Synopsis of Original Research Paper

Development of a novel microalgal aqueous astaxanthin binding protein for use in cosmetic products

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Under extreme environmental conditions such as desiccation and high salinity combined with high light irradiation, it is difficult for higher plants to survive because light energy, in combination with oxygen, leads to the generation of reactive oxygen species (ROS) under water stress conditions. However, microalgae are found to thrive under such conditions. A microalga, strain Ki-4 was previously isolated from asphalt in midsummer, and a novel water-soluble astaxanthin binding protein, named AstaP, was identified from this microalga. This protein is heat-stable and possesses singlet oxygen-quenching activity in water. AstaP is thought to enable the microalga to survive under the extreme photooxidative stress conditions. Our aim is to develop AstaP as a novel functional molecule, which can be produced at high yields, to enable lipid-soluble organic astaxanthin to function in water. In this study, we have been working on developing a system to obtain large amounts of the highly purified AstaP by engineering the cultivation systems of strain Ki-4. In addition, we are determining the possibility of using AstaP as a cosmetic product to protect human cells from the toxic effects of sun light and ROS.