DNA barcoding after cloning identifies taxonomically diverse botanical adulterants in the market samples of saffron

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Abstract

Saffron (Crocus sativus L.), commonly used all over the world for culinary purposes is said to have a lot of medicinal properties like antioxidant, anticancer, antidepressant, memory enhancing activities etc. Saffron is also consumed by pregnant women in many places. It is the world's most expensive spice. Its high cost is due to the low production and the high intense labor required for its harvest. As a result, saffron is highly prone for adulteration. In our initial screening of commercial saffron samples by DNA barcoding, 6 samples were found to be adulterated by mixing the plant parts from more than one species. In order to identify the constituent adulterant plant species, we have employed DNA barcoding after cloning (DBAC) method using *rbcL* DNA barcode and TA cloning. The results showed the presence of atleast three to seven taxonomically diverse plant species in each adulerated sample. Twenty six adulterant species belonging to 20 genera and 10 family were identified. Some of the adulterant species were reported to be toxic if consumed. Therefore, it is essential for identifying the botanical adulterants in saffron to prevent fraudulent business practices and to enhance the safety of the consumers.