A.O.C.S. Official Bleaching Earths

Special Report of the Uniform Methods Committee

R. R. KING, Chairman

OUR Society is currently responsible for the preparation, standardization, distribution, and sale of two types of official standard bleaching earths. These earths are used in all bleaching tests which govern trading in oils under the rules of the National Cotton Products Association, the National Soybean Processors Association, and the New York Produce Exchange. Few persons outside of the members of technical committees have much knowledge of the methods by which these earths are selected, prepared, and certified by the American Oil Chemists' Society. Very little has been published on the selection, testing, and preparation of these highly important materials, which are generally taken for granted in daily grading of oils.

The Official Natural Bleaching Earth

From the historical standpoint, the Official Natural Bleaching Earth (Official Fuller's Earth) is much the older of the two earths. Records show that its distribution under the auspices of the N.C.P.A. was started in 1920, or soon thereafter. The original intention appeared to be that a new lot of earth was to be purchased and standardized each summer for use in the following season. While the provision of official natural bleaching earth has always been heretofore a function of the Chemists Committee of the N.C.P.A., the actual work of mixing and packaging the earth has always been done in the plant of a cooperating company, due to the mechanical requirements of the operation. Writing in 1938 concerning the preparation of a lot of official earth, the late C. B. Cluff stated that the preparation of the earth had been done at the Ivorydale plant of Procter and Gamble "for at least a dozen years" prior to that time. The Society has always reimbursed the company for the direct expenses involved, but direct expenses cannot include certain other costs and the inconvenience involved. Certainly the Society owes the Procter and Gamble organization a debt of gratitude for this help, both past and present, in handling our official earths.

The commercial earth originally chosen for use as a standard was 100 mesh sieved English earth known as XLOOO brand. With the passing of the years the use of this particular earth has come to be considered mandatory in order that successive lots of the standard may be as nearly as possible identical. In the past a member company or the dealer has been asked to set aside and hold the required number of bags of earth. These are sampled, and portions of the composited samples are submitted to the Chemists Committee of the N.C.P.A. for their approval. When approved for use as a standard, the bags are transferred to the company who is to do the mixing. There the bags are dumped and resieved and the earth thoroughly mixed. The mixed earth is then packed in four-pound cans and sealed.

Through the years it had been considered from experience rather than sound scientific data that the English earth was exceptionally stable and that its bleaching properties did not change on storage in sealed cans. For this reason and to obviate the inconvenience of frequent mixing, a lot estimated to be sufficient for two years was packed in 1936. This was exhausted by early summer 1938, at which time it was decided to pack an exceptionally large batch of standard earth. Accordingly, in May of 1938 a batch of between eight and nine tons was prepared and packed. It was fortunate that this was done for with the coming of the war additional supplies might have become difficult to obtain. This supply, packed in 1938, is still being used although the supply has now become low, and a new standard lot is currently being prepared by the Procter and Gamble Company at Ivorydale, Ohio.

In certifying the 1938 earth as "official" for each succeeding year, a sample from the stock on hand is sent to members of the Chemists Committee of the N.C.P.A. during the summer. This committee tests the submitted sample against the current official earth, using the same oils, and if the same degree of bleach is obtained, certifies the supply as "official" for the next year starting August 1. The validity of this standardization procedure has been questioned by some and will be discussed later.

Just when distribution of this earth was transferred from the N.C.P.A. to the A.O.C.S. is not certain, but it was many years ago. The current lot of earth being prepared by the Procter and Gamble Company is the first to be prepared under the auspices of the Uniform Methods Committee, all previous preparations having been directed by the Chemists Committee of the N.C.P.A. These two committees, although representing different organizations, have for many years had overlapping personnel and extremely close cooperation. For this reason, and in this particular service the gradual shifting of responsibility from the N.C.P.A. Chemists Committee to the Uniform Methods of the A.O.C.S. is not traceable through any action of either Society but merely a result of natural events. The A.O.C.S now serves the N.C.P.A. and the cottonseed oil industry in all phases of this project except that the Chemists Committee still approves and certifies the quality of the earth as to its official standing.

The Official Activated Bleaching Earth

The Official Activated Bleaching Earth (Official Activated Clay) is of much more recent origin than the official natural fuller's earth. The single and only lot of this material ever prepared to date was proposed, prepared, and sponsored by the Technical Committee of the N.S.P.A. for use in evaluating soybean oil for trading purposes. With the adoption of the activated clay bleaching test by the A.O.C.S. in 1945 the stocks of this lot of activated clay originally sponsored by the N.S.P.A. were transferred to and have since been distributed by the A.O.C.S.

This lot of activated earth consisted of a specially selected quantity of Special Filtrol which was re-, sieved, mixed, and packaged at the Procter and Gamble Ivorydale plant in 1943, following essentially the same methods as those used for preparing the official

natural bleaching earth. There was at one time considerable doubt as to the stability of this particular lot of earth. This led to an investigation by the Bleaching Committee, which reported in its 1945-46 report that the activated earth had been found to be stable in its bleaching effect, the criterion of stability being the bleaching stability of the official natural bleaching earth. The cause of the apparent change in bleaching effect of the earth was traced to changes in the oils used rather than in the earth. On prolonged ageing it was the bleaching response of the oil that changed, not the bleaching activity of the earth.

Portions of this original lot of official activated bleaching earth are still being used as standard and are available in one-pound cans. A new lot is currently being prepared by the Filtrol Company, to be made available in the same type of 4-pound can used for the official natural bleaching earth. The currently available material in one-pound cans has been recently approved by the Technical Committee of the N.S.P.A. for use for another year.

Primary Standard for Evaluating Bleaching Earths

It is evident from what has been said before that the methods used in the past for standardization and checking of these official earths could not have detected change in the bleaching activity, had any occurred. The standardization procedure used in testing a new lot of official earth has merely served to match its activity when new with that of the old earth from the previous lot, aged for a number of years. The yearly checking of samples for certification has been no more than checking the same earth stored for a year under slightly different conditions. Actually, this has merely been checking the earth "against itself." The value as a standard has been due to (1) the apparent inherent stability of the English earth and (2) the fact that we have all used the same bleaching material at the same time, regardless of whether or not it had retained its original activity.

This applies equally to the activated earth, with the exception that, although it is imminent, preparation of a second lot of the standard has not yet occurred.

There is no cause for alarm because of this situation. Most men connected with this project actually feel that both types of earth have been quite stable, based on their general experiences in the industry over a great number of years. Still, there is no scientific proof that they have been stable because no primary standard of bleaching response has ever been developed or used.

What is needed is a primary standard which can be used to evaluate the bleaching properties of earths by taking the place of oil in the bleaching test. Such a material ideally would be like an oil in physical and color body make-up, be capable of exact reproduction by synthetic means, and be unvarying on ageing. Considerable preliminary thought has been given to the development of such a standard, and some ideas along that line have been expressed. Work along the line of developing such a standard has been proposed to the Bleaching Committee.

Present Policy Regarding Official Earths

Considering the fact that so little has been published concerning the whole matter of the official earths, the Uniform Methods Committee has deemed it advisable to give verbal expression to the present policies of that committee on the preparation and standardization of these materials. In view of the fact that the English earth used through the years for the official natural bleaching earth has appeared to remain stable in its bleaching effect so far as can be determined by present methods; that the Bleaching Committee has found that Special Filtrol earth used for the official activated bleaching earth has remained stable, based on the assumed stability of the official fuller's earth; the Uniform Methods Committee has adopted the following statement of policy on official earths:

1. "Official Natural Bleaching Earth" shall be made from English Earth of the XLOOO brand.

2. "Official Activated Bleaching Earth" shall be made from Special Filtrol brand activated clay.

3. Both types of earth shall be thoroughly mixed, passed through a 100-mesh screen and packed four pounds in a friction top can, or its nearest available equivalent.

4. The earths shall be labelled "A.O.C.S. Official Natural Bleaching Earth," or "A.O.C.S. Activated Bleaching Earth" as the case may be.

5. The label shall also carry the statement that the natural earth has been approved by the Chemists Committee of the N.C.P.A., and that the activated earth has been approved by the Technical Committee of the N.S.P.A.

6. Both types of earths shall carry on the label the yearly expiration date of July 31.

7. Until any further work is reported to the contrary, it will be considered that both earths are stable as regards changes on prolonged ageing and that it is not necessary for new lots to be prepared yearly.

8. Several months before July 31 of each year, samples of the material of each type proposed for use through the coming year shall be submitted to each member of the above mentioned committees concerned for his approval.

The Uniform Methods Committee will arrange for the preparation of additional lots of standard earths as required, in line with the above policy, until such time as better methods are available. It is hoped that a satisfactory primary standard for the precise evaluation of the bleaching earths may be developed in the future.

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