

No.	Name of Anaesthetic	Quantity added	Quantity estimated	Variation per cent.
1	Trichlorethylene	1.4 mg./200 c.c.	1.25 mg./200 c.c.	-0.075 mg./100 c.c.
2	Chloroform	1.125 mg./100 c.c.	1.325 mg./100 c.c.	+0.20 mg./100 c.c.

were determined and it was found that in all these cases the results obtained which will be published later are in close agreement with the recent findings of other workers.

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1. Fujiwara, *Sit mysh u. Abhandl., Naturfors.*, 1914, **6**,  
*I. Ges. Rostock. Chem. Abh.*, 1917, **11**, 3201. 2. Cole,  
*J. Phys. Chem.*, 1926, **71**, 173. 3. Daroga & Pollard, *J.*  
*Sci. Chem. Ind.*, 1941, **60**, 218.

### PANICUM MILIACEUM (GUJARATI-CHENA). A NEW RAW MATERIAL FOR STARCH INDUSTRY

THE fall in the imports of starch into India, and the increased demand for sizing agents for the textile industry, have rendered the search for a suitable indigenous source of starch both urgent and necessary. In view of the prevailing food scarcity, cereals like wheat, maize and jawar are no longer available for industrial purposes. Attempts to utilise, for the first time, the corn *Panicum miliaceum*, which is grown in Gujarat as a side crop during both the rainy and hot seasons, have proved eminently successful. The normal yield of this crop is 20 maunds per acre. The stems and roots of this corn are used as manure. The straw provides excellent fodder in considerable quantity when there is scarcity of fodder. The following is the chemical composition of the grain:—

Moisture 7.8 per cent., Ash 4.95 per cent., Fibre 9.75 per cent., Fat 4.0 per cent., Protein 9.06 per cent., Carbohydrates 64.44 per cent.

The usual treatment of corn, i.e., steeping, milling, caustic treatment and tabling, yields 52 per cent. of pure starch. The starch in microscopic appearance resembles maize starch and possesses the following properties, to recommend its use as a sizing agent in the textile industry:—

The gelatinisation temperature is 76° C.

The following table gives a comparative idea of the viscosity in relation to maize and wheat.

Effect of continued heating at 90° C.  
on change in viscosity.  
(In 1/π seconds) (By Stormer Viscometer)

3% Starch paste	10	15	20	25	30	60	120	180	240	360
	Mts.	Mts.	Mts.	Mts.	Mts.	Mts.	Mts.	Mts.	Mts.	Mts.
Maize	57	52	51	51	51	49	45	41	39	37
Wheat	45	46	46	43	43	39	37	36	35	34
<i>Panicum miliaceum</i> (Chena)	37	40	—	41	44	49	54	50	48	40

On large-scale sizing test carried out in textile mill, the results of this starch have been found to be identical to that of the maize starch.

Further, the waste bran obtained after separation of starch from the corn contains 11.4 per cent. protein matter which compares favourably good with other cattle-feeds.

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### N<sup>1</sup>-SULPHANILYL-ISOTHIUREAS

ALTHOUGH the preparation of many N<sup>1</sup>-sulphanilyl-derivatives of urea, thiourea, guanidine, etc., has been described, there appears to be no systematic study of N<sup>1</sup>-sulphanilyl-isothiourea derivatives reported in literature. As these bear structural resemblance to sulphathiazole the following derivatives

- (I) acetylamino-benzenesulphonyl-ethylisothiourea, m.p. 180-1°;
- (II) acetylamino-benzenesulphonyl-propylisothiourea, m.p. 174°;
- (III) acetylamino-benzenesulphonyl-butylisothiourea, m.p. 157°;
- (IV) acetylamino-benzenesulphonyl-allylisothiourea, m.p. 173-74°; and
- (V) acetylamino-benzenesulphonyl-benzylisothiourea, m.p. 171-73°;

have now been prepared from the corresponding alkyl isothiourea hydrochlorides and hydrobromides using standard methods.

The free bases corresponding to compounds (I) to (IV) are obtained by digestion with 8-10 per cent. aqueous hydrochloric acid for 15-20 minutes, and they melt respectively at 155-56°, 133-34°, 116° and 170°. Roblin *et al.*<sup>1</sup> prepared the free base of the compound (I) by hydrolysing it with alcoholic hydrochloric acid for two minutes. It has now been found that the hydrolysis of the compounds (I) to (IV) is not carried to completion by this method. Hydrolysis of the compound (V) by the above methods is attended with disruption of the molecule, yielding only sulphanilic acid and benzylmercaptan. Further work on the condensation of other isothiourea hydrobromides