very ticklish. This agent is one of the most dangerous treatments from the viewpoint of rancidity.

In certain pastry products a maturing action is necessary in order to obtain good baked products. Chlorine is the agent which accomplishes this. Figure 3 shows the great advantages of this chlorine treatment on cake production.

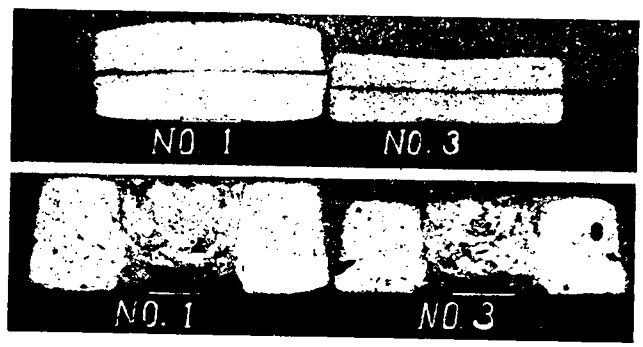

Fig. 3

Treated with Chlorine or Maturing Treatment — Untreated

This treatment is of little advantage if not of disadvantage on the cookie production as measured by the spread. This is shown by Figure 4.

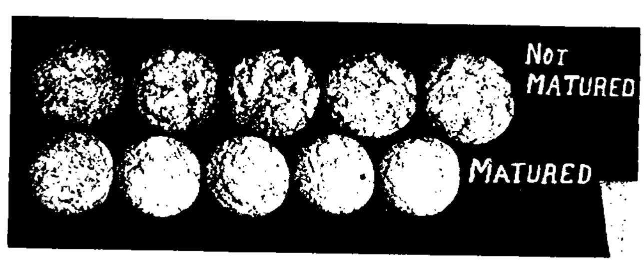

Fig. 4

As in the case of nitrogen trichloride the chlorine is also a powerful bleaching agent, and the balance between maximum maturing action and bleaching effect is more sensitive than in the preceding case because of the decreasing pH due to the chlorine treatment. Chlorine is the most dangerous treatment because of the danger of rancidity accentuated by the change in pH.

Benzoyl peroxide and nitrogen peroxide are the two most commonly used agents for bleaching effect alone. Benzoyl peroxide is by far the most commonly used bleach and is usually used in conjunction with nitrogen trichloride and/or chlorine.

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volume of whole wheat bread is affected most by the use of rancid fat. The volume of white bread is affected but not to the same degree as that of whole wheat bread. Cake volume is also affected but the effect on taste is much greater. There are many antioxidants that can be added to cereal products. Among those that can be considered for human consumption are lecithin and soya products. Table 2 shows this effect.

In the summary we will make the following points:

1. The fat content of the milled product is the most important factor to be considered in the evaluation of the keeping quality of milled products.

2. Bleaching and maturing treatments demand consideration when evaluating keeping quality. These agents in order of their effect on keeping quality are chlorine, nitrogen trichloride, and benzoyl peroxide.

TABLE II
Effect of Some Antioxidants

Mixture	Keeping time
Control	35 days
1% Lecithin	87 days
0.5 Lecithin	90 days
0.125 Lecithin	63 days
20% soy (extracted)	93 days
10% soy (extracted)	77 days
5% soy (extracted)	63 days

3. The metallic ingredients of the flour, such as copper, iron, etc., and of added ingredients, are instrumental in shortening the keeping time.

4. The addition of good hydrogenated shortenings do much to improve the taste and keeping quality of prepared mixes.

5. Certain antioxidants definitely improve the keeping quality.

Sampling Soybeans for Analysis[1]

ORLAND A. KROBER, F. I. COLLINS, and MARIE J. DEMLOW[2]
U. S. Regional Soybean Laboratory
Urbana, Ill.

THE present situation in the soybean industry is similar to that described by Ainslie (1) for cottonseed when that commodity was first bought on the basis of chemical analysis. Much work is being done on the refinement of chemical methods in an effort to obtain reliable and consistent results, when in many cases, accuracy of sampling may be the limiting factor. It was early recognized by Barrow (2) and Munch and Bidwell (6) that accuracy of sampling is largely determined by sample size and uniformity of material sampled, and the more homogeneous the material, the smaller the sample may be.

Accurate sampling is imperative in soybean breeding work if reproducible and reliable chemical data are to be obtained. It is often desirable to composite seed of each strain from several uniform soybean nurseries in an area in order to obtain reliable varietal comparisons with a minimum number of analyses. A similar problem arises in the sampling of carloads of seed which may consist of a number of different lots varying widely in composition. According to Morse and Cartter (5), seed of different varieties may vary as much as 5% in oil content and 9% in protein content.

It seems to be quite generally assumed that any difference in results in the analysis of duplicate samplings is due to variations in the chemical analysis rather than to sampling differences. The purpose of this investigation is to determine the relative importance of sampling differences and how they may be reduced to a reasonable minimum.

In order to check the accuracy of generally accepted sampling methods, a mixture of soybeans was prepared consisting of equal weights of the Mandarin and Lincoln varieties. Aliquots were prepared from the mixture and the percentage of each variety in each aliquot was obtained. The aliquots were then analyzed for nitrogen by A.O.A.C. methods and for oil by A.O.C.S. methods. Variations in analytical results were then checked against variations in varietal composition to determine to what extent differences in chemical analyses were due to actual differences in varietal composition.

Methods and Materials

THE two varieties, Mandarin and Lincoln, were chosen because Mandarin is high in nitrogen and relatively low in oil content, and Lincoln is high in oil and relatively low in nitrogen content. The two varieties were readily separated to determine the varietal composition of an aliquot because Lincoln has a black hilum and Mandarin a colorless hilum. They have approximately the same seed size; Lincoln 14.2 grams and Mandarin 15.3 grams per hundred seed.

A bulk supply of each variety was screened to remove small or broken seed and foreign matter. A 480-gram lot of each variety was sampled from these bulk supplies and mixed thoroughly to make 960 grams of the mixture. This mixture was sampled by means of a Boerner Sampler (3) into 32 aliquots of approximately 30 grams each which were saved for chemical analysis. After each split with the sampler the two varieties were separated, and the percentage composition by weight of each aliquot was obtained. The two varieties were mixed thoroughly before the next sampling division was made. Figure 1 shows that there is a marked increase in range of percentage composition as the weight of the aliquots decrease. This is particularly true for samples smaller than 120 grams. Points on the curve represent the maximum differences obtained during the sampling from the two samples of approximately 480 grams each down

[1] The U. S. Regional Soybean Laboratory is a cooperative organization participated in by the Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, U. S. Department of Agriculture and the Agricultural Experiment Stations of Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Oklahoma, South Carolina, South Dakota, Tennessee, Texas, Virginia, and Wisconsin.

[2] Assistant Chemists and Assistant Scientific Aide, respectively, U. S. Regional Soybean Laboratory, Urbana, Illinois.