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Research Article

OPTIMIZATION THE PRODUCTION OF YEAST BY USING DIFFERENT CARBON AND NITROGEN SOURCES

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ABSTRACT

In this work effect of different combination of carbon source (Lactose, Glucose and Maltose) and nitrogen source(DAHP, Ammonium nitrate and Yeast Extract with peptote) were studied on yeast production. Among different combination Lacstose with DAHP gave best result followed by Glucose with Yeast extract + peptone and Glucose with DAHP.

Keywords: SCP, Lactose, β-galactosidase, DAHP.

INTRODUCTION

A variety of microorganisms and substrate are used to produce single cell proteins(SCP). Yeast is suitable for single cell protein production because of its superior nutritional quality .The supplementation cereals with single cell proteins. it is possible to see that there are many people, even whole populations, who are not able to hydrolise lactose, due to the lack of β - galactosidase in their digestive tract. The problem is mostly related to older people. Almost the same problem is the utilization of lactose from whey (or milk) by grown pigs, while young pigs can consume whey or milk. These problems have brought about many limitations in using whey as food or feed. An alternative of using whey is to hydrolyse its lactose by the enzyme lactase to a glucose and galactose (Bird, 1996; Compagno et al. 1993).In spite of these advantages, most of the whey is discarded as waste in many countries around the world and is the cause of several pollution problems because of its high biological oxygen demand (BOD) which is 35–40·10–9 kg m–3.1 BOD is due mainly to the lactose mass fraction which is usually 4,5–5 %. This lactose content is also present in the whey, it permeates after recovery of whey proteins by ultrafiltrations (Gonzales and Suarez-Doval 1994). Ojokoh and Uzeh (2005) utilized glucose (2% w/v) and (NH4)2HPO4 (0.25% w/v) as a nitrogen source supplement for the production of *Saccharomyces cerevisiae* biomass in papaya extract medium. Yeast has β-galactosidase enzyme which digest the lactose to grow better on medium containing it.

MATERIAL AND METHODS

Yeast strain was Isolated from dairy source(whey) and petri plates were prepared by MEB media and slant PDA media .Slant was transferred to the refrigirator at 4°c and preserved for the future use.. Use different combination of carbon source(2-4%) and nitrogen source(0.5%) in 9 different flask containing 50 ml distilled water given below:

Flask no.	Carbon source (2-4%)	Nitrogen source (0.5%)	Distilled water
1	Glucose	Ammonium Nitrate	50ml
2	Glucose	Di-ammonium hydrogen phosphate	50ml
3	Glucose	Yeast extract +peptone	50ml
4	Lactose	Ammonium Nitrate	50ml
5	Lactose	Di-ammonium hydrogen phosphate	50ml
6	Lactose	Yeast extract +peptone	50ml
7	Maltose	Ammonium Nitrate	50ml
8	Maltose	Di-ammonium hydrogen phosphate	50ml
9	Maltose	Yeast extract +peptone	50ml

Well grown Yeast in different flasks were examined for their optical density at 620nm with spectrophotometer.

RESULT AND DISCUSSION

All 9 flask are subjected to OD measurement after 3 hours of interval. Results here in table 1 shows that flask 5 which has Lactose with DAHP gave highest optical density(1.41) after 69 hour. It was followed by flask 3 (OD-1.33 which contain Glucose with Yeast extract + peptone) and flask 2 (OD-0.91) which contain glucose with DAHP. It was due to that Yeast has β-galactosidase enzyme which digest the lactose to grow better on medium containing it.

Table 1: Optical density of Yeast produced on different combination of carbon and nitrogen source

Time(Hr)	Flask 1	Flask 2	Flask 3	Flask 4	Flask 5	Flask 6	Flask 7	Flask 8	Flask9
0	0	0.21	0.15	0.05	0.16	0.83	0.05	0.15	0.04
3	0.02	0.54	0.58	0.12	0.27	0.8	0.06	0.26	0.45
6	0.03	0.7	0.85	0.3	0.66	1.33	0.11	0.67	0.5
9	0.07	0.86	1.32	0.32	1.04	1.57	0.36	0.81	0.56
24	0.19	0.9	1.32	0.71	1.03	1.6	0.4	0.85	0.6
27	0.2	1	1.3	0.72	1	1.62	0.41	0.85	0.69
30	0.62	1.21	1.69	0.62	1.29	1.63	0.5	0.87	0.98
45	0.7	1.21	1.6	0.63	1.32	1.64	0.9	0.9	0.8
48	0.76	1.3	1.6	0.64	1.3	1.66	1	0.61	0.36
51	0.76	1.3	1.33	0.6	1.38	1.66	0.9	0.67	0.35
66	0.77	1	1.12	0.63	1.4	1.7	0.92	0.7	0.38
69	0.76	0.91	1.33	0.64	1.41	1.7	0.9	0.72	0.39

Fig. Flasks containing Yeast on different combinations of different carbon and nitrogen sources

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