

Search for polymorphisms responsible for shifting fatty acid biosynthesis in sea buckthorn fruits

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Sea buckthorn (*Hippophae rhamnoides* L.) has valuable nutritional and medicinal properties. Biologically active oils of sea buckthorn are contained in the seed and pulp of the fruit. The high content of palmitic acid (C 16:0) in the pulp (about 36%) limits the development of sea buckthorn production, but this characteristic can be improved. Thus, by chemical mutagenesis of seeds of variety Panteleevskaya, varieties Elizaveta (treatment with diethyl sulfate) and Inya (treatment with nitrosodimethylurea) were obtained. These varieties have a reduced content of palmitic (23% and 19%, respectively) and increased content of valuable palmitoleic (C 16:1, 56% and 62%, respectively) fatty acids (FA) in the pulp. At present, the genetic basis of the shift in oil FA composition in Elizaveta and Inya is unknown. To investigate this question, we sequenced the genomes of Panteleevskaya, Elizaveta, and Inya using the Illumina platform and obtained 93, 86, and 81 million reads of 150 + 150 bp, respectively, which corresponds to approximately 30-fold genome coverage. The resulting reads were trimmed for quality and filtered for length (trimmomatic) and mapped to the sea buckthorn reference genome (<http://hipp.shengxin.ren/>) using the BWA. The percentage of the reference genome coverage was 94% for each variety. The search for polymorphisms with BCFtools revealed that Elizaveta had 21872 SNPs and 6295 InDels and Inya had 196064 SNPs and 5605 InDels compared to the parental variety Panteleevskaya. Further analysis will be focused on identifying mutations in genes involved in FA synthesis. Our data are necessary for the understanding of the mechanisms of palmitoleic acid synthesis, as well as for the development of marker-assisted selection of sea buckthorn to create varieties with high content of palmitoleic and low content of palmitic FA in fruit pulp. This work was financially supported by the Russian Science Foundation, grant 23-46-00026.