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论文

野生花生脂肪酸组成的遗传变异及远缘杂交创造高油酸低棕榈酸花生新种质

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摘要：

以花生属19个近缘野生物种87份种质和113份栽野远缘杂交后代为材料, 系统分析野生花生脂肪酸组成的遗传变异及其在栽培种花生脂肪酸改良中的潜力。结果表明, 野生花生的棕榈酸含量与栽培种花生相似, 硬脂酸和油酸含量略低于栽培种花生, 亚油酸含量略高于栽培种。不同物种间以及同一物种内不同资源间的脂肪酸组成存在较大差异。*A. rigonii*棕榈酸含量较低, *A. pusilla*和*A. duranensis*油酸含量较高, *A. batizocoi*亚油酸含量较高, *A. rigonii*和*A. duranensis*油酸和亚油酸含量变幅较大。发掘出油酸含量达60%以上的野生资源2份(19-6, *A. duranensis*和23-1, *A.* sp.), 亚油酸含量达40%以上的资源7份, 其中*A. rigonii*(编号为11-4)亚油酸含量高达48%, 是目前所发现的花生资源中亚油酸含量最高的种质。远缘杂交后代脂肪酸的变异远远超过亲本间的差异, 而且不同组合间的棕榈酸、硬脂酸、油酸和亚油酸含量差异达显著或极显著水平。通过远缘杂交获得了6份油酸含量达64.0%以上且棕榈酸含量在8.5%以下的新种质, 其中yz8913-8油酸含量达67.85%, 比其栽培种亲本提高近30个百分点, 且棕榈酸含量仅7.60%。SRAP检测表明, 这6份远缘杂交后代除整合了亲本的DNA片段外, 还产生了新的DNA片段, 有的还丢掉了亲本的某些片段。农艺性状分析表明, 其中4份种质的综合农艺性状较好, 具有重要育种利用价值。

关键词： 野生花生 脂肪酸 遗传变异 远缘杂交 种质创新

Genetic Variation of Fatty Acid Components in *Arachis* Species and development of Interspecific Hybrids with High Oleic and Low Palmitic Acids

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Abstract:

Wild *Arachis* species are important resource for genetic improvement of the cultivated peanut (*Arachis hypogaea* L.). Fatty acid composition is highly crucial for peanut quality in terms of nutritional value and shelf life duration, thus increasing oleate and decreasing the saturated fatty acids such as palmitic and stearic acids has been important breeding objectives worldwide. In the present study, fatty acids of 87 wild *Arachis* accessions and 113 interspecific hybrid derivatives were tested. Considerable variation in fatty acid components was observed among the *Arachis* species involved. Among the saturated fatty acids, lowest content of palmitic acid was identified in *A. rigonii.* Among the unsaturated fatty acids, the highest oleic acid contents were found in *A. pusilla* and *A. duranensis* and the highest linoleic acid was in *A. batizocoi*. Two genotypes (*A. duranensis* with documented number as 19-6 and *A.* sp. with documented number as 23-1) with oleic acid content more than 60.0% were identified. Compared to the cultivated peanut, stearic and oleic acid contents were slightly lower and linoleic acid content was slightly higher in the wild species while palmitic acid content was similar to that in *A. hypogaea*. The interspecific hybrid derivatives had wider ranges of most fatty acids than their parents. The variation of contents of palmitic, stearic, oleic and linoleic acids among the hybrid derivatives was statistically significant. Six derivatives with oleic acid content over 64.0% and palmitic acid content less than 8.5% were identified, among which yz8913-8 had a high oleic acid content as 67.85% (30.0% higher than its parents) and a low palmitic acid as 7.60%. Based on sequence-related amplified polymorphism (SRAP) analysis, new bands were observed in all these 6 derivatives.

Keywords: *Arachis* species Fatty acids Genetic diversity Wide crosses Genetic enhancement

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