THE WHITE LUPINE FLOUR AND OIL

By M. F. Lauro

The lupines are plants of the Leguminosae known for their beautiful foliage and flowers. A great many species are cultivated here in the United States only as garden plants. The white lupine, however, is grown in Europe for the sake of its seeds, which are used as food. The bean contains a bitter principle, a glucoside and alkaloid called lupinin. Among Italians, the bean is soaked in salt water, drained and then boiled with water to make it edible.

Two large samples of imported dried beans were soaked in water to loosen the skin (which was rejected), dried in the oven for many hours and then ground to a very fine powder, passing through a 100 mesh sieve. This flour resembles soya bean flour in appearance and analysis, of a creamy yellow color, "bean" odor and bitter taste, containing lecithin, high protein and no starch. Some of the flour from each lot was extracted with petrolic ether to obtain the oil which is also very much like soya bean oil.

Analysis of the FLOUR—

Moisture	4.25%	4.42%
Oil	13.65%	13.38%
Protein (N × 6.25)	47.81%	48.25%
Ash	2.77%	2.98%
Insoluble Ash	1.48%	1.57%
Crude Fiber	3.72%	4.02%
Carbohydrates (by diff.)	27.80%	26.95%
Starch	0.00%	0.00%
Lipoids (extract)	14.16%	13.84%
Lipoid Phosphoric	0.16%	0.17%

Analysis of the OIL—

Specific Gravity @ 15.5 C	0.9193%	0.9180%
Iodine Value (Wijs)	96.9 %	96.0 %
Saponification Value	190.9 %	186.6 %
Free Fatty Acids (oleic)	3.7 %	2.1 %
Unsaponifiable Matter (FAC)	1.25%	1.32%
Phosphates as P_2O_5	0.17%	0.18%
Acetyl Value	1.75%	2.57%
Titer of the Fatty Acids	31 C	31.2 C

The oil closely resembles soya bean oil in odor, color and behavior. It darkens with heat on account of the high content of extractive matter of the bean. It is a semi-drying oil, much better than its iodine number would indicate, which value varies with the method and degree of extraction.

From the flour, for example, carbon tetrachloride extracts the least oil, with iodine value (Wijs) of 93.3 and 95.6. Chloroform extracts the maximum of oil, containing all of the lecithin, with iodine value (Hanus) of 91.4 and 92.4. On the same lot of flour, using separate samples, carbon tetrachloride dissolved out 10.43% oil, ethyl ether 11.70%, petrolic ether (rather unusual) 12.40% and chloroform 13.20%. The iodine values were determined on aliquot portions of the extracts, avoiding oxidation. With regard to the higher iodine value on the bulk oil by petrolic ether extraction, of the flour, since the method employed was the commercial batch process and not the laboratory Soxhlet extraction, not all the oil possible of solution in petrolic ether was removed by this solvent, consequently a greater proportion of unsaturated components of the oil was present than obtained on the small-scale process. This would account for the higher fatty acidity also.

The whole-bean flour can be used for the manufacture of products similar to those obtainable from the soya bean flour, as casein, lecithin, milk, sauce and cereal food. It will probably be utilized in much the same way as an egg-substitute in alimentary pastes, also for health breads and crackers. The bitter principle is easily removable and has some medicinal properties. Boiling with dilute acids convert this to lupigenin and a dextro-rotatory glucose. Mucic acid and a superior vegetable glue may also be made. There is present also in the bean a remarkably active ferment. In time, therefore, the lupine will attract the usual commercial exploitation.

CORRECTION

Errata

In the paper, *"Interpretation of Cottonseed Oil Mill Products Analysis,"* July, 1934, p. 138, under the heading "Cake and Meal," change the equations,

$$950 \times \frac{44}{43} = 972, \text{ and } 972 - 950 = 22$$

to read

$$950 \times \frac{43}{44} = 928, \text{ and } 950 - 928 = 22$$

Also correct the calculation in the middle column of page 139 as follows: Change the equation,

$$950 \times .0488 = 46.4 \text{ lbs.}$$

to read

$$950 \times \frac{8.37}{7.98} \times .0488 = 48.6 \text{ lbs., cake equivalent of discount}$$

then

$$48.6 - \frac{2}{3}\left(950 \times \frac{7.98}{8.37} - 950\right) = 18.0 \text{ lbs. of cake, loss per ton of seed.}$$

gain due to increased yield, corrected for hull value.

Very truly yours,

EGBERT FREYER.

THE BOWLING TOURNAMENT

Plans for the fifth annual Bowling Tournament of the American Oil Chemists' Society are practically complete. October 11 is the date, and the Medinah Club, Chicago, is the place.

This event, which has been one of the chief entertainment features of the last four Fall conventions, promises to be more interesting and spectacular than ever before. As usual, a large number of useful prizes are being offered. The prize list is topped by the beautiful Amaizo Challenge trophy, high 5 man team prize, which was donated after the 1932 tournament by R. E. Daly of the American Maize Products Company, after the "Amaizo" team had won permanent possession of the previous trophy, the Nuchar cup. At the 1933 tournament, the Lever Bros. team, headed by W. E. Oyler, won the "Amaizo" cup for the year and "Lever Bros." is the first team name engraved on this trophy. Since the cup must be won three times by the team obtaining permanent possession of it, Lever Bros.' team will have to step to take it home with them again this year. They won by the narrow margin of 29 pins last year and it is expected that the race will be even closer this year.

The "Amaizos," who placed second last year, will not let the trophy go back to the boys who work across the road from them without a big struggle. The Swift teams, which never have been quite able to win first place, will be out again with another year's bowling experience behind them and will be

dangerous competitors. The Industrial "Nuchars" will be out to win with a reorganized team. The Armour teams were in a slump last year, but expect to finish with the best this year. The Wilson "Bakerites," tail enders last year, are taking their bowling seriously this year. Captain A. A. Robinson of the "Bakerites" is in training for the meet and expects to make a real showing this year.

Last year we had some difficulty through a shortage of alleys. This year has been rectified by arranging the tournament in two sections—the first from 4:30 p. m. to 6:30 p. m., and the second from 8:00 p. m. to 10:00 p. m. The alleys at the beautiful Medinah Club have been refinished during the summer and are in fine condition for the meet.

A large number of our members and friends come to our Convention as individuals. It is proposed to organize these people into 5 man teams for the tournament. Better still, those coming to the Convention are invited to make up a 5 man team of their friends. There will be a large number of individual prizes as well as team prizes.

This year we are arranging the prize list with special attention to those in the "fair to poor" bowler class and to those who have bowled in previous tournaments without winning a prize.

More important than the prizes in this tournament is the sociability and atmosphere of informality and friendliness which abounds. After a strenuous convention day, bowling affords mental relaxation and also a chance to become acquainted with the real personalities of many members of the Society.

The Committee is anxious to have entries for this tournament as early as possible to facilitate arrangements. Bowlers are requested to send in their name, if bowling as an individual, or the names of the 5 men if a five man team, also the team name and the time at which it is most convenient to bowl. Address all entries to A. E. King, care of Swift & Company Laboratories, Chicago.

For the benefit of those who are not sure of attendance, entries will be accepted right up to 8 p. m. on the evening of the tournament.

No chemist in the Fat and Oil industries can afford to miss the Fall Meeting of the American Oil Chemists' Society at Chicago. Enjoyment of Convention activities to the full must include participation in the fifth annual bowling tournament. This is not a "sharks'" tourney. The poorest bowlers, we have observed, always have the most fun and carry away a large share of the prizes.