



2022年第34期总357期

## 蔬菜育种专题

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2022年8月22日

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## ▶ 前沿资讯

### 1. PNAS | 河北农业大学蔬菜遗传育种团队揭示大白菜叶球发育调控新机制

**简介:** 近日,河北农业大学蔬菜遗传育种团队在PNAS上发表了题为OCTOPUS Regulates BIN2 to Control Leaf Curvature in Chinese Cabbage的研究论文,阐明了BrOPS基因介导油菜素内酯(BR)信号途径调控大白菜叶片抱合方式的分子机理。值得一提的是,该成果是继本团队2022年发表在Molecular Plant上关于大白菜突变体研究的又一重要进展。

**来源:** BioArt植物

**发布日期:**2022-08-16

**全文链接:**

<http://agri.ckcest.cn/file1/M00/03/3B/Csgk0YdUT2eALcYmABqt5wi0jX0265.pdf>

## ▶ 学术文献

### 1. *Alcaligenes faecalis* Juj3 alleviates *Plasmodiophora brassicae* stress to cabbage via promoting growth and inducing resistance(*Alcaligenes faecalis* Juj3通过促进生长和诱导抗性来缓解*Plasmodiophora brassicae*对甘蓝的胁迫)

**简介:** Clubroot is a devastating disease threatening global cruciferous vegetable production caused by *Plasmodiophora brassicae* (Pb). We have evaluated the positive effects of the *Alcaligenes faecalis* Juj3 on cabbage growth promotion and Pb stress alleviation through pot and field experiments. The Juj3 strain was isolated from a healthy cabbage rhizosphere with growth-promoting characteristics and was identified as *A. faecalis* based on morphological traits and phylogeny. Seed germination assays revealed that Juj3 inoculation enhances cabbage bud shoot and root growth. In pot experiments, inoculation with Juj3 fermentation powder at cabbage sowing dates significantly improved the seedling biomass. Combining seed treatments with root irrigation after transplanting considerably reduced the clubroot disease index and resulted in appreciable biocontrol efficacy (83.7%). Gene expression analyses of cabbage after Juj3 inoculation showed that PR2 and EIN3 expression were significantly up-regulated. Physiologically, Juj3 inoculation enhanced cabbage chlorophyll content and root activity in a normal environment. Irrespective of whether plants were under normal environment or Pb stresses, Juj3 improved photosynthesis. Field trial analyses revealed that Juj3 exhibits satisfactory biocontrol efficacy in cabbage (51.4%) and Chinese cabbage (37.7%). Moreover, Juj3 could also enhance cabbage and Chinese cabbage biomass to improve the yield quality. These findings pave the way for future use of *A. faecalis* as biocontrol agents for clubroot and reveal the great potential of the rhizobacterium for plant growth-promoting applications in agriculture and horticulture.

**来源:** Front Sustain Food Syst

**发布日期:**2022-07-15

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## **2. Transcriptome Analysis of Glutathione Response: RNA-Seq Provides Insights into Balance between Antioxidant Response and Glucosinolate Metabolism (谷胱甘肽反应的转录组分析: RNA-Seq 提供抗氧化反应和硫代葡萄糖苷代谢平衡的见解)**

简介: When being stressed, plants require a balance between the resistance pathway and metabolism. Glucosinolates (GS) are secondary metabolics that widely exist in Brassicaceae. Glu-tathione (GSH) not only participates in plant processing reactive oxygen species (ROS) but also directly participates in GS synthesis as a sulfur donor. Therefore, we used transcriptomic to identify antioxidant and GS metabolism responses in GSH-treated pakchoi. Our study elucidated that GSH can be used as priming to improve oxidative resistance and preferentially stimulate the expression of resistance genes such as CAT1. The reduction in transcription factor expression inhibits the key steps of the GS synthesis pathway. When ROS returned to normal level, the resistance gene decreased and returned to normal level, while GSH restored the gene expression of GS biosynthesis. This work puts forward the mechanism of GSH in regulating the antioxidant system and glucosinolate metabolic pathway, which provides a basis for further study on the relationship between environmental signals and plant metabolism and provides ideas for follow-up research.

来源: Antioxidants

发布日期: 2022-07-05

全文链接:

[http://agri.ckcest.cn/file1/M00/10/0D/Csgk0GL9niWATBqfAFV3R68Yp\\_M832.pdf](http://agri.ckcest.cn/file1/M00/10/0D/Csgk0GL9niWATBqfAFV3R68Yp_M832.pdf)

## **3. Effects of Vertical Smashing Rotary Tillage on Root Growth Characteristics and Yield of Broccoli (垂直破碎旋耕对青花菜根系生长特性及产量的影响)**

简介: Most of the soils of the cultivated land in southern China are Ferralsols, which are easily deposited and hardened. To date, rotary tillage (RT) has been the major tillage system used in China. This tillage system results in a shallow soil pan, which reduces broccoli growth and yield. A two-year field experiment was conducted in the Central Zhejiang Basin, China, to compare the effects of vertical smashing rotary tillage (VSRT), RT, and vertical rotary tillage (VRT) on the soil properties, growth characteristics, and yield of broccoli. VSRT reduced the bulk density and penetration resistance of the 0-40 cm soil layer, and increased the soil water content of the 10-40 cm layer. Compared with RT and VRT, VSRT significantly promoted broccoli root length and increased broccoli root dry matter accumulation (DMA). VSRT significantly increased the DMA rate during the growth period, and the size of the broccoli florets was more uniform. In 2020, compared with RT and VRT, VSRT increased yields by 7.8% and 19.5%, respectively; while in 2021, the corresponding increases in yield due to VSRT were 24.8% and 40.5%. Therefore, VSRT, as a deep tillage method, can improve soil characteristics before planting broccoli and ultimately increase

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broccoli yield.

来源: Agriculture

发布日期: 2022-06-27

全文链接:

<http://agri.ckcest.cn/file1/M00/03/3B/Csgk0YdUSbWAY8UuACramDXpgCw967.pdf>

#### **4. Identification and quantification of intact glucosinolates at different vegetative growth periods in Chinese cabbage cultivars by UHPLC-Q-TOF-MS (UHPLC-Q-TOF-MS对白菜不同营养生长期完整硫代葡萄糖苷的鉴定和定量分析)**

简介: The aims of this study were to investigate glucosinolate variations in Chinese cabbage cultivars at different growth periods. Glucosinolates in two types of Chinese cabbage (Xiayangbai and Zaoshu-5) at different growth periods (seeds, germination, seedling, and rosette period) were investigated. Thirteen glucosinolates were identified and quantified using UHPLC-Q-TOF-MS. Concentrations of the glucosinolates were significantly different between Xiayangbai and Zaoshu-5. The seed period generated the highest concentration of glucose-nolates, and aliphatic glucosinolate predominated in seeds, seedling, and leaves of the rosette as well as during germination. However, the dominant glucosinolate in the roots was an aromatic glucosinolate (gluconasturtiin). In addition, glucoerucin was only found in the roots of rosettes. There were positive significant correlations with each other among gluconapin, glucobrassicinapin, glucoraphanin, glucoalyssin, and 4-hydroxyglucobrassicin. Our results released the metabolism pathways of glucosinolates in Chinese cabbage, which provided scientific evidence to develop functional foods with higher glucosinolate.

来源: Food Chemistry

发布日期: 2022-06-08

全文链接:

<http://agri.ckcest.cn/file1/M00/03/3B/Csgk0YdUTliAKfG1AB9acPoybLk546.pdf>