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Stable isotope ratio analysis of different European raspberries, blackberries, blueberries, currants and strawberries

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2 **blackberries, blueberries, currants and strawberries**

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12 **Keywords:** IRMS, SNIF-NMR, C, N, H, O stable isotope ratios, soft fruits, protected cultivation  
13 effect

14

15 Abstract

16 To date the stable isotope ratios of berries have never been extensively explored. In this work the  
17 H, C, N and O isotopic ratios of 190 samples of different soft fruits (strawberries, raspberries,  
18 blueberries, blackberries and currants) produced in a northern Italian region and at two sites in  
19 Romania and Poland collected over three harvest years are presented and discussed.

20 The different soft fruits showed a typical range for one or more isotopic parameters that can be used  
21 to verify the authenticity of the fruit composition declared on the label. The  $\delta^{13}\text{C}$  and  $\delta^{15}\text{N}$  of pulp  
22 and the  $\delta^{18}\text{O}$  of juice can be considered effective tools for identifying the different geographical  
23 origin of fruit. A significant effect of crop cover on juice  $\delta^{18}\text{O}$  and fertilisation practices on pulp  
24  $\delta^{15}\text{N}$  was demonstrated and must be considered with attention when evaluating data.

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