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Transcriptome analysis of *Lesquerella*: A potential industrial oilseed crop for hydroxy fatty acid production

Seed oil of *Lesquerella* (*Physaria fendelri*) contains 55-60% hydroxy fatty acid (HFA) that has important industrial application. A high-throughput, large-scale sequencing of transcripts from developing *Lesquerella* seeds was carried out by 454 pyrosequencing to generate a database for quality improvement of seed oil and other agronomic traits. Deep mining and characterization of acyl-lipid genes were conducted to uncover candidate genes for further studies of mechanisms underlying HFA and seed oil synthesis. A total of 651 megabases of raw sequences from an mRNA sample of developing seeds was acquired. Bioinformatic analysis of these sequences revealed 59,914 transcripts representing 26,995 unique genes that include nearly all known seed expressed genes. Based on sequence similarity with known plant proteins, about 74% (19,861) genes matched with annotated coding genes. Among them, 95% (18,868) showed highest sequence homology with *Arabidopsis* genes which will allow translation of genomics and genetics findings from *Arabidopsis* to *Lesquerella*. Using *Arabidopsis* acyl-lipid genes as queries, we searched the transcriptome assembly and identified 615 *Lesquerella* genes involved in all known pathways of acyl-lipid metabolism. Further deep mining the transcriptome assembly led to identification of almost all *Lesquerella* genes involved in fatty acid and triacylglycerol synthesis. Moreover, we characterized the spatial and temporal expression profiles of 15 key genes using the quantitative PCR assay. The information obtained from data mining and gene expression profiling will provide a resource not only for the study of HFA metabolism but also for the biotechnological improvement of HFA production in *Lesquerella*.

Biography

Grace Chen has obtained her PhD from University of Wisconsin at Madison and completed her Post-doctoral studies from University of California-Plant Gene Expression Center. She has published more than 35 papers in reputed journals and is globally recognized as an expert in Oilseed Biotechnology.

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