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Title:	Evaluation of the promoters of the mevalonate biosynthetic pathway genes of the red yeast <i>Rhodospiridium toruloides</i>
Authors:	Behera, Subhasis. (/jspui/browse?type=author&value=Behera%2C+Subhasis.)
Keywords:	Mevalonate Biosynthetic <i>Rhodospiridium</i> <i>Toruloides</i>
Issue Date:	28-Jul-2021
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Abstract:	<p>The mevalonate biosynthetic pathway (MVA) or the Isoprenoid pathway is essential in mammals, plants, and yeast to synthesise sterols and isoprenoids. There are also many valuable terpenoids that are produced from these pathways in different plant organisms. <i>Rhodospiridium toruloides</i> is emerging as a potential host organism for heterologously producing these terpenoids and isoprenoids. However, few tools are available to modify this yeast genetically. Also, there is limited knowledge regarding promoters and their regulation in <i>R. toruloides</i> in the MVA pathway. The goal was to evaluate <i>R. toruloides</i> promoters in <i>R. toruloides</i> and <i>S. cerevisiae</i> and to find any possible bifunctional promoter that may work in both yeasts. As part of this project, in silico work was followed by experiments towards this goal. In silico work was carried out to compare the promoters by phylogenetic footprinting to identify conserved motifs. Several promoters of the mevalonate pathway of <i>R. toruloides</i> were cloned, and evaluated in <i>S. cerevisiae</i>, followed by a directed evolution approach to make functional <i>Rt HMG1</i> promoter in <i>S. cerevisiae</i>. We also evaluated selected promoters for their function in the native host, <i>R. toruloides</i>. Promoter deletions were also created of the <i>RtHMG1</i> promoter and preliminary evaluation of a few of them was carried out. The GFP reporter was used to evaluate promoter strength of MVA pathway genes. The modified <i>R. toruloides</i> vector which was also developed in this project, would be helpful as a genetic engineering tool in <i>R. toruloides</i> based research.</p>
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