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Utilization of Chinese woad to develop the antiviral rapeseed

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Chinese woad (Isatis indigotica Fort., 2n = 14, II) which belongs to the Isatideae tribe of the Brassicaceae family has been widely cultivated as a medicinal and dye plant from ancient times. Its dried root (Radix Isatidis) and dried leaf (Folium Isatidis) are common medicine for the indications of eruptive epidemic diseases caused by the bacteria and viruses. During the last decade, the intertribal somatic hybrid (2n = 52, AACCII) between rapeseed (Brassica napus L., 2n = 38, AACC) and Chinese woad was produced and backcrossed recurrently to parental rapeseed, leading to the establishment of a complete set of alien addition lines with each woad chromosome in the rapeseed background for the dissection of woad genome. Specifically, the extracts from the aerial part of three additions showed strong activity against influenza viruses (H1N1 and H5N6). Transcriptome sequencing revealed that several genes of I. indigotica had higher expression levels in addition lines, involved in biosynthesis of secondary metabolites such as indole alkaloids, flavonoids, etc. Addition lines serve as the new plant types to provided novel vegetable for human and fodder or feed additives for livestock, and the bridge to introduce genes of interest from wild relatives into cultivated crops.