



Effect of Glucose on Biosurfactant Production using Bacterial Isolates from Oil Contaminated Sites

Anjali Sharma

Lecturer, Department of Microbiology,
Shri Shivaji Science College Nagpur, Maharashtra, India

ABSTRACT

The demand for biosurfactants is gradually increasing and are thus substituting their chemically synthesized counterparts [14]. The production of biosurfactants commercially requires high expenses. For the production of biosurfactant proper optimization of the physico-chemical parameters is very important. Hence the research was conducted to study the effect of glucose as a carbon source for production of biosurfactant using bacterial isolates from oil contaminated sites in MSM medium.

KEY WORDS: *Biosurfactants, Bacterial isolates, Glucose medium, Minimal Salt Medium.*

INTRODUCTION

Biosurfactants are amphiphatic compounds that are mostly produced by bacterial species [1,4,17]. Biosurfactants are reported to be toxic in nature [7]. They are biodegradable in nature as compared to other commercially available surfactants [1]. Biosurfactants have varied environmental applications such as hydrocarbon remediation from soil, dispersion of oil spills and enhancement of oil recovery processes [2, 5]. Biosurfactants have potential use in various industry, agriculture, pharmaceuticals, petro chemistry, paper and pulp industry etc. and therefore research in the area of biosurfactants has expanded quite a lot in recent years. The development of this line of research is of great importance, mainly in view of the present concern with protection of the environment. The most

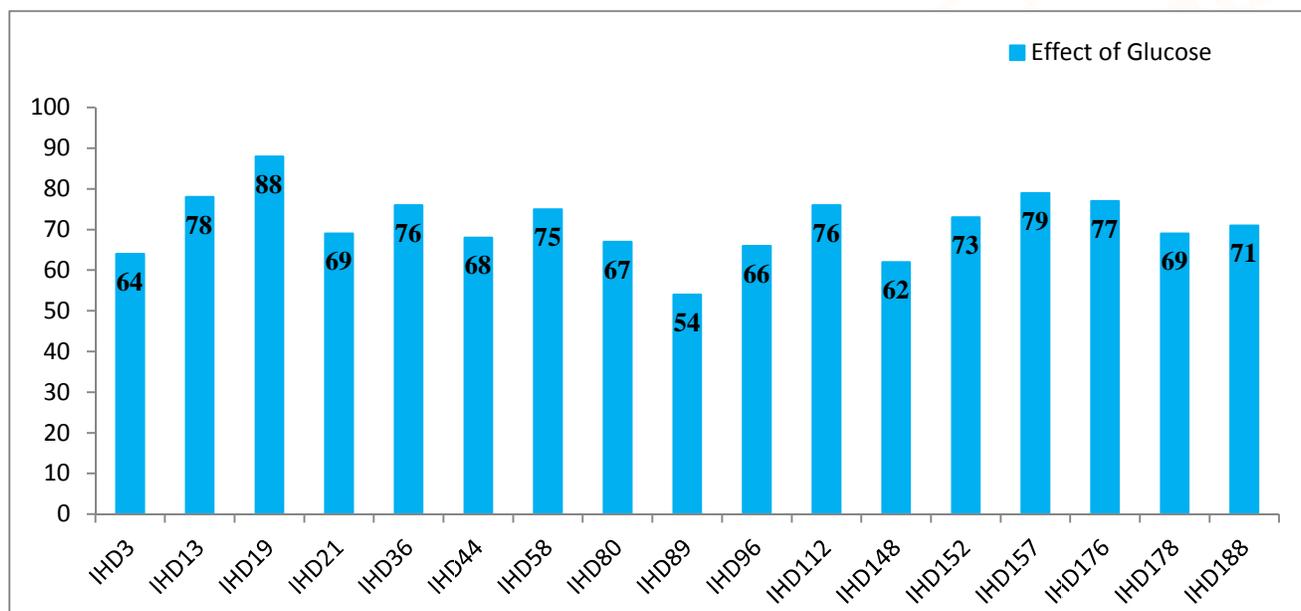
significant advantage of a biosurfactant over chemical surfactants is its ecological acceptance [6,8]. Some of the other advantages of biosurfactants include selectivity, specific activity at extreme temperatures, pH and salinity and the possibility of their production through fermentation [9, 10]. A large variety of biosurfactants have been reported [11]. Production of biosurfactant is influenced by the factors which also enhance the growth of the microbe. One strategy used to stimulate biosurfactant production has been the optimization of ecological, physiological and nutritional conditions [15].

MATERIALS AND METHODS:

In order to study effect of glucose as a carbon source on production of biosurfactant, Minimal Salt Medium was used as the basal medium. The concentration of the glucose was kept at 1% (w/v). 1% inoculum culture of isolated bacterial strains (IHD3, IHD13, IHD19, IHD21, IHD36, IHD44, IHD58, IHD80, IHD89, IHD96, IHD112, IHD 148, IHD152, IHD157, IHD 176, IHD178, and IHD188) were inoculated into 100 ml of Minimal Salt Medium containing glucose as carbon source and were incubated in rotary shaker at 120rpm at 37 °C for 7 days. Growth of cells was monitored by measuring the absorbance (Optical Density), A_{540} . The biosurfactant production was determined by measuring the EI% as described under [2, 12, 13, 16, 18]

RESULTS AND DISCUSSION:**Table.1. Effect of Glucose as Carbon Sources**

pH = 7.00, Temperature: 37 °C. Inoculum = 1 vol%, engine oil = 2 vol%, Incubation time = 7days, shaking speed = 125 r.p.m.																	
Bacterial isolates	IHD 3	IHD 13	IHD 19	IHD 21	IHD 36	IHD 44	IHD 58	IHD 80	IHD 89	IHD 96	IHD 112	IHD 148	IHD 152	IHD 157	IHD 176	IHD 178	IHD 188
EI %	64	78	88	69	76	68	75	67	54	66	76	62	73	79	77	69	71
O.D 600 nm	0.7	1.6	1.82	0.8	1.76	1.28	1.5	1.07	0.62	0.9	0.6	0.4	0.7	0.8	1	0.6	0.9



A number of carbon sources have been used by many researchers for biosurfactant production. The quality and quantity of produced biosurfactant are affected and influenced by the nature of the carbon substrate. Out of the various carbon sources screened for production of biosurfactant in the current study, glucose was found to be the best carbon source for growth and biosurfactant production. The highest Emulsification activity was obtained using glucose at concentration of (1% w/v) as source of carbon along with engine oil, resulted in higher emulsifier activity (EI% = 88 % and EA = 1.82). The results were in disagreement with the founding of A. Khopade et.al.,[11] where they obtained maximum activity (EI%= 80%) when using sucrose as source of carbon along with engine oil by marine isolate *Streptomyces* sp. B3.

Maximum growth of bacterial cell and biosurfactant production by bacterial species isolated from petroleum contaminated soil were observed by using glucose as the source of carbon along with engine oil where the maximum value of emulsification index

was found to be EI%= 88%. which was given by IHD 19, Intermediate range of Emulsification Index were recorded between 79% to 64% given by the bacterial isolates viz., IHD 3, IHD 13, IHD 21, IHD 36, IHD 44, IHD 58, IHD 80, IHD 96, IHD 112, IHD 148, IHD 152, IHD 157, IHD 176. IHD 178 and IHD188. Lowest EI% was recorded to be 54% which was given by IHD 89.

CONCLUSION:

Growth and production medium for biosurfactant production was optimized by using glucose as the carbon source in the Minimal Salt Medium. Maximum production of biosurfactant was observed in MSM medium containing glucose and 2% engine oil.

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