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The current progress of cellulosic ethanol developmentin CPC Corporation, Taiwan

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The development of cellulosic ethanol in Taiwan was inspired by the potential policy of nationwide E3 gasoline by 2018. To lower the consumption of bioethanol made from food crops; the CPC Corporation, the foremost energy enterprise in Taiwan, aims to develop technology that can converse inedible parts of plants into cellulosic ethanol. The most abundant crop waste in Taiwan is rice straw, estimated to be 1.5 million tonnes yearly, and is the first target that we used to produce cellulosic ethanol. Employing our customized fragmenting/grinding machine, we are able to process the raw straw into 200 mesh fine particles at speed of maximum 200kg/hr. A pilot-scale saccharification (150kg straw powder) can be successfully and reproducibly achieved, evidenced by similar glucose/xylose ratio as small-scale results, when using our formulated alkaline hydrolysis (pre-treatment) followed by commercial cellulase digestion. A microorganism capable of fermenting C6 and C5 sugars, a gift from our collaborator, Institute of Nuclear Energy Research, Taiwan, was applied to saccharified biomass and can reach the maximum ethanol yield (84% of theoretical) in 31 hours. According to this test run result, an estimated 140 L absolute alcohol can be produced from one ton of straw powder. Our future direction will be to increase the total sugar concentration by stepwise enzymatic digestion of the pre-treated cellulosic materials and to optimize the fermentation condition. In the long run, we would like to build up different protocols for various biomasses such as napier grass and bamboo and scale up the fermentation volume.

Biography

Jui-Hui Chen has completed her PhD from Purdue University and Postdoctoral studies from Academia Sinica, Taiwan. She is the currently a researcher of CPC Corporation, Taiwan, a premier energy enterprise in Taiwan.

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