RELATIONSHIP BETWEEN PRECIPITATION AND WINE TRITIUM CONCENTRATIONS, TOKAJ, HUNGARY

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Introduction

The relationship between the elemental composition and quality of wine and geographical and climatic conditions is a well-known fact, which also significantly determines the international recognition of wines. The isotopic composition of Tokaj wines provides important information about changes in the environment and provides basic information for determining the authenticity of wines. Isotope analysis studies have previously shown that the isotopic composition of wines contains tritium from natural and artificial sources.

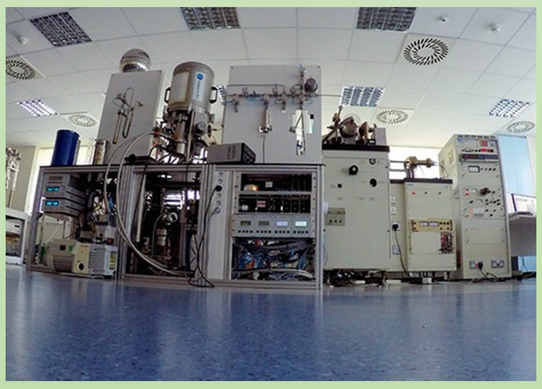
Artificial sources and natural source

Factors influencing the concentration of tritium: seasonal effect, latitude effect, continental effect, atmospheric flow conditions

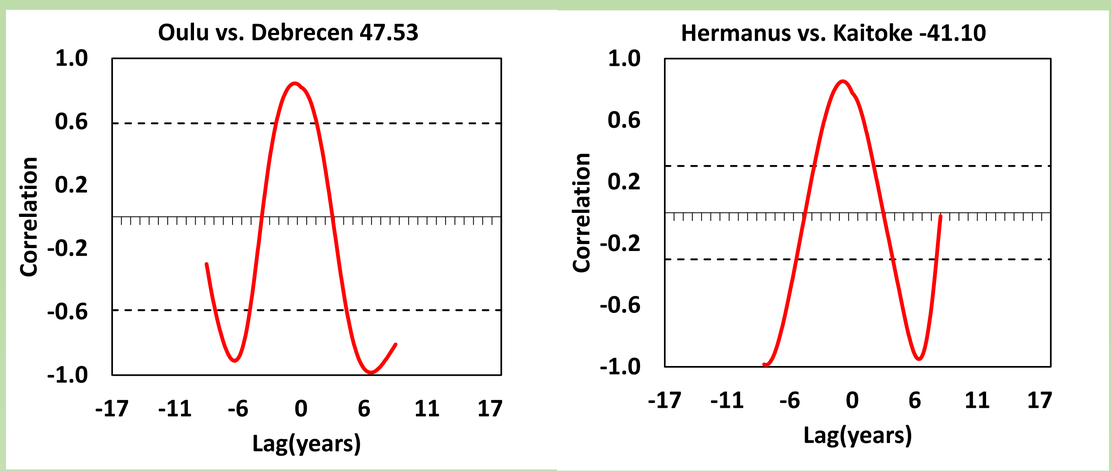
Experimental

Wine and precipitation samples have been analysed using the ^{3}He ingrowth method. The main principle of this method is based on the mass spectrometric measurement of the accumulation of ^{3}He, because the daughter product of tritium is ^{3}He. This method is the most sensitive one that can be used to detect low-level tritium concentrations in environmental waters. The uncertainty of the ^{3}He ingrowth method is about 0.1–0.4 TU in the range of 5-20 TU.

Gas inlet system and VG5400 and Helix SFT



The relationship between solar activity and tritium concentration of precipitation in the Northern and Southern Hemisphere



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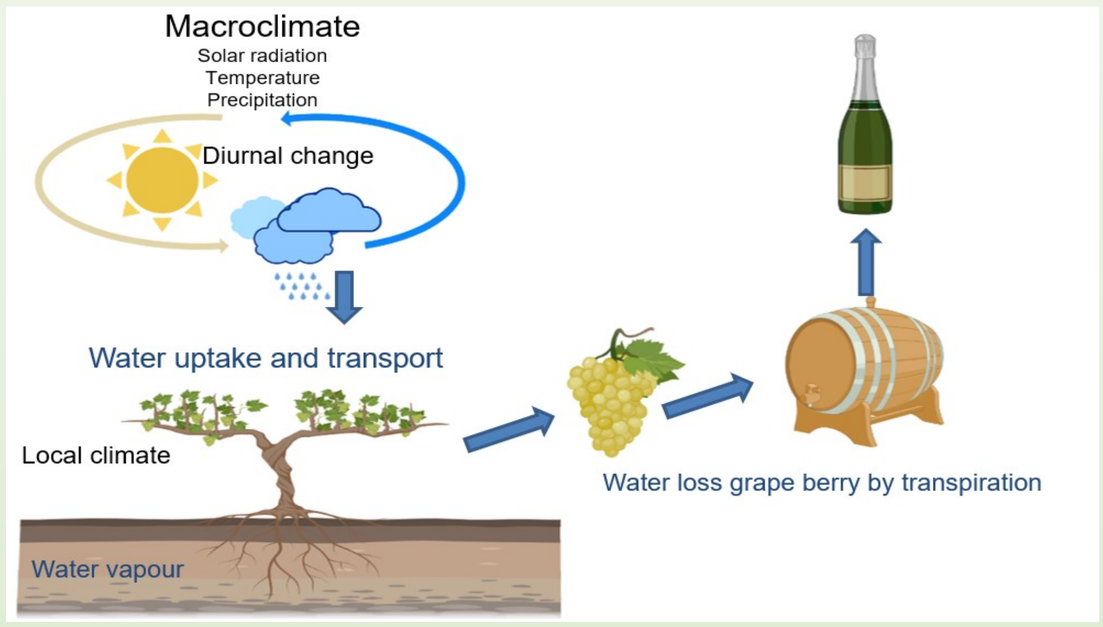
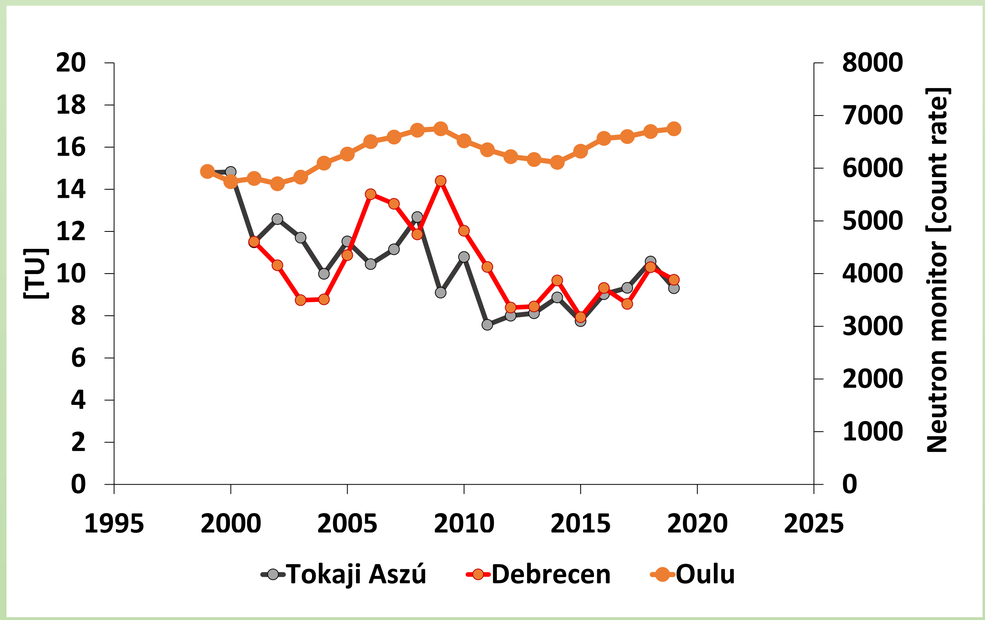
Rain water into the wine bottle



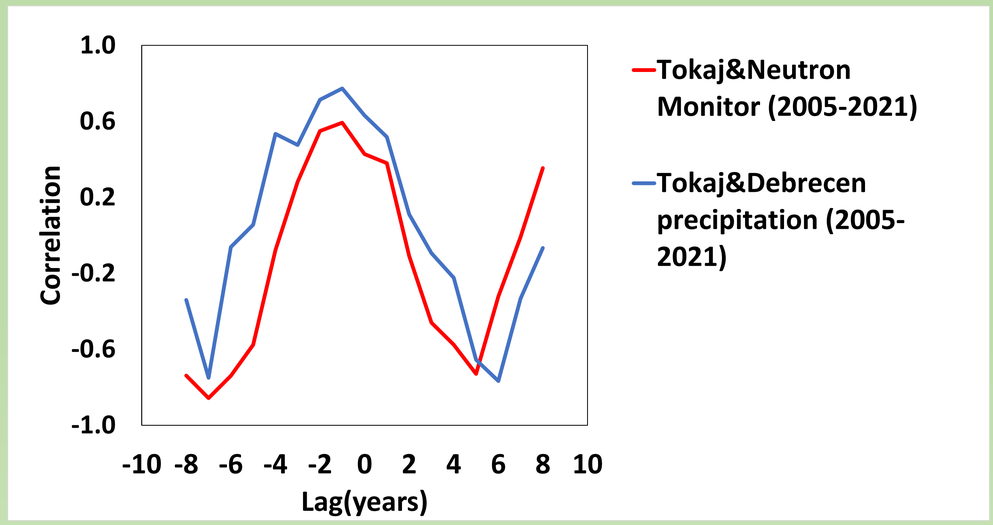
- The pattern induced by solar activity is well reflected in the precipitation tritium.
- In the research, we sought the answer to whether this natural variability can also be discovered in the isotope composition of wine samples.
- To explore this, we use a Tokaj wine collection covering a longer period (1999-2019).

Results

- The pattern induced by solar activity is well reflected in precipitation tritium concentrations, so the research sought to answer whether this natural variability can be detected in the isotope composition of wine samples as well.



Relationship between precipitation and wine tritium concentrations



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