Rice s unique energy storage substances

Results suggest that increased energy consumption from storage substances occurred during drought, and increased expression of the enzymes involved in anabolic pathways corresponded with an increase in the content of six amino acids. We used proteomic analysis to determine the response of rice plant seedlings to drought-induced stress. The expression of 71 ...

SIBs have emerged as one of the most promising candidates for next-generation energy storage systems because sodium is abundant in nature. The practical application of SIBs critically depends on developing robust electrode materials with high specific capacity and long cycling life, and developing suitable anode materials is even more challenging.

Grain and legume seeds cannot obtain energy from the outside world during germination, so they must degrade their own storage substances to provide energy for growth. There are a large number of bound enzymes stored in quiescent dry seeds, and these dormant enzymes could be activated under suitable conditions, resulting in enzymatic hydrolysis.

Rice grain starch is an essential component of grain quality and includes four aspects: grain appearance, milling quality, nutritional quality, and cooking and eating quality. These quality attributes are influenced and modulated by several key components during the starch development process. These include enzymes, genes, and environmental factors that ...

ADP-glucose pyrophosphorylase (AGPase) controls a rate-limiting step in the starch biosynthetic pathway in higher plants. Here we isolated a shrunken rice mutant w24.Map-based cloning identified OsAGPL2, a large subunit of the cytosolic AGPase in rice endosperm, as the gene responsible for the w24 mutation. In addition to severe inhibition of starch synthesis ...

Among the storage products in the rice endosperm, starch and seed storage proteins (SSPs) are the major nutritional components, both of which are important for nourishing the embryo during ...

For successful germination, the breakdown of starch in the rice endosperm, mediated by GA signaling, is essential (Kennedy, 1980).This degradation process results in the accumulation of free sugars, including glucose, sucrose, and fructose (Tai et al., 2021) ee sugars have been reported to attenuate ABA signaling during germination (Faix et al., 2012), while a deficiency in ...

Proteins, the second-largest storage substance in rice endosperm, play an important role in determining the cooking and eating qualities of rice. Its contents are influenced by both genetic and environmental factors. This article provides a review of the evaluation methods for cooking and eating qualities of rice and starch physicochemical properties, the factors that affect the ...

Rice s unique energy storage substances

We used proteomic analysis to determine the response of rice plant seedlings to drought-induced stress. The expression of 71 protein spots was significantly altered, and 60 spots were successfully identified. ... These results suggest that increased energy consumption from storage substances occurred during drought. In addition, increased ...

These activated carbons possess remarkable energy storage capabilities in supercapacitors, with reported specific capacitances reaching an impressive value 1400 F/g. Furthermore, we have highlighted the functionalities of supercapacitors and batteries, as well as the distinct roles played by their individual components in energy storage.

Request PDF | On May 1, 2016, Xiao-Jie Tang and others published ADP-glucose pyrophosphorylase large subunit 2 is essential for storage substance accumulation and subunit interactions in rice ...

Background Biological and abiotic stresses such as salt, extreme temperatures, and pests and diseases place major constraints on plant growth and crop yields. Fatty acids (FAs) and FA- derivatives are unique biologically active substance that show a wide range of functions in biological systems. They are not only participated in the regulation of energy storage ...

Starch is the main storage substance in rice caryopsis and its properties will determine the quality of rice. Super rice has been extensively studied due to its high-yield ...

Aluminium has a very high volumetric and gravimetric energy densities (~84 MJ/L; ~31 MJ/kg) and is a promising light metal for the use in energy storage and conversion applications by different means, including its combustion or steam oxidation, use as an anode in the Al-air, Al-ion and other batteries as well as hydrogen generation via its interaction with ...

(DOI: 10.1093/JXB/ERZ168) Starch and storage proteins, the primary storage substances of cereal endosperm, are a major source of food for humans. However, the transcriptional regulatory networks of the synthesis and accumulation of storage substances remain largely unknown. Here, we identified a rice endosperm-specific gene, NF-YC12, that ...

Therefore, there is an urgent need for an up-to-date review on the rational design and fabrication of biomass-based functional carbon materials (BFCs) with multi-dimension structures and their applications in energy conversion and storage, as shown in Fig. 1 rstly, this review details the synthesis methods of BFCs, including carbonization, activation and ...

For carbon materials, the charge storage capacity correlates closely with their pore structure. [21, 22] However, fabricating electrode materials of structures with unimpeded charge transfer and high intrinsic capacitance properties remains a challenge.[6, 23, 24] Novel materials and new ideas may be obtained by designing carbon materials using complex ...

Substances. Plant Proteins. We used proteomic analysis to determine the response of rice plant seedlings to drought-induced stress. The expression of 71 protein spots was significantly ...

The biosynthesis of starch and storage proteins in rice The endosperm is an important energy storage organ of cereals and one of the important food sources for human beings. Starch consists of more than 80% of the mature rice endosperm, and SSPs contain approximately 8%-10% of the dry weight of grains.

Rice (Oryza sativa) is the most staple and cereal component that sustains the two-third of the world population.The chief livelihood of human beings abundantly relies on rice due to their sovereignty nutritive property and energy value (Burlando & Cornara, 2014).Majority of rice grains eroded as cooked rice and a small percentage is used as elements in the ...

Constant variations in the amount of sunlight available on Earth at any given location make energy storage a necessary design feature of terrestrial solar-energy systems. For systems transforming solar to thermal energy, the thermal energy may be stored in matter as either latent heat or sensible heat. ... but in any substance this storage is ...

Background. Rice (Oryza sativa L.) is one of the most important cereal crops in the world, whose production ranks third, second only to maize and wheat.About 50% of global population consume rice as staple food and more than 20 million people take in energy and nutrition from rice and its by-products [].Especially in Asia, including China, rice plays a pivotal ...

Background Starch is the main storage substance in rice caryopsis and its properties will determine the quality of rice. Super rice has been extensively studied due to its high-yield characteristics, but the knowledge of amyloplast development and starch quality in caryopsis of super rice especially with large panicle is limited. Results To address this, large ...

Compared to brown and white rice, black rice contains more nutrients and numerous unique bioactive substances, such as essential amino acids, dietary fiber, g-oryzanols, g-aminobutyric acid, phenolic compounds, and anthocyanins, which makes it highly valuable for development and use. Whole-grain bla ...

Supercapacitors can deliver energy quickly, offering extraordinary potential for efficient electrochemical energy storage (EES) systems. Specifically, carbon-based supercapacitors have reliable operational stability and outstanding cycle lifespans. However, designing low-cost and high-energy-density carbon electrode materials using a simple method ...