

Increasing of Carotene Production from Local Isolate when Using Additional Supernatant from Bacterial Culture in their Growth Medium

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Abstract

Screening of quorum sensing (QS) quencher takes many attentions because of resistances problems in the using of antibiotics to kill pathogenic bacteria. There are several reports that QS mechanism controls more than one metabolism that not very closes relatively each others. Because of these reasons research in finding of quencher molecule should take into account about side effect of this molecule. *Chromobacterium violacein* Tn5 and lasR-lasI-GFP plasmid recombinant that uses in the QS research seems to be difficult to detect side effect on using QS quencher molecule, because of engineering on their DNA make the reporter gene express higher than the normal gene, this make difficulties to observe other gene which is effect by quencher molecule. In this research we used wild type local isolate of bacteria that produce carotene. We also reported that carotene production in our isolate was driven by quorum sensing. Adding of supernatant from bacterial culture in bacterial growth medium until 25; 50 and 75% gave increasing of carotene production until 64; 50 and 50%. Extracting supernatant from bacterial culture using ethyl acetate and adding to the growth medium until 40; 50 and 60%, gave 31; 40 and 22% increasing of carotene production. In this research we reported that adding of supernatant or ethyl acetate extract supernatant from bacterial culture also decreasing cell mass production. Based on this data we concluded that increasing of carotene production causing by increasing of carotene production per cell not by increasing of number of cells.

Keywords: Quorum sensing, carotene, local isolate.

INTRODUCTION

Quorum sensing is communication mechanism among bacteria to regulate their metabolite through the environmental condition. Quorum sensing also used as defend mechanism against other bacteria or host immunity in the pathogen bacteria.

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Recent researches in pathogen quorum sensing tend to explore novel substances that inhibit this quorum sensing mechanism. Auto inducer molecules in quorum sensing become a target to find quorum quenching substances.

There are two well known reporter that used for quorum sensing research, *GFP/lux* gene that conjugated with lasR and las I and *Chromobacterium violacein* that mutated using transposon. These two reporters are recombinants that allow high expression of protein/substances reporter, while another protein in the host cell expressed in the normal condition.

Violacein molecule as reporter in *Chromobacterium violacein* will be not produce when this bacteria grown in the complex media. This fact shown that this pigment is not important for the bacteria growth or defense. Violacein is important in respiration process, in the regulation of tryptophan synthesis and take a role in the defend mechanism against UV radiation.

These function above will be disturbed when auto inducer (AI) molecule inhibited by quorum quenching molecule that researcher try to find. Based on this fact, it is important to investigate another function in the cell that will be impact when using quorum quenching molecule. High expression of protein molecule in the reporter will inhibit us to observe another protein that may impact, because level of expression of reporter molecule very sensitive with quorum quenching concentration in the media, while level of expression normal molecule will react in the normal condition. Because of this reason we have difficulties to observe of another effect of quenching molecule when using recombinant reporter.

This research had a goal to find natural reporter in the quorum sensing research. Hopefully this natural reporter will be detect the entire gene that impacted by quorum quenching molecule. In the previous research we isolated local bacteria producing carotene. (Emantoko *et al.*, 2005). This local isolate can produce astaxanthin until 8.98 ng/ml in the growth culture. Our studies showed this isolate was