

polymerisation) in the composition of the fat. The process also inactivates the lipase, so that parboiled rice generally has better keeping quality even when unpolished.

Further work on the nature of the deteriorative changes and the factors contributing to improved keeping quality of shelled, unpolished rice is under study. It has been shown that desiccation combined with airtight packing, can successfully be employed for the preservation of unpolished rice or rice bran provided freedom from insect attack is ensured. Among the different varieties examined, I have observed that certain varieties of coloured rice do not generally deteriorate in the unpolished condition as rapidly as the other varieties do. In this connection, it is interesting to note that carotenoid and other plant pigments have been known to act as powerful anti-oxidants.

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## ACTIVATED CARBON.

### Activated Carbon from Bagasse.

ACTIVATED carbons apart from their use for gas absorption are also extensively used in diverse industries for decolourisation purposes. Although animal charcoal was being mostly used for these purposes only a few years ago, the vegetable activated carbons have now been successfully replacing the same in most cases. In spite of the poor regenerative capacities of most of the vegetable carbons they have been employed either on account of their better efficiency or for sentimental reasons.

Attempts are being made in several places in India to prepare activated carbons from different raw materials of Indian origin so as to supply the increasing needs of this commodity in different industries. Several methods have been tried before in this connection for making carbons from bagasse—a bye-product of the sugar industry—but mostly without any marked success. Utilising the same raw material, a highly activated form of carbon has now been obtained by the authors. This carbon has been found to be superior to all the imported carbons on the market, particularly so far as its use in the sugar and gur industries is concerned.

The carbon is made by treating bagasse with zinc chloride solutions of suitable strength and heating the mixture to suitable temperatures to obtain finally a highly gelatinous dark-looking mass. The mass after being heated nearly to dryness at the lowest possible temperature is put into a suitable ignition furnace and heated to a definite temperature. It must be remarked that the activity of the final carbon depends to a large extent on the carefulness with which the temperature is controlled at the optimum value. When the evolution of steam and other vapours have stopped issuing out completely and after maintaining the temperature of the furnace at the optimum value for about half to one hour, the mass is allowed to cool and, after crushing the same suitably, is treated with hydrochloric acid solutions. The carbon is filtered off from the solution and washed with water till the wash liquid is well free from acid. The carbon mass is dried suitably and is then ready for use.

<sup>1</sup> *Curr. Sci.*, 1938, 6, 446.

<sup>2</sup> Sreenivasan, A., and Das Gupta, H. P., *Ibid.*, 1936, 5, 75.

<sup>3</sup> Douglas, C. E., *Emp. Mark. Bd. Rept.*, 32, 1930.  
Aykroyd, W. R., *Jour. Hyg.*, 1932, 32, 184.

Ghosh, S., and Dutt, A., *Ind. Jour. Med. Res.*, 1933, 20, 863.

Acton, H. W., Ghosh, S., and Dutt, A., *Ibid.*, 1933, 21, 103.

Codd, L. E. W., and Peterkin, E. M., *Brit. Guiana Dept. of Agric. Rice Bull.*, 1933, No. 1.

<sup>4</sup> Ind. Patent No. 22025 dated 2nd July 1936.

<sup>5</sup> Charlton, J., *Agri. Res. Inst., Fusa, Bull.* 1923, No. 146.

<sup>6</sup> Cf. also Rami Reddy, K., and Subrahmanyam, V., *Trans. National Inst. Sci.*, 1937, 1, No. 11.

<sup>7</sup> Sahasrabuddhe, D. L., and Kibe, M. M., *Ind. Jour. Agric.*, 1935, 5, 12.

<sup>8</sup> Giri, K. V., and Sreenivasan, A., *Nature*, 1936, 138, 406; also *Biochem. Zeit.*, 1937, 289, 155.

<sup>9</sup> Browne, C. A., *J.A.C.S.*, 1903, 25, 948.

West, A. P., and Cruz, A. O., *Phil. Jour. Sci.*, 1933, 52, 1.

Almost the whole of the zinc chloride used in the process is recovered and is used over and over again. Attempts are also being made to recover the hydrochloric acid in a suitable form to reduce the cost of manufacture still further.

Although zinc chloride has been used before for making several types of activated carbons in other countries, the processes have been kept absolutely secret and the details of the same are not available to the public. The authors have here worked out a method in detail for making a highly activated carbon from bagasse and utilising zinc chloride so as to be able to meet the demands of Indian consumers.

Further experiments are also in progress regarding the utilisation of many other raw materials as well as activating agents for making activated carbons still better and cheaper utilising the method described in this paper.

Preliminary calculations have shown that this carbon is cheaper than the imported ones.

Further details of the method and of the equipment necessary for a large-scale plant will be published elsewhere. An application for securing the patent rights for the above process and plant has already been submitted.

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#### Activated Carbon from Paddy Husk.

WITHIN the last few years quite a few articles have appeared in Indian Journals, describing methods for the preparation of activated carbon. The need for a cheap production of a highly active carbon for various industrial and agricultural purposes requires no emphasis and accordingly work was undertaken by the authors early during this year. As a result of a series of prolonged trials, the following method was arrived at and found to be the

most satisfactory. Government are being approached for patent rights which it is hoped will be granted early.

Paddy husk is treated with a solution of zinc chloride and allowed to stand overnight when it swells and becomes brown in colour. The mass is then digested under pressure when the husk becomes charred and carbonises. The wet mass is then evaporated almost to dryness and filled into activating tubes and heated. After all the steam and other gases have stopped issuing, the tube is made air-tight and raised to optimum temperature where it is maintained for a few hours. The mass is then allowed to cool out of contact with air, broken, and the zinc chloride extracted from it by boiling with dilute solution of hydrochloric acid and filtering (zinc chloride can be easily recovered from the filtrate). The mass is then washed free from chloride, dried, ground to required fineness and dried again.

The cost of production of this carbon is comparatively low and large-scale production is already under way. From an examination of the carbon by means of standard methods such as the determination of the molasses and permanganate numbers, etc., it appears to belong to the carboraffin group. It may be added that the carbon has been used with much success for large-scale production of cream jaggery.

It is hoped in the very near future to extend the use of this carbon to other industrial purposes such as refining of oils, etc., on which experiments are progressing. It is to be stated that cheap raw materials like casuarina needles, etc., are being exploited for the preparation of active carbon. A detailed account of this investigation will appear in due course.

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