

十一、研究計畫中英文摘要：請就本計畫要點作一概述，並依本計畫性質自訂關鍵詞。

(二) 計畫英文摘要。(五百字以內)

Most of energy is supplied from fossil fuel, which includes mainly coal, gas and natural gas, the fossil fuel energy is estimated to be exhausted after 40 years. Therefore, the new alternative energies are strivingly sought by every country in the world among them, biomass energy, especially the bioethanol is the most important one, which is capable of being sustainability used and converted from crops. Sweet sorghum (*Sorghum bicolor*) was found to be one of the useful energy plants for bioethanol production in Taiwan. Six lines of sweet sorghum possessed high sugar content in stem have been selected from project I, last year. Those six lines are continually crossed and purified, hopeful two to three varieties characterized high sugar content and high yield will be bred for mass cultivation. From project II, the results of the ANOVA analyses on SN ratios and means of production rate of H₂ revealed that the temperature and substrate concentration (sorghum stem juice) are key factors. They are favorable with setting 35°C (temperature) and 10000mg COD/L (concentration) for H₂ production. The project is proposed to investigate the production of hydrogen by anaerobic fermentation with sole substrate of sweet sorghum. A related production system will be also established for further determining suitable operative parameters. Project III will concentrated on 1. surveying the proper temperature, pH and aeration for fermentation of sweet sorghum stalk. 2. assessing the effects of nitrogen sources or the production of ethanol and xylitol. 3. studies the suitable of microorganism suspension for fermentation this year. As the studies of pest studies, asia corn borers (*Ostrinia furnacalis* Guénee) and sorghum aphid were found to be the main insect pests of sweet sorghum. *Alternaria* sp., *Colletotrichum graminicola* and *Curvalaria lunata* were identified as the most important disease agents of sweet sorghum, this year is aimed, in cooperated with the improved variety selection of the sweet sorghum, to set up of the control techniques for above pests, which include the screening of pesticides and the selection of resistant varieties, this project also studies on the seed production technique of sweet sorghum for mass cultivation in Taiwan.