3 - 31 Sugar Accumlation in Stem of Sweet Sorghum Mutant Induced by Carbon Ion Irradiation

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Sweet sorghum, the world's fifth most important cereal after rice, corn, wheat and barley, is a very attractive source for biomass production. This raw material complements sugarcane production and is emerging as the ideal feed for animals and for the production of the first-generation of biofuels, such as ethanol and value-added chemicals. At present, most of the studies about sweet sorghum focus on utilization (such as ethanol production), and the study of suger accumulation in stem are rarely.

In this study, early-maturity mutant (KF1210-4), induced by carbon ions irradiation and its wild type (KFJT-CK) were evaluated as materials. The difference of sucrose metabolism was comparatively studied between KF1210-4 and KFJT-CK by using methods of DNS and anthrone colorimetry. The composition and content of soluble sugar (sucrose, glucose and fructose) were determined all over the growing period in two cultivars KFJT-CK and KF1210-4. According to Fig. 1, the change of the sugar contents and compositions in all growth phase of KF1210-4 stem were similar to KFJT-CK. In KF1210-4 (Fig.1(a)), the similar contents of sucrose, fructose and glucose were detected in vegetative stage, however, the content of sucrose (135.45 mg/g FW) increased drastically in grain stage, and which was about 1.23 fold in KFJT-CK (Fig.1(b)) (110 mg/g FW). Fructose and glucose are minor components in sweet sorghum stem, accounting for 15.7% and 12% of total sugars in KF1210-4 mature stage, respectively, while accounting for 17.7% and 13.4% of total sugars in KFJT-CK. These results indicated that the carbon ion irradiation had effectively effects on suger accumulation in sweet sorghum stem.

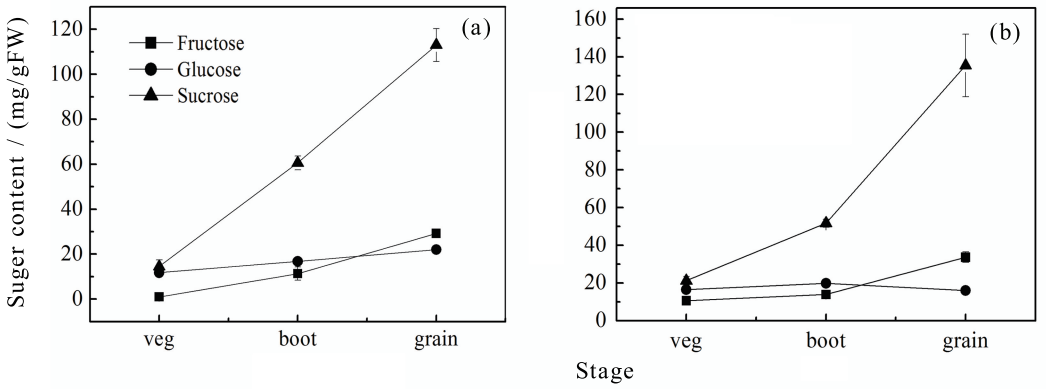

Fig. 1 The suger content of Sweet sorghum; (a) the suger content of KFJT-CK, (b) the suger content of KFJT-1210-4.