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## Effect of 9-aminoacridine hydrochloride hemihydrate on the aerobic degradation of sucrose to citric acid by *Aspergillus candidus* NCIM-883

Serwer Equbal\*

Department of Chemistry, M.G.College, Magadh University, Gaya, Bihar, India

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**Abstract:** Citric acid is the most important commercial product which is produced by using various sugar substrates in the terrestrial environment. The present study is an attempt to show the effect of 9-aminoacridine hydrochloride hemihydrate on the degradation of sucrose to citric acid by the fungal strain *Aspergillus candidus*. The aerobic degradation of sucrose to citric acid can decrease sucrose yield and affect end product quality. It has been found that mutagen of 9-aminoacridine hydrochloride hemihydrates has stimulatory effect on the novel method of citric acid production by *Aspergillus candidus* NCIM-883 and yield of citric acid to some extent.

**Key words:** 9-aminoacridine hydrochloride hemihydrates, mutagen, aerobic degradation, sucrose, Citric acid, *A.candidus*

### INTRODUCTION

Citric acid has high economic potential because of its numerous applications. It is usually produced by microbial fermentation using *Aspergillus candidus*. There is always a need for the discovery and development of better production techniques and solutions to improve production yields and the efficiency of product recovery due to its higher demand and growing markets.<sup>1</sup> For its enormous scale of production it is necessary and important for the production process to be environmental friendly by utilizing readily available and inexpensive agro-industrial waste products at the same time high production yields also. 9-aminoacridine hydrochloride is a

hydrochloride salt resulting from the reaction of equimolar amounts of 9-aminoacridine and hydrogen chloride.<sup>2,3</sup> It has a role as an anti infective agent, an antiseptic drug and a mutagen. It contains a 9-aminoacridine (1+). This article reviews the biochemistry of citric acid formation, fermentation strategies, the effects of various fermentation conditions.<sup>4</sup>

In general prediction of mutagenic activity cannot be made on the basis of chemical structure along some compounds. The mutagenic chemical's effect the molar concentration and production of citric acid has been enhanced but order of citric acid productivity is reverse in respect to increasing molecular concentration of 9-aminoacridine hydrochloride hemihydrates.<sup>5</sup> However the aerobic degradation of sugar to citric acid by *Aspergillus candidus* NCIM-883 under the influence of each

\*Corresponding author:

Phone : 9631326431

E-mail : equbalserwer@gmail.com

concentration of 9-aminoacridine hydrochloride hemihydrates used has been stimulating and the yield of citric acid has been found greater. The influence of different chemical mutagens in different fermentations process has been investigated by a number of workers. Chemical mutagens are required for genetic manipulation and exploitation especially for citric acid fermentation and in view of this, the influence of 9-aminoacridine hydrochloride hemihydrates on aerobic degradation of sucrose to citric acid by *Aspergillus candidus* NCIM-883 have been studied.<sup>6</sup>

#### **MATERIALS & METHODS**

The influence of 9-aminoacridine hydrochloride hemihydrates on aerobic degradation of sucrose to citric acid by *Aspergillus candidus* NCIM-883. For the degradation of sucrose to citric acid by *Aspergillus candidus* NCIM-883, a composition of the production medium was prepared with following components, Sucrose-1485gm (15%),  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ -34.65 gm (0.35%), pH-2.2,  $\text{NH}_4\text{NO}_3$ -24.75gm (0.25%),  $\text{KH}_2\text{PO}_4$ -24.75g (0.25%). The pH of the production medium was adjusted to 2.2 by adding requisite amount of KCl-HCl buffer solution and pH was determined by a pH meter. A total of 10 such fermented flasks were prepared. After preparing the fermentor flasks, the 9-aminoacridine hydrochloride hemihydrates were prepared from the mutagenic solution and were added to mutagenic chemical. Now the total volume in each fermentor flasks was made up to 100 ml by adding required amount of distilled water. The fermented flasks were sterilized, cooled, inoculated and incubated at 28°C and analyzed after 6, 12 and 18 days for sucrose sugar left unfermented and citric acid formed.

#### **RESULTS & DISCUSSION**

9-aminoacridine hydrochloride hemihydrates have been found stimulatory for the aerobic degradation of sucrose to citric acid by *Aspergillus candidus* NCIM-883. It is found that 9-aminoacridine hydrochloride hemihydrate influences the citric acid fermentation process in different phases. The main characteristics of the 9-aminoacridine hydrochloride hemihydrates are as follows:-

The molar concentration of 9-aminoacridine hydrochloride hemihydrate influences the yield of citric acid in a regular manner enhancing the yield.

#### **CONCLUSION**

From the above findings it is clear that various chemical mutagens and some other mutagenic agents are used to produce mutants. If a microbial population exposed to the effect of mutagens differs in cultural properties then these mutations may be differentiated according to size, shape, structure and colour of the colonies. Mutations of biochemical properties are revealed by means of minimal media containing only salts and carbohydrates. Thus it is concluded that a large number of mutagens have been employed to generate the mutants of different microbes but still there are some chemical mutagens whose influence on citric acid fermentation by species of fungus have not been well studied and established.

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