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Biotechnical Production of Lactic Acid: Effect of Orotic Acid as an Efficient Promoting Agent

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Abstract: *Orotic acid monohydrate was found effective for the biotechnological production of lactic acid by Lactobacillus casei used and it could enhance the Amount/Concentration of lactic acid an extent of 7.158% in the discussed experimental conditions.*
Background*: Organic molecules are the chemicals of life, compounds composed of more than one type of element, that are found in, and produced by living organisms. The feature that distinguishes an organic from inorganic molecule is that organic contain carbon-hydrogen bonds, whereas inorganic molecules do not. The four major classes of organic molecules include carbohydrates, proteins, lipids and nucleic acids. It has been found that a few physiologically and pharmacologically active organic molecules are very dynamic.*
Materials and Methods*: Colorimetric determination of homolactic acid formed and molasses (substrate) left unfermented during the course of present investigation Search for Fermentation biotransformation of molasses pollutant to homolactic acid has also been studied. Biotransformation to homolactic acid has been discussed here. It includes chemical cleaning and steam sterilization of glassware (fermentor flask, petri-dishes, platinum needle, pipettes and micro-pipettes) preparation and sterilization of different media, culture medium, inoculum medium and production medium, seeding of culture tubes, inoculation of inoculum medium and production medium preparation of buffer solution, incubation of culture tubes, inoculum medium, mutation medium.*
Results*: It may be summarized that Orotic acid monohydrate and pentobarbital enhances the biotechnological production of lactic acid by Lactobacillus casei at all concentrations used. Pentobarbital was very effective amongst the active organic molecule used which could increase significantly the Amount/Concentration of lactic acid to a greater extent in comparison to control fermentor flasks.*
Conclusion: *Orotic acid monohydrate was found effective for the biotechnological production of lactic acid by Lactobacillus casei used but it could enhance the Amount/Concentration of lactic acid only to an extent of 7.158% in the same experimental conditions.*
Key Word*: lactic acid, beet molasses, Lactobacillus pentosus, Orotic Acid.*

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I. Introduction

A biologically active compound is defined as one that has a direct Physiological effect on a plant, animal, or another microorganism. Many known compounds with biological activity are found only in trace amounts in soil. Research has shown that there are essential, highly active organic molecules that can even in extremely small quantities, vastly influence the fermentative actions and interactions. Various organic molecules and its differential coefficient are well acknowledged to demonstrate pharmacological property. Information regarding their role in biological arrangement is a good deal bounded and even uncertain. vastly influence the fermentative actions and interactions. Various organic molecules and its differential coefficient are well acknowledged to demonstrate pharmacological property. Information regarding their role in biological arrangement is a good deal bounded and even uncertain.

A group of scientists now studied organic compounds, which has barbiturate nucleus. This is present in its structure. It shows that this is found and hence it is very much effective and usable in case of the various processes, which is used during the fermentation process in details.

Zahid et al. reports that the barbitone is used as a promoter. Further it is used for the enzyme enhancer, which actually helps to stimulate all the biological enzymes used during the fermentation.

Watson tells that glycolates is a good quality stimulant, which is helpful to increase the production of L. gibba. Mishra el al finally got this result that the fumaric acid stimulant for L. delbrueckii. Various action composite of the fumaric acid is actually helpful to support the various experiments. Therefore, all the cases these results ae verified by various other experiments. Once the correct result is obtained all the cases rechecked to achieve the final result. It shows that glycolates is a good quality stimulant.

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Finally, the result is found very interesting. Its further conflict to the observations. It then obvious and hence many employments are produced upon the basis of the various active method and mediums, which is responsible for the organic molecule, which has demands for the different bacteria and the fungi and also the yeasts. This is the case where it is not confirmed the condition which is done to produce the biotechnical applications of 2-hydroxy Propanoic Acid. This is done by the help of Lactobacillus casei, but it is brought out to respective dynamic organic molecule. This is case for various types of the consider is constituted in the references, which reports the advancement of the various dynamic organic Mecoptera by using the production of 2-hydroxy Propanoic Acid biotechnologically by Lactobacillus casei.

II. Material and Methods

Colorimetric determination of homolactic acid formed and molasses (substrate) left unfermented during the course of present investigation Search for Fermentation biotransformation of molasses pollutant to homolactic acid has also been studied. Biotransformation to homolactic acid has been discussed here. It includes chemical cleaning and steam sterilization of glassware (fermentor flask, petri-dishes, platinum needle, pipettes and micro-pipettes) preparation and sterilization of different media, culture medium, inoculum medium and production medium, seeding of culture tubes, inoculation of inoculum medium and production medium preparation of buffer solution, incubation of culture tubes, inoculum medium, mutation medium.

III. Result and Discussion

The influence of Orotic acid monohydrate on biotechnological production of lactic acid by Lactobacillus casei.
The composition of the production medium for the biotechnological production of lactic acid by Lactobacillus casei was prepared as follows:

Molasses	:	22% (w/v)
Malt Extract	:	0.75 %
Yeast Extract	:	0.75 %
Peptone	:	0.75%
$(NH_4)_2HPO_4$	:	0.75%
$CaCO_3$	:	8.5%
pH	:	6.2
Distilled water:	To make up 100 ml.	

The pH of the medium was adjusted to 6.2 by adding requisite amount of phosphate-buffer solution, and the pH was also ascertained by a pH meter. The above composition medium represents volume of a fermentor flask, i. e., l00 ml production medium for lactic acid fermentation. Now, the same production medium

for biotechnological production of lactic acid by Lactobacillus easel NCIM-1987 was prepared for 99 fermentor flasks, i. e., each fermentor flask contained 'I® ml' of production medium.

The above fermentor flasks were then arranged in ten sets, each comprising 9 fermentor flask. Each set was again rearranged in three subsets, each comprising of 3 fermentor flasks. The remaining nine fermentor flasks out of 99 fermentor flasks were kept as control and these were also rearranged in three subsets each consisting of three fermentor flasks.

Now M/l000 solution/suspension of Orotic acid monohydrate was prepared and 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0 and 10.0 ml of this solution was added to the fermentor flasks of 1st to l0th sets respectively. The control fermentor flasks contained no active organic molecule. Now the total volume in each fermentor flask were made up to 100ml by adding requisite amount of distil water. Thus, the concentration of Orotic acid monohydrate in lst, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th and l0th subsets were approximately discussed.

The fermentor flasks were then sterilized, cooled, inoculated, incubated and analysed after 4, 6 md 8 days for lactic acid formed and molasses sugars left unfermented as described in the experimental portion, i. e., chapter II of this thesis. The experimental procedure for the study of influence of other active organic molecules were exactly the same as described above with the only difference that in place of M/l000 solution of orotic acid monohydrate, other active organic molecule under trials were added to the lactic acid fermentation medium respectively.

Result and discussion:

Table 1: Biotechnical production of lactic acid from Lactobacillus casei exposed to orotic acid monohydrate

Concentration of AOM used	Incubation period in hours	Yield of lactic acid in g/100 ml	Molasses Substrate left unfermented	% of lactic acid increased in 3, 5, 7 days
Control	3	5.981	3.456	
	5	7.582	1.564	
	7	6.895	1.316	
1.0×10^{-5} M	3	6.124	3.564	
	5	7.984	1.342	1.615
	7	7.214	1.453	
3.0×10^{-5} M	3	6.258	3.895	
	5	8.457	1.758	3.125
	7	7.458	1.321	
4.0×10^{-5} M**	3	6.786	3.654	
	5	9.508**	1.425	+ 7.158**
	7	8.324	1.189	
5.0×10^{-5} M	3	6.345	3.865	
	5	8.124	1.712	6.458
	7	7.523	1.198	
7.0×10^{-5} M	3	5.987	3.859	
	5	7.954	1.671	2.169
	7	7.129	1.146	

* Each value represents mean of three trials.

** Optimum concentration of Active organic molecule *** Optimum yield of lactic acid
(+) Values indicate % increases in the yield of lactic acid Experimental deviation ± 2.5 - 3.5%

IV. Conclusion

It may be summarized that orotic acid monohydrate and pentobarbital enhances the biotechnological production of lactic acid by Lactobacillus casei at all concentrations used. Pentobarbital was very effective amongst the active organic molecule used which could increase significantly the Amount/Concentration of lactic acid to a greater extent in comparison to control fermentor flasks.

Orotic acid monohydrate was also found effective for the biotechnological production of lactic acid by Lactobacillus casei used but it could enhance the Amount/Concentration of lactic acid only to an extent of 7.158% in the same experimental conditions.

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