Report of the Referee Board, 1954-1955

IN THE YEAR ending May 31, 1955, 48 laboratories were granted Referee Certificates, of which 30 were issued on Cottonseed, Oil Cake and Meal, and Fatty Oils; 12 were issued Certificates on Cottonseed and Oil Cake and Meal; three were issued Certificates on Oil Cake and Meal and Fatty Oils; two were issued Certificates on Oil Cake and Meal, and one on Fatty Oils only. During the year two of the laboratories having restricted certificates were retired from the field by disposing of their laboratories.

NO UNUSUAL difficulties or situations confronted the Board this year, enabling it to allot some time to constructive planning of changes in the rules of its conduct and proposals for changes in the constitution and by-laws of the Society. The latter information covering a temporary change in the constitution is already in the hands of a special committee of the Governing Board. Consideration of proposals for a change in the rules by which the Referee Examination Board shall operate is being carefully given by its members with the hope that complete agreement may be reached as quickly as is expedient with good judgment.

THE CHAIRMAN extends his thanks and those of the Referee Board to R. W. Bates, who withdrew from the committee when he returned to Armour and Company. His experience as previous chairman of the Referee Board and as present chairman of the Smalley Committee has been a great help. His place on the committee was taken by E. R. Hahn of the Hahn Laboratories, Columbia, S. C. Thanks are also extended to all members of the regular committee and to C. E. Morris, *ex officio* member, for the efficient and cooperative manner in which they responded to all requests.

R. R. KING C. E. MORRIS
R. C. STILLMAN E. R. HAHN
N. W. ZIELS, chairman

Interaction of Gossypol with the Ferrous Ion[1]

HANS B. JONASSEN, Tulane University, New Orleans, Louisiana, and ROBERT J. DEMINT, Southern Regional Research Laboratory,[2] New Orleans, Louisiana

A BASIC CONSIDERATION in the utilization of cottonseed meals has been the inactivation or modification of gossypol so that the meal is rendered nontoxic and has a greater nutritive value when fed to nonruminants as well as to ruminants. Consequently considerable attention has been given to ascertaining information on the chemical properties of gossypol and its reactions (1, 2, 5). Although several investigators have used iron salts to inactivate gossypol and render the meal nontoxic to nonruminants (3, 7, 8, 9), no fundamental investigation of the formation of complexes between gossypol and metallic ions seems to have been undertaken. The objective of the present investigation was to determine the combining ratios for the reaction between gossypol and the ferrous ion as a portion of a program of research on improving the nutritional value and utility of cottonseed meal.

Methods and Discussion

Several independent methods were used to establish the proportion in which gossypol reacts with the ferrous ion. These include conductometric, potentiometric, and spectrophotometric measurements as well as analysis of the isolated reaction product. The dissociation constant was determined from spectrophotometric data. The effect of the anion on the reaction was evaluated by substitution of perchlorate for the chloride ion.

The ferrous ion complex was formed by reacting ferrous chloride with sodium gossypolate. A 0.001 M solution of sodium gossypolate was prepared as follows. A flask was freed of oxygen by flooding with oxygen-free nitrogen prepared by passing tank nitrogen through alkaline pyrogallol. Pure gossypol (0.2 millimole) was introduced into the flask and dissolved by addition of 20 ml. of acetone. While mixing with a magnetic stirrer, 180 ml. of a sodium hydroxide solution, containing 0.4 millimoles, were added. This sodium gossypolate solution was found to be stable for about 5 hrs. in the absence of oxygen. This was established by spectrophotometric measurement of the optical density (1 cm. cell) of a 0.00003 M acetone solution of sodium gossypolate (Table I). Assuming that the absorption at the maximum of 380-382 mμ is a criterion of stability, the solution is stable for sufficient time for the study of the reaction with the ferrous ion.

TABLE I

Stability of Sodium Gossypolate Solution

Hours	Optical density at maximum of 380-382 mμ
0	0.515
1	0.522
2	0.515
5	0.517
7	0.498

During preliminary experiments in which solutions of sodium gossypolate were combined with equal portions of ferrous chloride solution of the same molarity, an immediate color change from yellow to dark amber was noted, indicating that a reaction had occurred.

Measurements of optical density at the 389-391 mμ maximum, similar to those for the sodium gossypolate solution, after addition of ferrous chloride indicated that the ferrous gossypolate formed is stable for at

[1] Findings reported in this paper were included in a thesis submitted to Tulane University by Robert J. Demint in partial fulfillment of the requirements for the M.S. degree.

[2] One of the laboratories of the Southern Utilization Research Branch, Agricultural Research Service, U. S. Department of Agriculture.