

A Conductometric Method for Moisture in Bagasse.

WHEN a definite quantity of moist bagasse is digested hot with a common salt solution of known electrical conductivity the distribution of the salt through the water in the bagasse results in a depression in the conductivity of the original solution and this depression will be a measure of the amount of moisture in the bagasse sample. It is essential to make an allowance for the conductance of the 'residual juice' and this should only be of lower magnitude compared to the conductance of the salt solution when accurate quantitative results are desired. The sugar chemist is already familiar with the digestion with plain water for determining the sucrose per cent. bagasse and it is only a small modification to use a salt solution instead and derive both the sucrose and moisture data in one experiment. The great advantage of this method is the elimination of the drying method which requires several weighings and separate samples for moisture and sucrose determinations. By employing the familiar Deerr digestion an unprepared and a large sample can be analysed. The simultaneous determination of both sucrose and moisture on one and the same sample results in a better derivation of the fibre figures especially where fibre per cent. cane is calculated indirectly. These advantages of the conductometric method more than set off the high cost of conductivity equipment the necessity of which is already being felt for making such determinations. One limitation of this method, however, is its applicability only for the final bagasse and when the common method of plain water inhibition is practised at the mills.

Experiments employing approximately normal solution of sodium chloride and about 500 gms. of bagasse in a Deerr digestion have given results which are in agreement within 1½% with those obtained by drying to constant weight. The moisture content of the samples analysed lay between 40% and 50%. Some samples were deliberately dried partially and then analysed. The results were again satisfactory. All these analyses were done on preserved samples and their extracts were of as low a pH as 4.6 but nevertheless the method works and it should succeed under the better conditions prevailing during the routine factory analyses.

The conductance of the residual juice enters into the calculation only as a correction factor provided the brine solution is strong enough (at least unnormal) and an average value for this factor can be experimentally established once for all and applied always it being necessary to redetermine it only very occasionally. A better method is to correlate the conductance or even the brix of the 'last-expressed juice' with the 'residual juice' correction. Such a correlation between the composition of the 'last-expressed juice' and the 'residual juice' is already in practice while calculating the fibre per cent. bagasse.

A detailed paper on this new method of bagasse analysis will appear elsewhere.

G. GUNDU RAO.

Indian Institute of Science,
Bangalore,
August 7, 1934.

The Inactivating Effect of Ultraviolet Light on the Virus of Rabies.

CLIFTON (1931),¹ Perdrau and Todd (1933)² found that methylene blue had the photodynamic property of inactivating certain viruses: *e.g.*, Bacteriophage, Herpes, etc. Shortt and Brooks (1934)³ found that this dye exercised a similar action on the Fixed Virus of Rabies in the presence of Sunlight. Galloway (1934),⁴ almost simultaneously, made a similar observation, but was not able to confirm that of Shortt and Brooks' when using unfiltered suspensions of infective material. Since Shortt and Brooks used sunlight while the other observers used an electric filament or Pointolite lamp, it occurred to us that the success recorded by Shortt and Brooks was, perhaps, due to the action of ultraviolet rays of light. Accordingly, we repeated their experiments using a quartz mercury vapour lamp as the source of ultraviolet rays. We found that by this means we were able to inactivate a 0.5 per cent. centrifuged emulsion of Rabies-infected rabbit's brain (Fixed Virus)

¹ Clifton, C. E., *Proc. Soc. Exp. Biol. N. Y.*, 1931, **28**, 745.

² Perdrau and Todd, *Proc. Roy. Soc.*, 1933, **B 112**, 277 & 288.

³ Shortt and Brooks, *Ind. Jour. Med. Res.*, 1934, **21**, 581.

⁴ Galloway, I. A., *Brit. Jour. Exp. Path.*, 1934, **15**, 2, 97.

in as short a time as 60 seconds exposure to the ultraviolet rays of light. With shorter exposures, 15 and 30 seconds, the Virus appeared to be attenuated but not completely inactivated, since some animals inoculated with the brain emulsion irradiated for the shorter periods developed Rabies while the others did not; in the former the incubation period was somewhat prolonged. It was found, further, that inactivation was as complete in the absence of methylene blue as in its presence (dilution of 1 in 25,000). Irradiation with the quartz mercury vapour lamp had a similar effect on Street Virus Rabies. It then occurred to us that this method of inactivation of the Virus might be used instead of the carbolic acid method for the preparation of Rabies Vaccine; the advantage being that 30 days are required for its preparation by the latter method, while by the former a few days would suffice. The present-day Rabies Vaccine is a 5 per cent. emulsion of infected brains in normal saline solution. Accordingly, we irradiated a 5 per cent. emulsion of the brain of a rabbit that was infected with the Fixed Virus Rabies (Paris) for 15 minutes. The emulsion was inoculated subdurally into rabbits almost immediately afterwards. Two out of the three animals so inoculated subdurally died showing typical signs of Rabies. This we thought was due to the ultraviolet rays not having penetrated deep enough into the infected opaque emulsion. We, therefore, oscillated the shallow dish containing the emulsion while it was being irradiated for 20 minutes; by this means the ultraviolet light was enabled to reach the whole of the emulsion. The emulsion, so oscillated and irradiated, was found to be inactive on subdural inoculation into rabbits. These inoculations were carried out on the 6th of July and at the time of writing, one month later, the inoculated animals are alive and well.

Details of this work together with those of experiments designed to determine the antigenic property of ultraviolet irradiated Rabies Vaccine will be reported in the *Indian Journal of Medical Research* at a later date.

G. SANKARAN.

W. A. BEER.

Pasteur Institute,
Coonoor,
August 10, 1934.

Enteropneusta from Krusadai Island.

THE occurrence of Enteropneusta in the neighbourhood of Krusadai, South India, was first made known by F. H. Gravely and recently the members of the staff of the Zoology Department, Central College, have obtained a very large collection of these interesting forms. S. G. M. Ramanujam has also taken specimens from the same area but it is rather surprising that our collections do not include any of the specimens represented in Dr. Ramanujam's, which does not possess a single form contained in our material. But still both parties were investigating the same area and this rather curious phenomenon of distribution is worth carefully looking into.

I have examined the specimens contained in the two collections. Dr. Ramanujam's specimens are *Ptychodera minuta* and *Glandiceps hacksi* which have been reported from Madras coast by K. Ramunni Menon. The occurrence of these forms near Krusadai must be an interesting fact in their distribution. Among the specimens contained in our collection, there are two distinct species of the genus *Chlamydothorax*. It may be recalled that Spengel mentions in his monograph on Enteropneusta *Ptychodera ceylonica*, two specimens of which were obtained from the west coast of Ceylon. They were comparatively small and on an examination of the external morphology of the branchiogenital and liver regions, but without examining the internal anatomy he concluded that the Ceylon specimens were identical with *Pt. bahamensis*: the latter according to Spengel's suggested scheme of classification would rightly be regarded as *Ch. bahamensis*.

I have carefully examined the internal anatomy of the Krusadai forms and I have no hesitation in saying that there are two different species of *Chlamydothorax* contained in our collection. Spengel's specimens of *Chlamydothorax ceylonica* are not procurable from the University Museum of Giessen, or Berlin and none from Colombo Museum. It is unfortunate that Spengel did not leave on record a description of the internal anatomy of the Ceylonese Enteropneusta; the situation becomes further complicated if we add another Enteropneusta also insufficiently described, viz., *Pt. tricollaris* (Schmarda) from Ceylon.

In examining my material, I have kept these two undescribed or partly described