WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 6.805
Volume 5, Issue 6, 1150-1153. Research Article ISSN 2277– 7105

PRODUCTION OF BIOETHANOL FROM *Ixora COCCINEA*

Rupashree Salvi, Nikita Naik and Arati Potphode*

Department of Microbiology, Gogate Jogalekar College, Ratnagiri ,Maharashtra, India.

Article Received on
26 March 2016,
Revised on 15 April 2016,
Accepted on 04 May 2016
DOI: 10.20959/wjpr20166-6261

***Corresponding Author**
Arati Potphode
Department of Microbiology, Gogate Jogalekar College, Ratnagiri ,Maharashtra, India.

ABSTRACT

There are various substrates for bioethanol production like sugarcane, fruits, wheat etc. Many of them are sources of food. Worldwide demand of bioethanol is increasing. In this investigation attempt was made to produce bioethanol from Ixora coccinea, which is readily available worldwide. It was found to be flowers of Ixora coccinea contain 6.72 mg/ml of fermentable sugar. Estimation of sugar was done by DNSA method. The initial sugar content of Ixora coccinea was 6.72 mg/ml and was decreased after fermentation to 1.2 mg/ml. The total yield of bioethanol was 7.4 mg/ml by dichromate method.

KEYWORDS: Bioethanol, Ixora coccinea, Fermentaion.

1. INTRODUCTION

In recent years, largely in response to uncertain fuel supply and efforts to reduce carbon dioxide emissions, bioethanol (along with biodiesel) has become one of the most promising biofuel today and is considered as the only feasible short to medium alternative to fossil transport fuels.

Substrate

Ixora coccinea is flowering shrub native to Asia. *Ixora coccinea* Linn (Rubiaceae) is known as Jungle of Geranium (or) Flame of the woods or vetchi in Ayurveda. Nector is rich source of fermentable sugar,which can be converted into bioethanol.

Yeast for production of bioethanol

Various types of yeast have been reported for bioethanol production. *Saccharomyces cerevisiae* strains are the main yeast used for ethanol production because of their capability to efficiently convert sugars to ethanol and carbon dioxide. *S. cerevisiae*, as a model of eukaryotic cells, has been extensively studied in fundamental biological science.

2. MATERIAL AND METHODS

Substrate

Ixora coccinea flowers were collected from local sourses (Gardens). Flowers were transported to laboratory immediately after collection. All flowers were washed with distilled water so as to remove dust particles and other impurities.

Inoculum development

S. cerevisiae culture were obtained from culture collection centre of Department of Biological Sciences, R. P. Gogate college of Arts and Commerce and R.V. Jogalekar college of Science, Ratnagiri, Maharashtra, India.

S.cerevisiae culture was first transferred on Sterile Saborauds agar (Dextrose, 20 g/L; Peptone, 10 g/L; Agar agar,15 g/L; pH 5.4) Slant. And then loopful of culture was transfer in Sterile Saborauds broth and were incubated at room temperature (25°C ± 2°C g/L) for 2-3 days. The broth was centrifuged. Supernatant was discarded and the pellet was resuspend in 5ml of saline and used as inoculum. The density was adjusted to 1×106 cells/ml.

Media Preparation

Fresh flowers of *Ixora coccinea* were washed thouhgrly with distilled water. All flowers were crushed with the help of mortal and pastel to make slurry. Slurry were filtered with cloth to remove solid particles. Obtained juice were sterilized at 121°C and 15 psi pressure for 20 min. After cooling (NH4)2SO4 was added to slurry as nitrogen source and pH was adjusted to 5.5.

Fermentation

Fermentation was done by submerged method for 9 days. For fermentation assembly 250ml of prepared media in 500ml of conical flask were used. The density of culture was adjusted to 1×106 cells/ml. 5ml of culture was added to 250ml of broth. During the period of fermentation sugar and ethanol estimation was done regularly for every day.

Distillation

To 30 ml of fermented medium phenol red indicator was added and pH of the sample was adjusted between 7.0-8.0. Then 25% ZnSO4 (i.e.,2ml) was added to 1/15th volume of solution. Then equal amount of 1N NaOH (2ml) was added with proper mixing. Volume was

adjusted to a definite volume (twice) using distilled water, mixture was centrifuge to remove the precipitate and supernatant or filtrate was used for distillation.

Estimation of Sugar

Sugar of *Ixora coccinea* flower was estimated by DNSA (Dinitrosalicylic acid) method .

Estimation of Ethanol

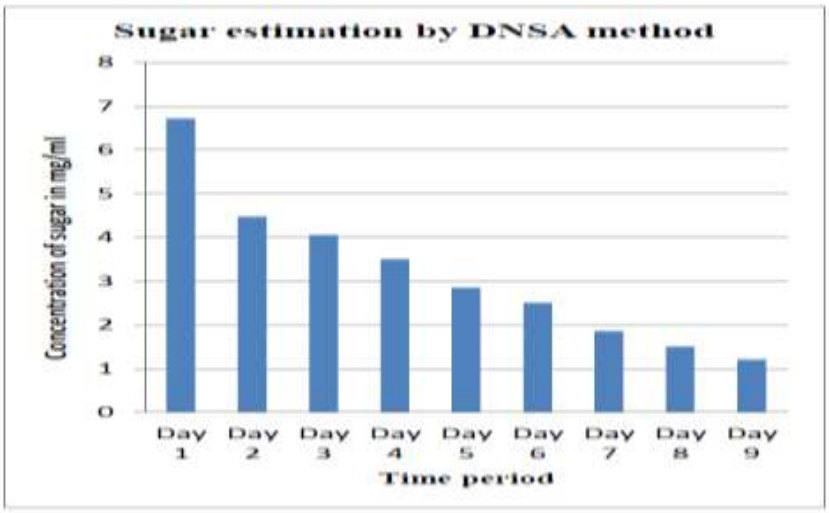
Ethanol was estimated by potassium dichromate oxidation method.

Antimicrobial Activity Testing

Antimicrobial activity of bioethanol was tested by Finger test method.

3. RESULT AND DISCUSSION

In this investigation attempt was made to fermentation of sugars with low cost substrate like Ixora coccinea flowers by *S. cerevisiae.* The sugar content of flowers were estimated by DNSA method. The initial sugar content (before fermentation) was found to be 6.72mg/ml and was decreased to 1.2mg/ml after fermentation. It shows there is gradual decrease in sugar content, that is sugar was utilizd by *S.cerevisiae.* The sugar concentration was found to be 6.72 mg/ml, 4.47 mg/ml, 4.45 mg/ml, 3.5 mg/ml, 2.85 mg/ml, 2.5 mg/ml, 1.85 mg/ml, 1.5 mg/ml, 1.2 mg/ml on 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th days respectively. Graph no. 1 sowing the results of sugar estimation.



Graph no.1 Sugar estimation by DNSA method

The ethanol estimation was done by potassium dichromate oxidation method, and was found to be 7.4 mg/ml. To test the antimicrobial activity of bioethanol Finger test was done. The

results showing good antimicrobial activity against surface flora of body. Fig.1 showing the results of Finger test Method.

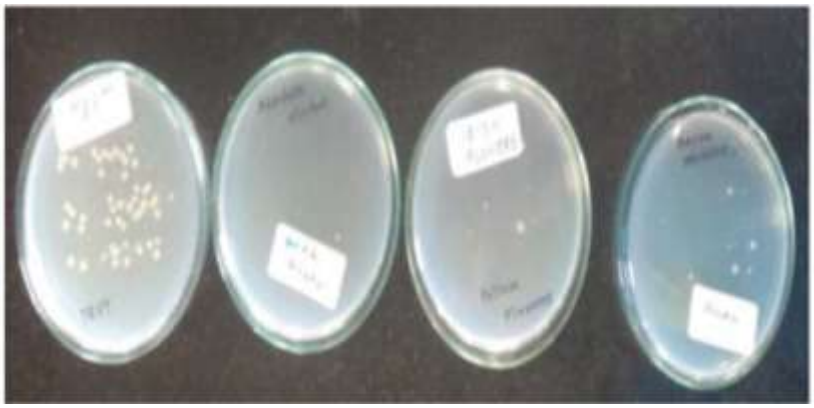


Fig.1 Results of Finger test Method

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