4758.

Discussion

The preliminary data reported here show that lespedeza seed oil is a highly unsaturated oil to be classed with the semi-drying oils. The crude oil has a high acid number, which may be reflected in a lengthened drying time. The low saponification number is also unusual. After correcting for unsaponifiables and free acid, the molecular weight is in the range of the C_{22-24} acid glycerides. The available data should be further established before this unusual conclusion is accepted. The data presented however indicate potential utility of this oil and suggest further studies, which are in progress and will be reported.

Summary

Lespedeza seed oil has been isolated by extraction of the pulverized seed with diethyl ether, petroleum ether, hexane, and tetrachloroethylene in 11.1-11.7% yield. The crude oil has been characterized by a number of standard tests. Its outstanding properties are its iodine number of 147 and its ability to dry.

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ABSTRACTS

Oils and Fats

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M. M. PISKUR

FAT DETERMINATION IN FECES USING MOJONNIER EXTRACTION FLASKS. U. Soderhjelm, Med. Lic., and L. Soderhjelm, Med. Lic. (Galveston, Texas). *J. Lab. & Clin. Med. 34,* 1471-2(1949). The method described offers several advantages. There is little loss of feces in the preparation and transfer of the material. The extraction can be completed in a very short time and emulsification rarely occurs. Duplicate samples agreed within narrow limits, except in two instances where the fat content was less than 1 per cent of the sample.

THE CORROSION OF LEAD BY XYLENE SOLUTIONS OF LAURIC ACID AND *p*-QUINONE. C. F. Prutton and J. H. Day (Cleveland, Ohio). *J. Phys. & Colloid Chem. 53,* 1101-17(1949). Lead is rapidly corroded by oxygen-free xylene solutions of *p*-quinone and lauric acid, neither of which by itself attacks lead appreciably. The reaction rate is increased by the presence of water and is unaffected by the presence of lead laurate.

A MONOLAYER STUDY OF THE ISOMERISM OF UNSATURATED AND OXY FATTY ACIDS. V. L. Schneider, R. T. Holman, and G. O. Burr. *J. Phys. & Colloid Chem. 53,* 1016-29(1949). Force-area curves of monolayers have been studied and compared, using the following substances: stearic, oleic, linoleic, linolenic, arachidonic, elaidic, linolelaidic, elaidolinolenic, α and β-eleostearic, pseudoeleostearic, licanic, ricinoleic, ricinelaidic, 9,10-diketostearic, 9-keto-10-hydroxystearic, 9-hydroxy-10-ketostearic, and 9,10-oxidostearic acids. With increasing numbers of double bonds per molecule, the limiting area increases in the naturally occurring unsaturated acids. Trans isomers have smaller limiting areas than cis isomers in the non-conjugated series. In the conjugated acids, trans isomers form condensed monolayers. Ricinelaidic acid monolayers are condensed, whereas ricinoleic acid monolayers are expanded. Close packing and hydrogen bonding in the trans form probably account for the condensed type of film. Intermolecular hydrogen bonding may operate in diketostearic acid monolayers, reducing the apparent limiting area, whereas in hydroxyketostearic acids the molecules show no sign of intermolecular hydrogen bonding, perhaps because of the possibility of intramolecular bonding. A study of monolayers of oxidostearic acids which were presumably identical indicated that the preparations were quite different. This study indicates the possibility of isomerism in this acid which is not reflected in melting point differences, and demonstrates the usefulness of monolayer study in the study of isomerism and identity.

THE EFFECT OF ADDED WATER AND ANTIOXIDANTS ON THE KEEPING QUALITY OF LARD. H. J. Lips. *Can. J. Res. 27F.,* 373-81(1949). Moisture alone had little detrimental effect on lard storage life (time at 90°F. to attain a peroxide oxygen value of 10 ml. of 0.002 N thiosulphate per gm.) except at the highest levels of incorporation (up to 12.8%), but citric acid, lecithin, and alpha-tocopherol had more stabilizing action in dry lard than in lard containing water. Gum guaiac