

A Simple and Rapid Method for the Estimation of Chlorine in Process Water

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Chlorine is the most common disinfectant for water supplies meant for drinking and food processing. Sodium hypochlorite, commonly referred to as bleach liquor, is the source of chlorine often used in our seafood processing industry. Water containing different levels (5 to 500 ppm.) of available chlorine is used in the different stages of seafood processing. Chlorine levels below 10 ppm are estimated by the orthotolidine method (Farber, 1960) while higher levels are determined by the iodometric titration (Franson, 1975). Both the methods have certain disadvantages. Orthotolidine method is applicable to estimate available chlorine upto 10 ppm only. Further, it is known to be a carcinogen and hence its use shall be avoided. The titration method is time consuming, costly and can be carried out only by a skilled technician. Moreover, it is inconvenient for field application. Thus, there exists the necessity to develop a simple, quick, reliable and cheap method for the assess-

ment of chlorine levels in process water. This paper reports the development of such a method using filter paper impregnated with a reagent, its standardisation and field application.

MODE OF PREPARATION OF THE TEST PAPER

The principle of quantitative liberation of iodine when chlorine is treated with acidified potassium iodine and its proportionate blue colour formation in presence of soluble starch is made use of in the development of the test paper.

COMPOSITION OF REAGENT SOLUTION

Potassium iodine AR/GR	1 g
Acetic acid glacial AR/GR	10ml
Soluble starch A/GR	5 g
Distilled water sufficient to make up the volume to one litre.	

Soluble starch was dissolved in sufficient quantity of distilled water, boiled and cooled before mixing with the other ingredients.

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Reagent solution, prepared as above, was taken in a tall glass cylinder. Filter Paper (Whatman No. 1) cut and rolled in the proper size was immersed in this solution for nearly 20 Minutes to absorb the solution. Two litres of the Solution was sufficient to treat one square meter of filter paper. The paper was then out of the solution, drained well and dried in an airoven maintained at 45-50°C. The paper was then cut into strips of 10 x 2 cm. size.

Water containing 5, 10, 20, 50, 100, 200 and 500 ppm available chlorine levels was prepared; the chlorine level being measured by the iodometric method. A piece of the test paper was moistened with a drop of water containing 5 ppm available chlorine and a painted equivalent of the colour was made. The correctness of the colour intensity was ascertained by repeated tests. Similarly colour intensities with higher concentrations of chlorine were also painted. These colours were got printed as strips of 10 x 2 cm. The standard colour chart thus prepared was verified for the colour intensities using known concentrations of chlorine in water and test paper.

The test papers were made in the form of books containing 10 strips with a cover of the colour chart. Each book was individually packed in polythene bag.

MODE OF TESTING

Tear out a piece of the test paper from the book and place on it with the help of a glass rod or by any other means a drop of water to be tested. Immediately compare the colour developed with the standard colour chart on the cover of the book and read the chlorine concentration.

REPRODUCIBILITY UNDER FIELD CONDITIONS

Several batches of the test paper were prepared and tested for reproducibility of correct intensities of colour. No batch to batch variation was noted. The chlorine level indicator paper was distributed to different seafood processing establishments to assess its suitability under field conditions. All of them reported that the paper is highly useful.

COST OF PRODUCTION

The cost of chemicals, filter paper and printing charges of a standard colour folder works out to 25 paise per book of 10 leaves at the existing prices. In addition labour charges and cost of electricity for drying are to be included, thus raising the cost of a book to 30 paise. One book is sufficient for a minimum of 30 tests.

ACKNOWLEDGEMENT

The authors are thankful to Dr. C. C. Panduranga Rao, Director and Shri M. Rajendranathan Nair, Joint Director for their cooperation and encouragement. The service rendered by Shri G. Mohanan, Artist during the printing of the standard colour chart is gratefully acknowledged.

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