

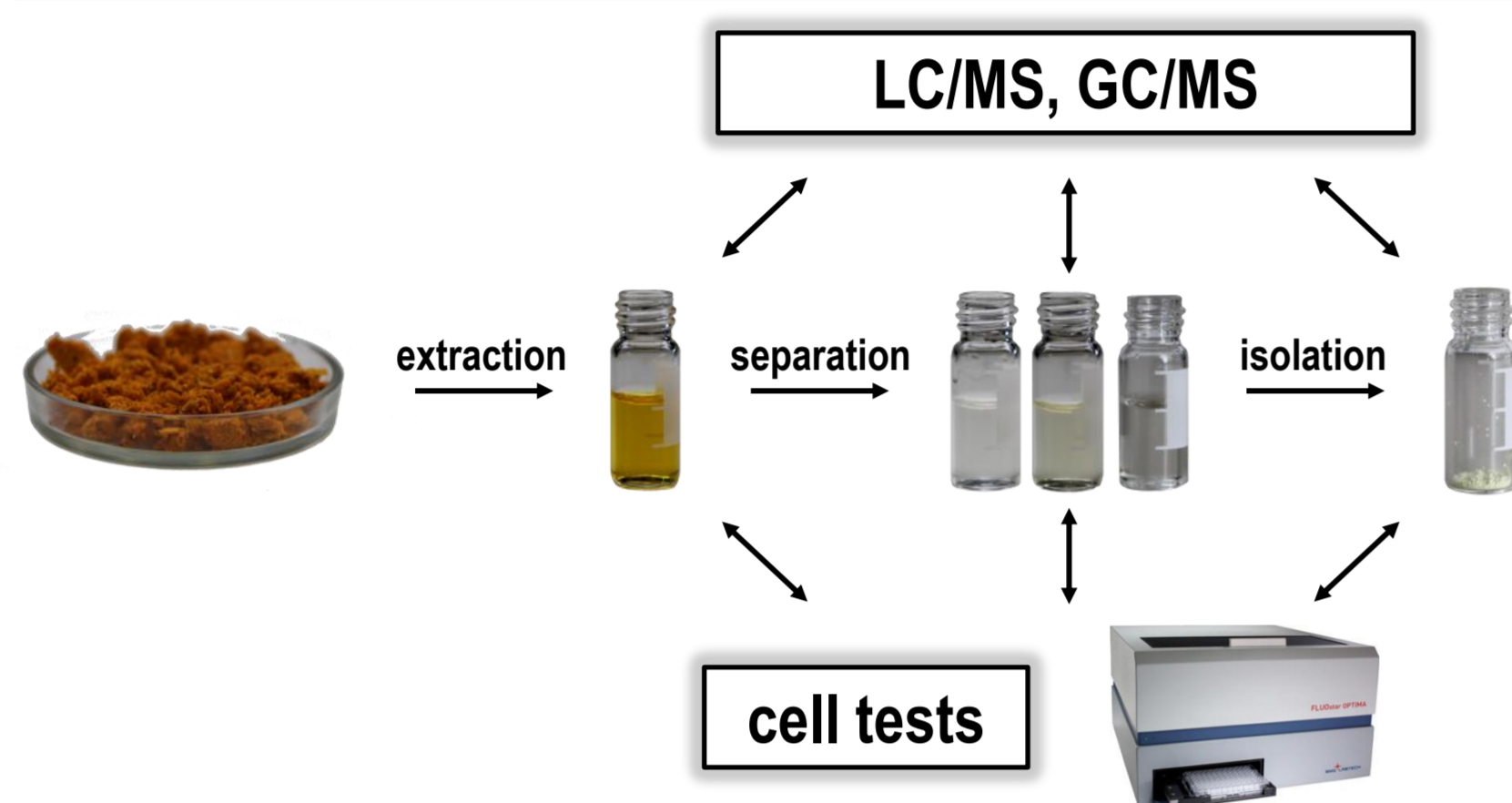
Isolation and Characterization of Natural Products for Medical Research

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Introduction



The utilization of natural products in medicine has always played a key role in the treatment of diseases. Especially plants containing secondary metabolites like flavonoids, lignans and other phytoestrogens are very promising and possess biological activity.^[1,2] In this context single substance interactions are just as important as synergistic effects.^[3] To identify even the smallest amount of compounds in plant extracts mass spectrometry is the most accurate and fastest method. It is essential for the progress of method development and compound identification.^[4] In close cooperation with our medical partners we want to establish a pipeline to deliver biological active substances for the treatment of hereditary diseases of liver and pancreas. Recently we produced promising first results.

Results

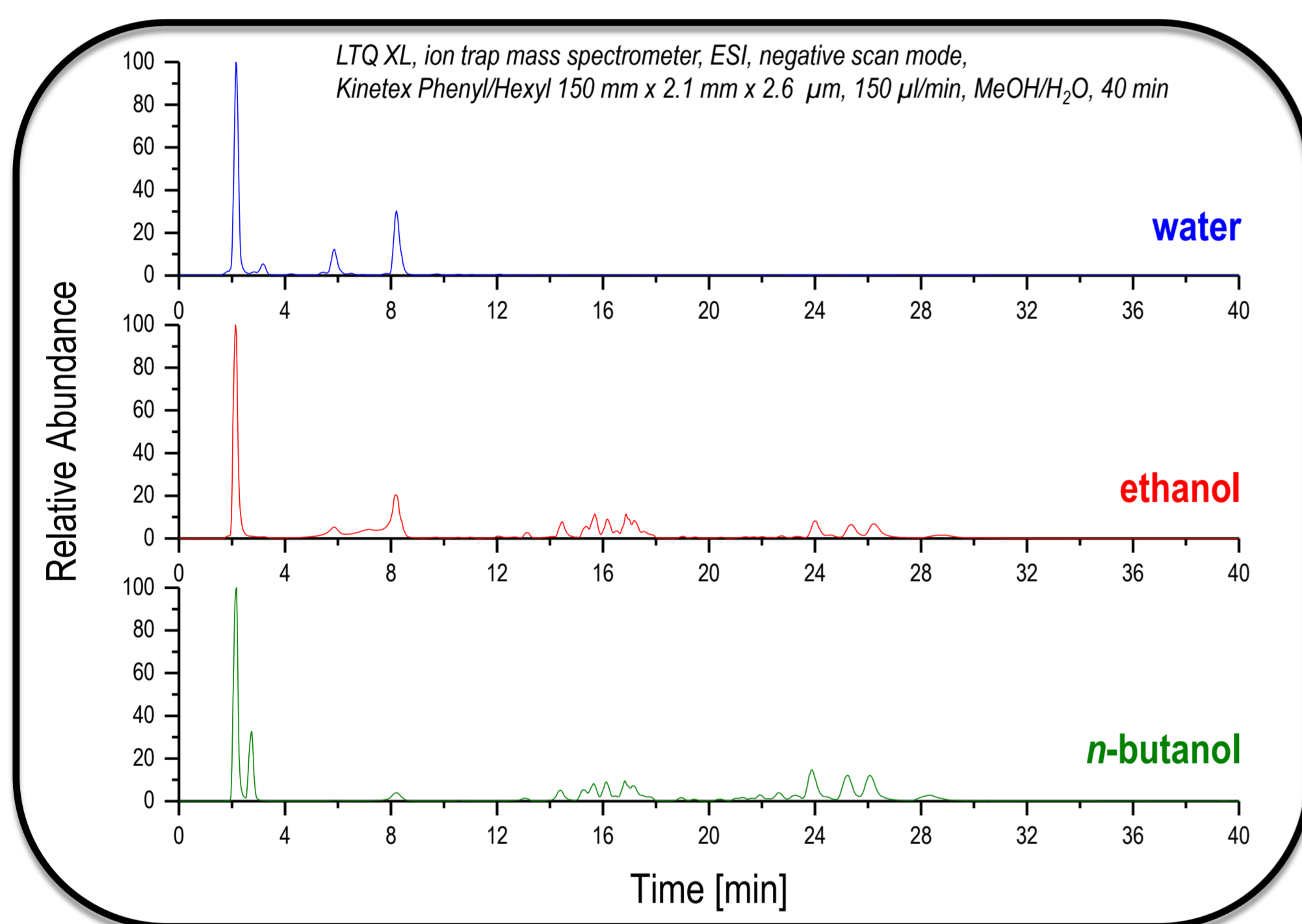


Figure 1: LC/MS chromatogram of Sea Buckthorn extracts

Sea Buckthorn extracts with different compositions are produced by using different solvents for the extraction. This is crucial for medical tests.

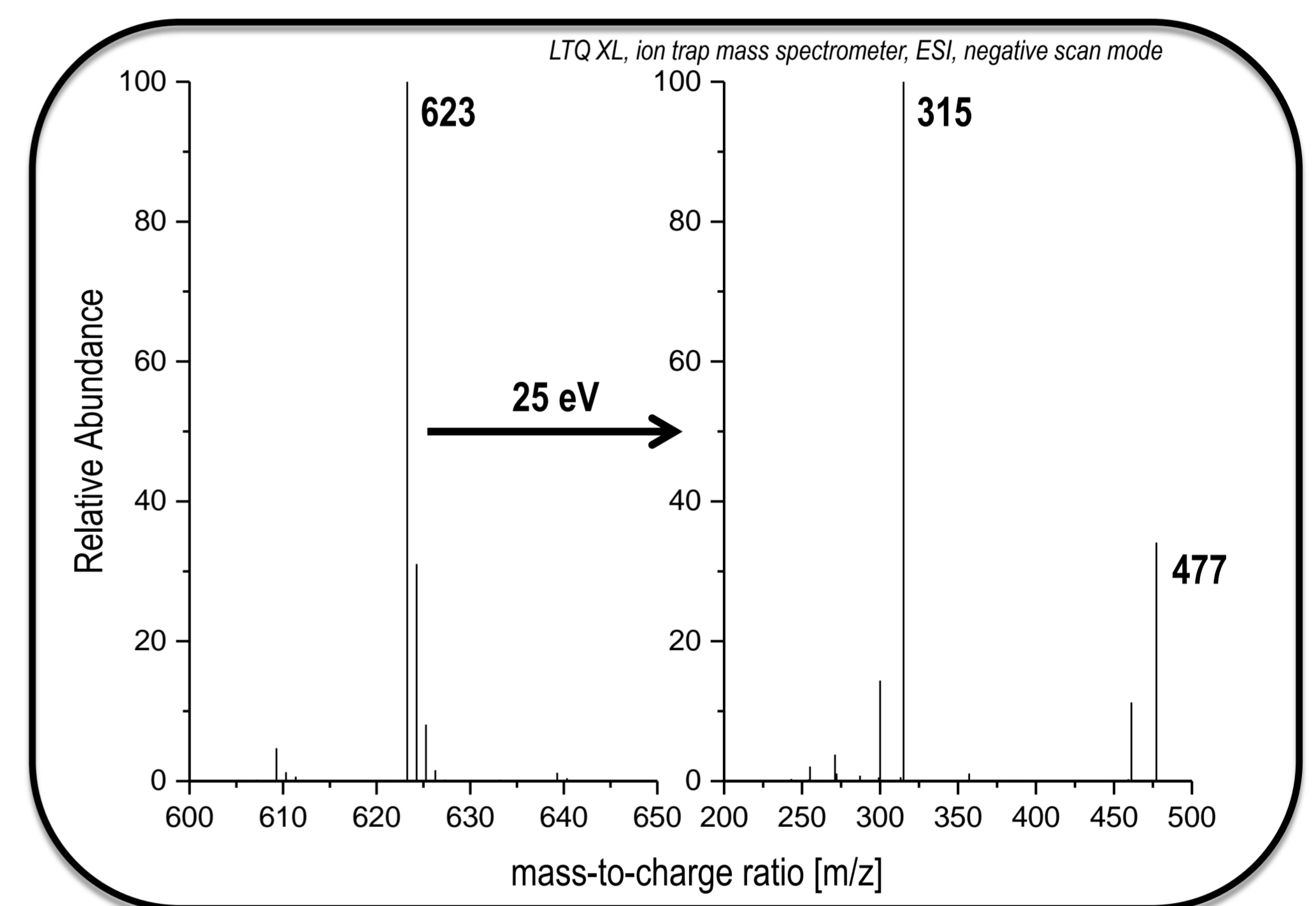
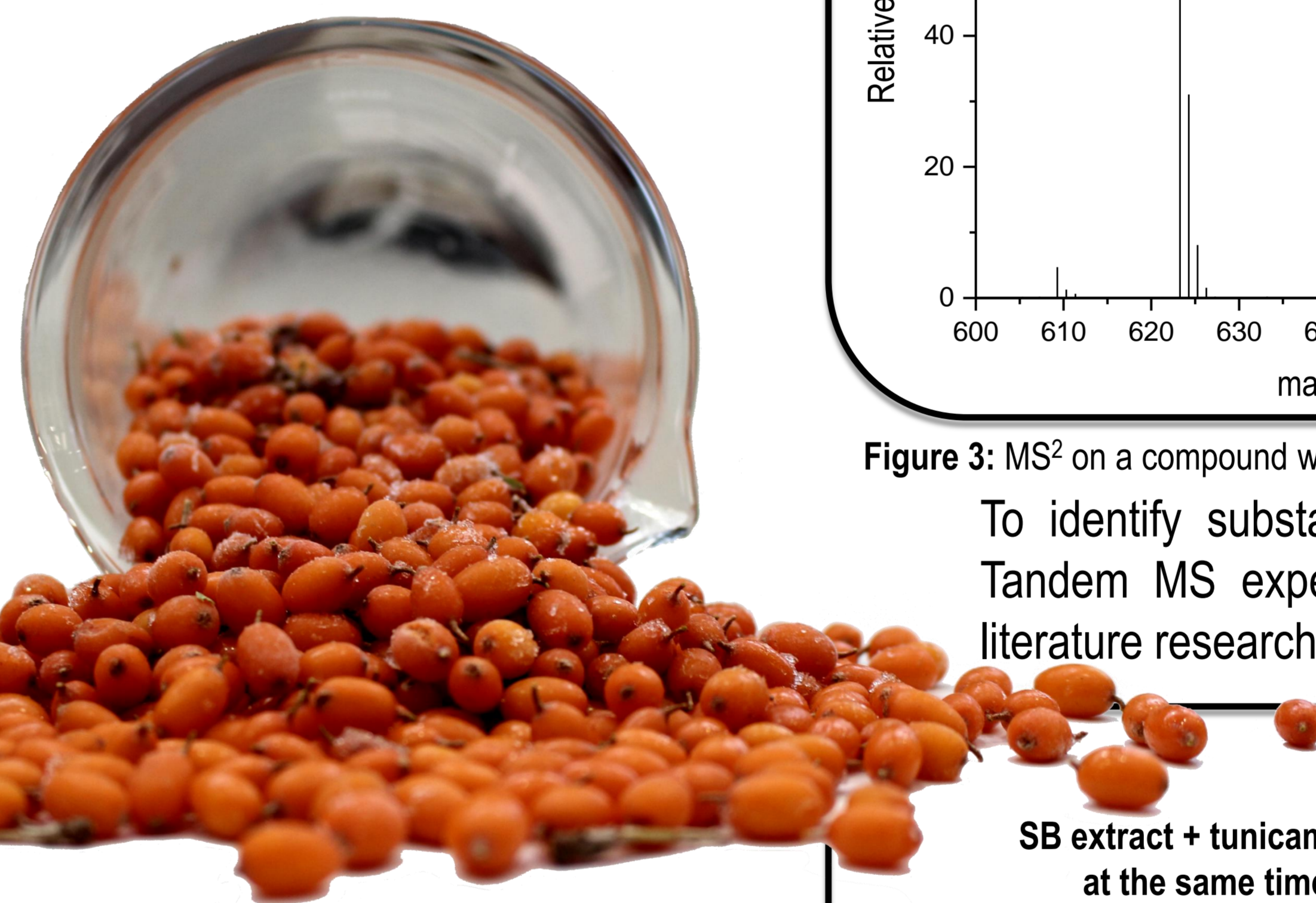


Figure 3: MS² on a compound with m/z = 623 in a *n*-butanol extract

To identify substances in the extracts we perform Tandem MS experiments. This goes together with literature research and the use of substance libraries.

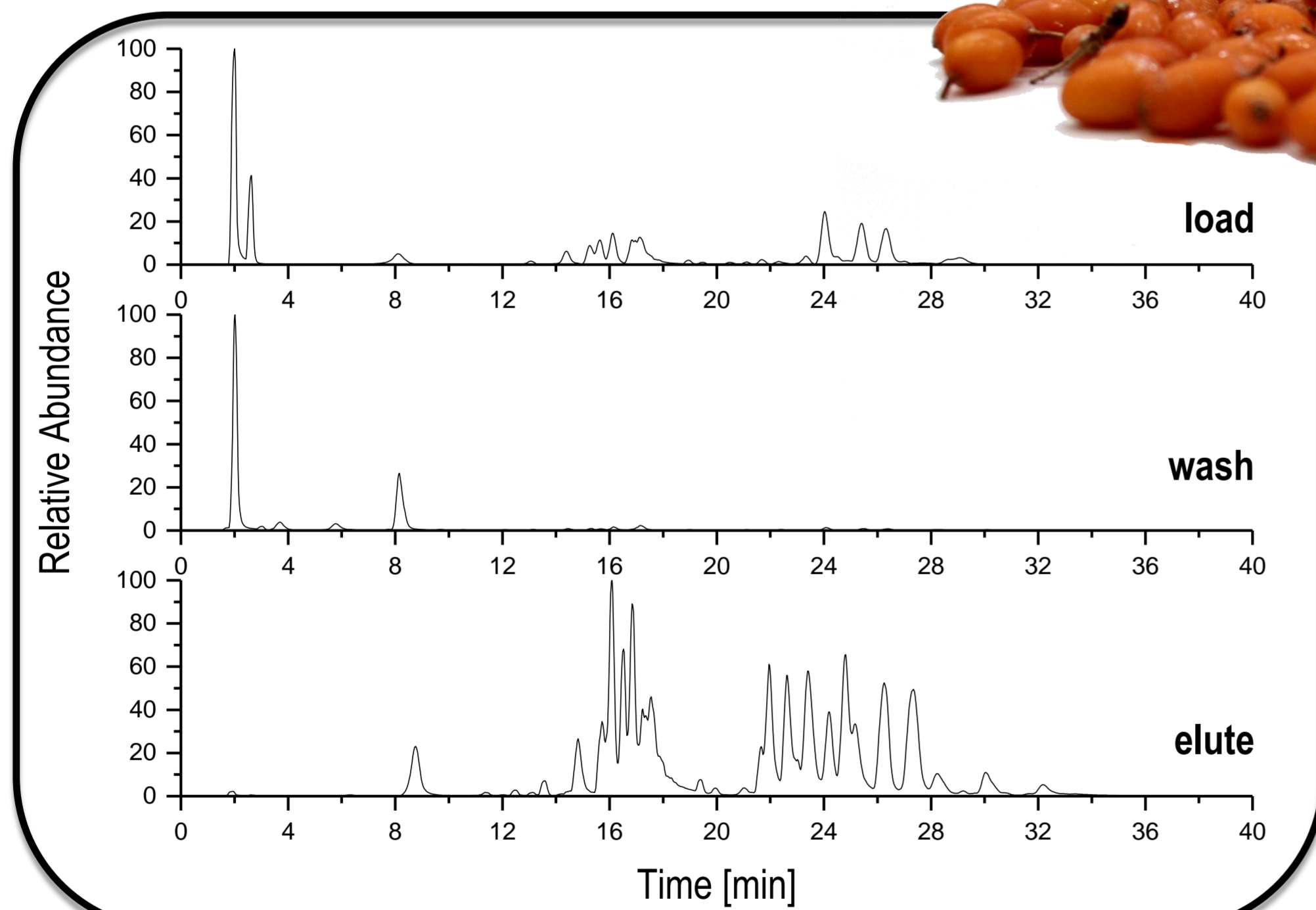


Figure 2: LC/MS chromatogram of SPE fractions of a Sea Buckthorn *n*-butanol extract

SPE as well as HPLC is applied to find the active compound(s) in our extracts. This way crude and fine fractions are generated.

Our project revolves around ER-stress as cause for hereditary diseases. The HEK-293T cells used for testing of the extracts were transfected with the GFP tagged XBP-1s fusion protein by our medical cooperation partners. This way fluorescence activity is a signal for ER-stress in the cell. The ER-stress is induced by tunicamycin.

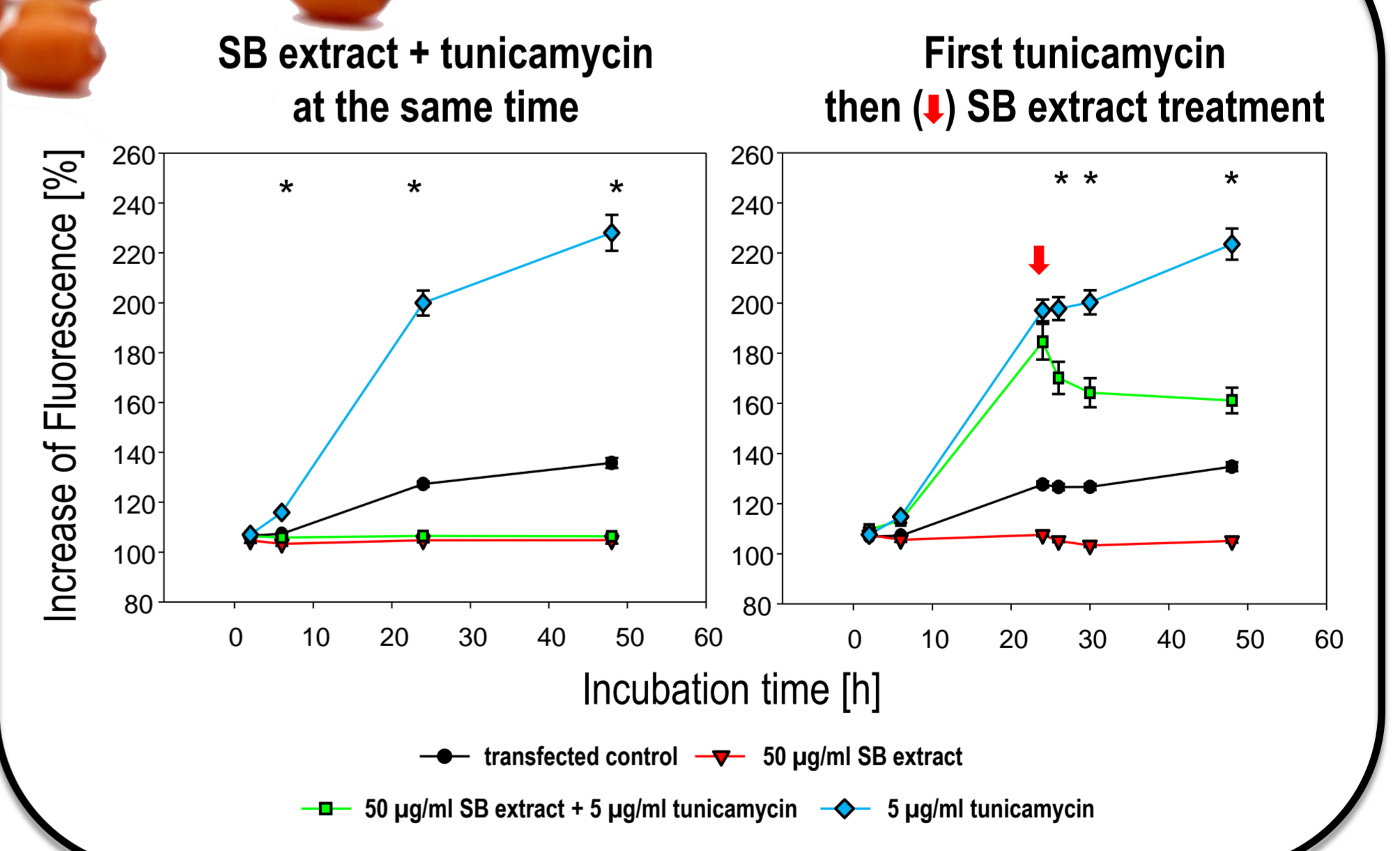


Figure 4: Influence of a Sea Buckthorn (SB) extract on ER-stress

In a preliminary study one of our Sea Buckthorn extracts was able to reduce the ER-stress in the modified cells. Both used methods showed good results.

Summary and Outlook

- ✓ Sea Buckthorn extracts with different composition were produced
- ✓ Extracts were separated into crude and fine fractions using SPE and HPLC
- ✓ One extract showed very promising results in a preliminary study
- ✓ Many compounds were identified via literature comparison and MSⁿ experiments
- More plants with promising ingredients will be included in the project
- We will focus on the determination of the biological active substances
- More medical studies are going to be made with the extracts

References:

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- [4] Vukics V., Guttman A.: Structural Characterization of Flavonoid Glycosides by Multi-Stage Mass Spectrometry. *Mass Spectrometry Reviews*, Vol. 29 (1), 1-16 (2010)

Acknowledgement:

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