ARTIFICIAL PHOTOSYNTHESIS OF CARBOHYDRATES USING MICROFLUIDIC CHIP

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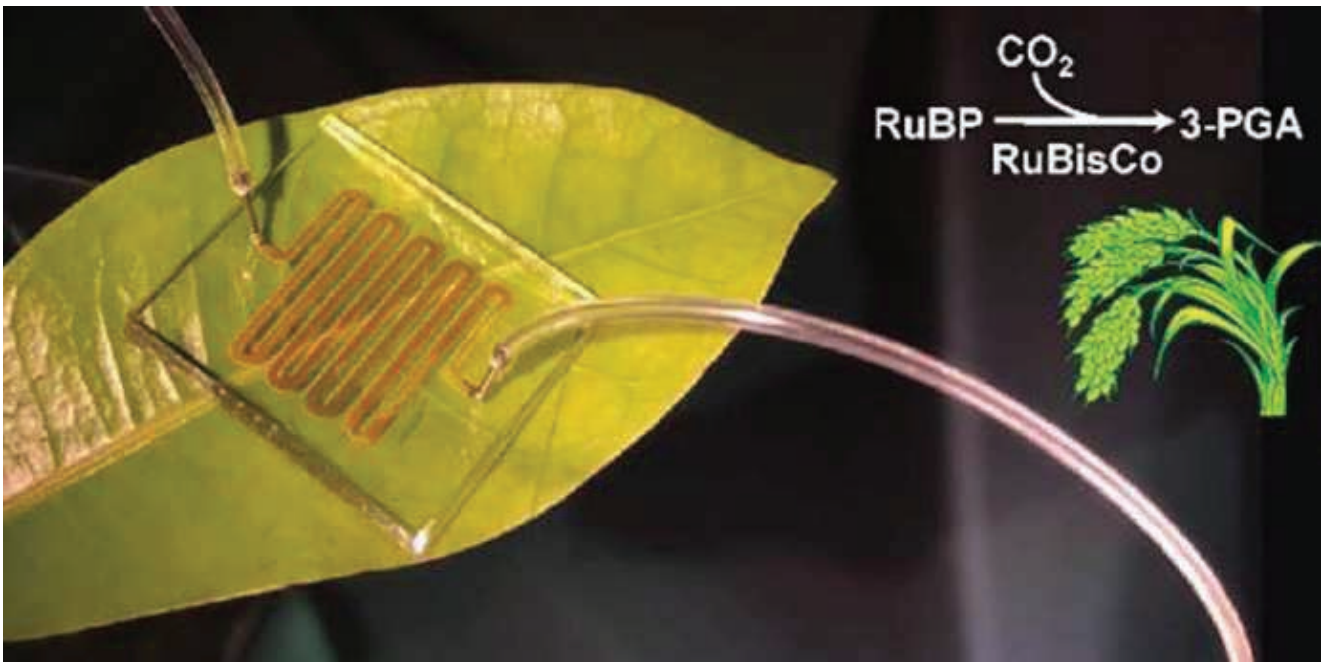
It is well known that food production relies on natural photosynthesis in green plants. However, its energy efficiency is low due to the low activity and poor specificity of the first and most abundant enzyme D-ribulose-1,5-bisphosphate carboxylase/oxygenase (RuBisCO) in green crops. To mimick natural photosynthesis with greater energy efficiency, this novel method is developed to immobilize the RuBiSCO enzyme inside a microfluidic reactor, thereby facilitating the continuous production of the glucose precursor from CO_2 with high efficiency and high stability. This innovation represents a major advancement towards the artificial photosynthesis of basic food materials and paves the way to a scientific solution that beats the food shortage threat and prepares for future space colonization.

NOVEL FEATURES

* Allows continuous production of carbohydrates with high stability and energy efficiency
* Possesses energy efficiency up to ~10% - much higher than that of natural photosynthesis (~1%)



▲ Mimicking photosynthesis, artificial synthesis of carbohydrates are realized from CO_2 using RuBisCO via microfluidic reactors

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