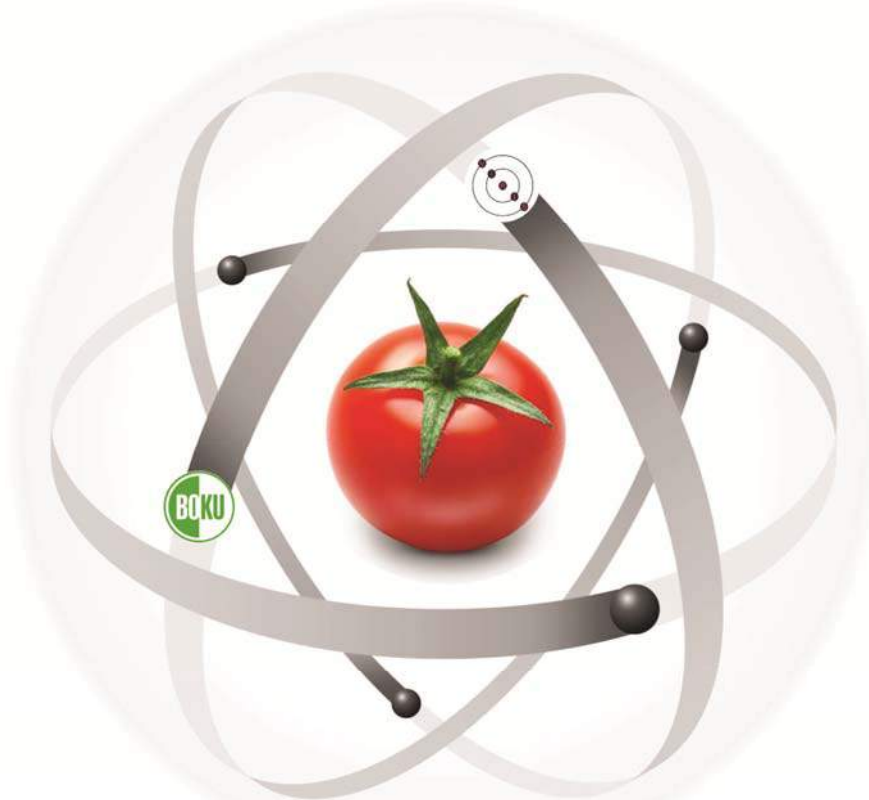
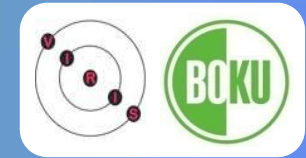


CSI:TRACE your FOOD!

Determination of provenance of food from regional production in Austria on the basis of multi-element and isotopic fingerprinting



CSI:TRACEYOURFOOD



Sparkling Science >
Science linking with School
School linking with Science

bmwfw

Austrian Agency for
Health and Food Safety



Agrarmarkt Austria
Marketing



Andreas ZITEK, Anastassiya TCHAIKOVSKY, Christine OPPER, Melanie DIESNER, Thomas PROHASKA

University of Natural Resources and Life Sciences, Vienna
Department of Chemistry, Division of Analytical Chemistry,
VIRIS Laboratory for Analytical Ecogeochemistry,
Konrad-Lorenz-Strasse 24, 3430 Tulln, Austria

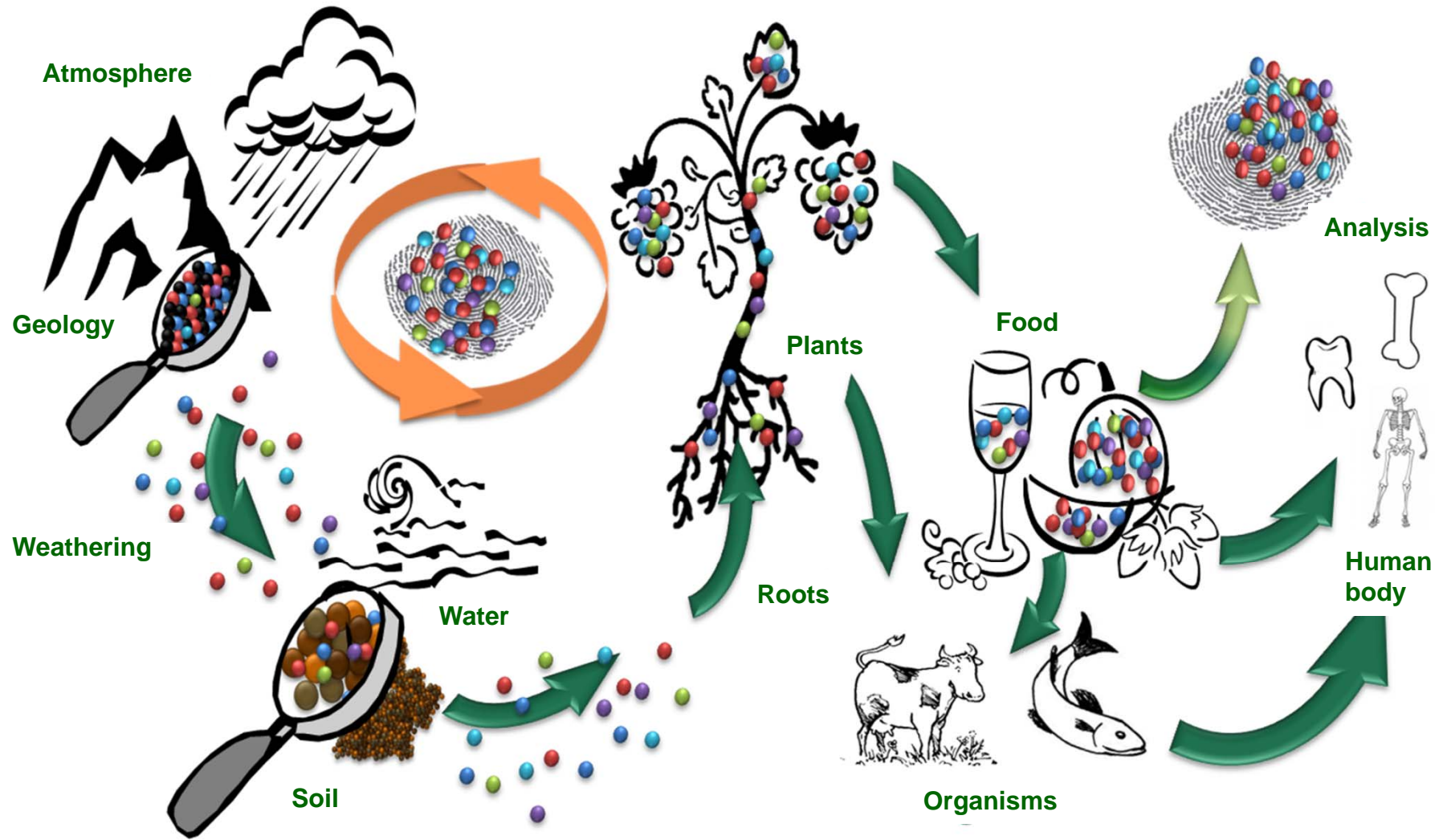
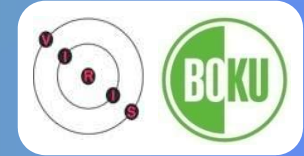
Food authenticity



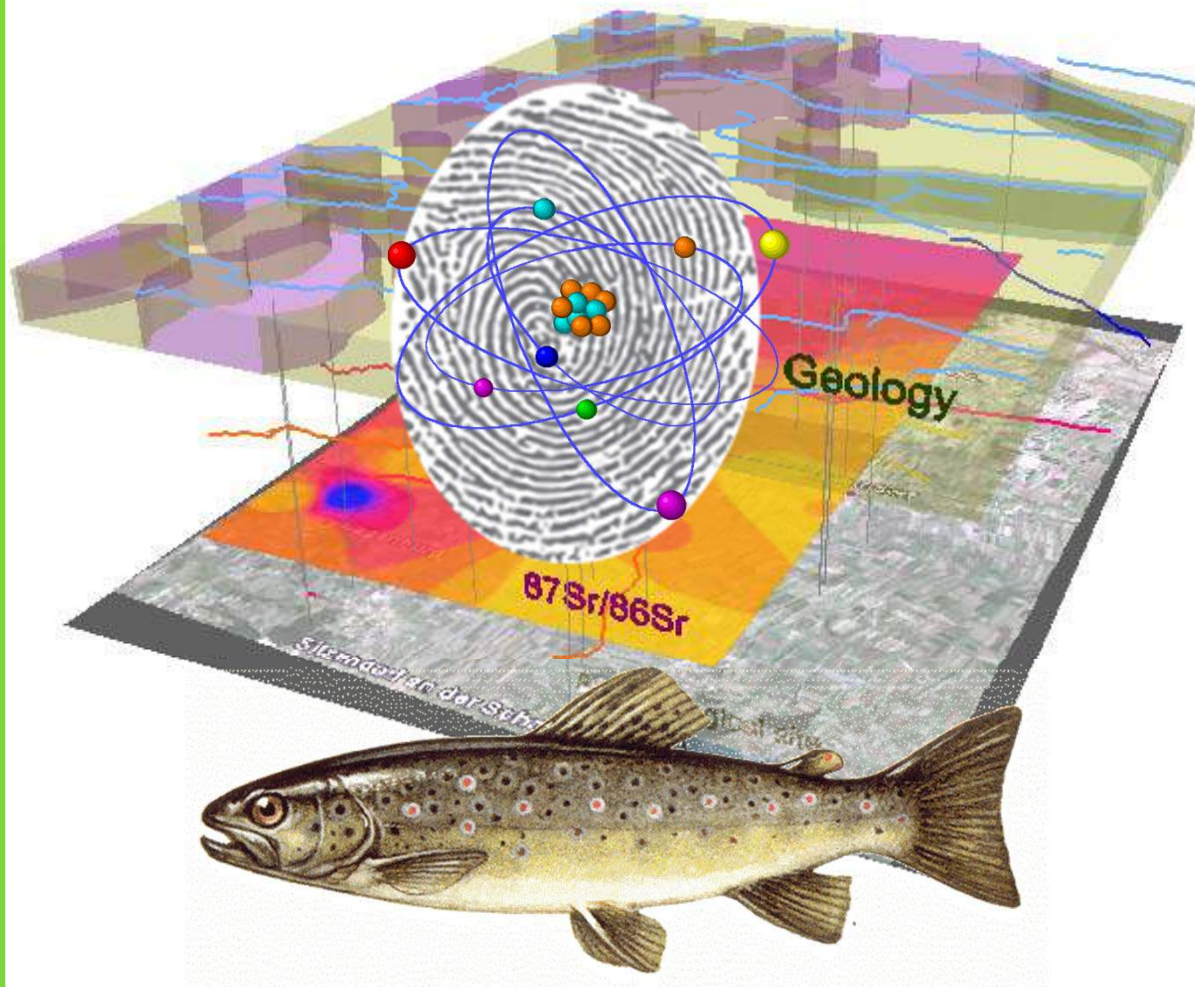
- **Consumer protection:**
 - Food security
 - Authenticity (,You get what you pay for')
- **Producer protection**
 - Competition
 - Prove of origin (and quality) of basic products (e.g. source of origin, fair trade, ...)



The way of elements and isotopes into food



Authentication by the local chemical elemental and isotopic fingerprint



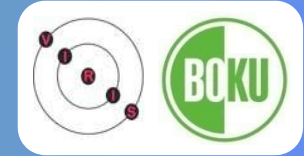
Geological unit

- Granit and Gneiss
- Tertiary sediments
- Quarternary sediments

$^{87}\text{Sr}/^{86}\text{Sr}$ values

- 0,71005 - 0,71064
- 0,71064 - 0,71124
- 0,71124 - 0,71183
- 0,71183 - 0,71243
- 0,71243 - 0,71302
- 0,71302 - 0,71362
- 0,71362 - 0,71421
- 0,71421 - 0,71481
- 0,71481 - 0,71540

Main research questions



- 1. Differentiation of food on the basis of multi-element and isotopic pattern?**
- 2. Relationship between environmental conditions and the elemental and isotopic pattern in food -> prediction for unknown regions?**
- 3. Temporal resolution of the elemental and isotopic composition in fish otoliths to reconstruct life histories in aquaculture?**

Complementary approaches to food authentication



Two *complementary* approaches for the verification of food geographical origin:

1. Database approach

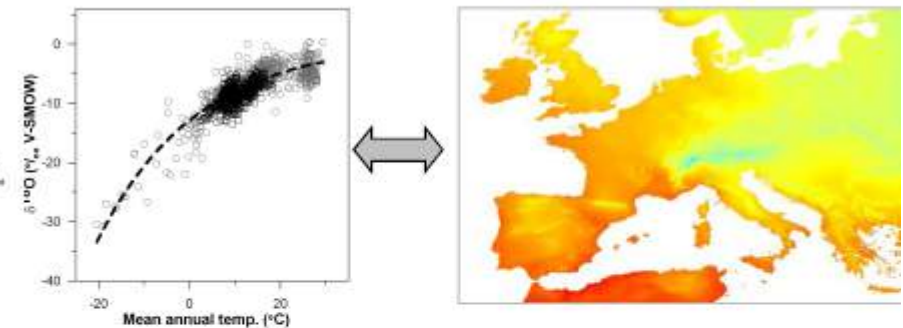


Origin determined from a dedicated database

- * Requires data/specs from all producers
- * Reliable but can be expensive
- * Not necessarily the result of local factors;
- * Needs regular update

Works best for limited number of well defined producers e.g. PDO

2. ISOSCAPE approach

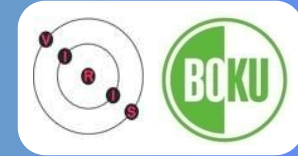


Origin based on interpolation or relationship between geo-climatic factors and food isotopic composition

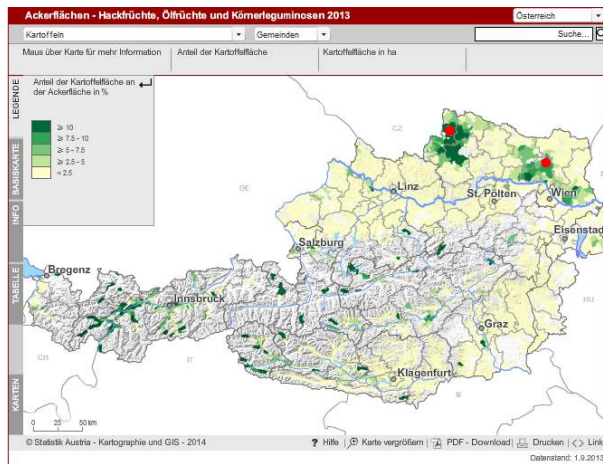
- * Predicts isotopes for unsampled areas
- * Potentially highly Cost effective
- * Based on “static” local factors

has the potential to work also for many ‘unsampled’ producers

Combination of a database and an isoscape approach in CSI: TRACE your FOOD!



1. Selection of relevant sites in regions/federal states



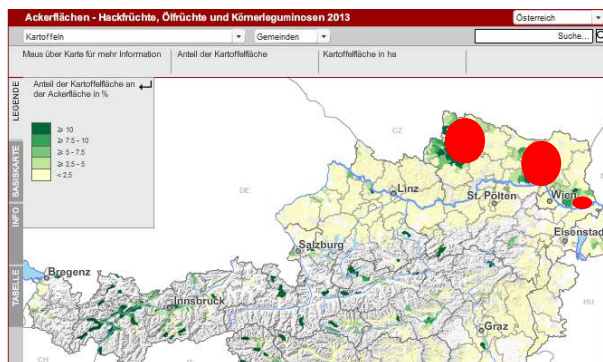
2. Characterization of selected food stuff – fish and vegetable/fruits („Data base approach “)



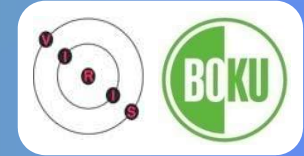
3. Characterization of soil and water



4. Regionalization and prediction of food composition in other regions (by the relation geology / soil / food)? ("Isoscape approach")



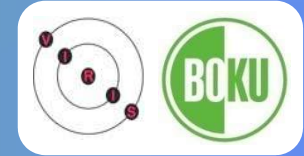
EU label for aquacultured fish



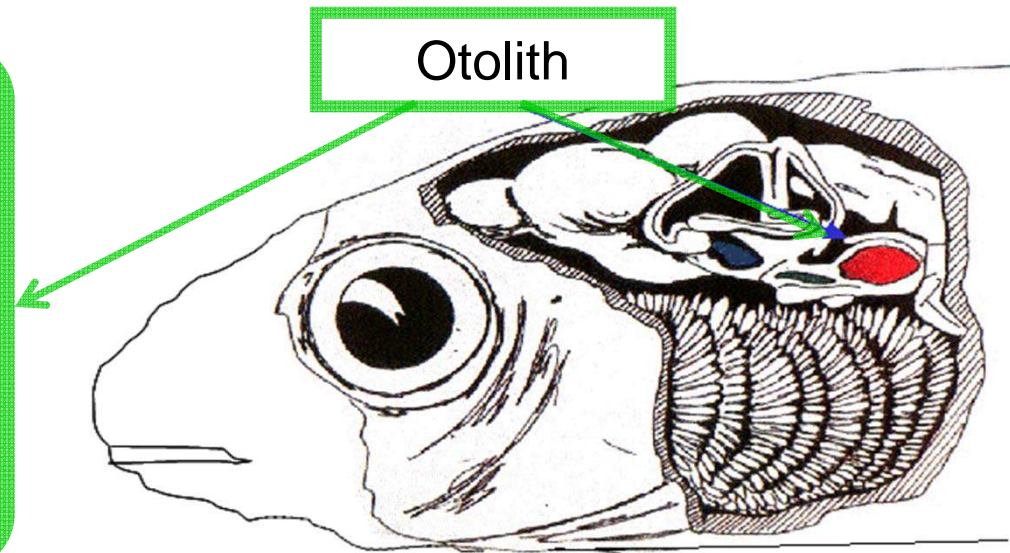
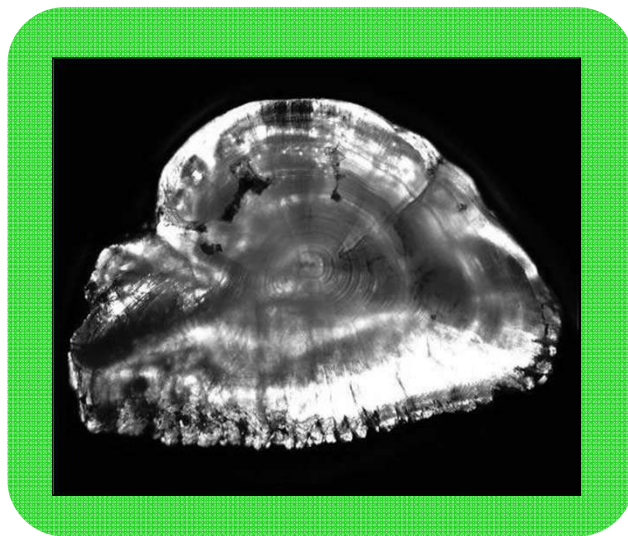
EU-regulation Nr. 1379/2013 on the common organisation of the markets in fishery and aquaculture products

In the case of aquaculture products, a reference to the member State or third country in which the product reached more than half of its final weight or stayed for more than half of the rearing period

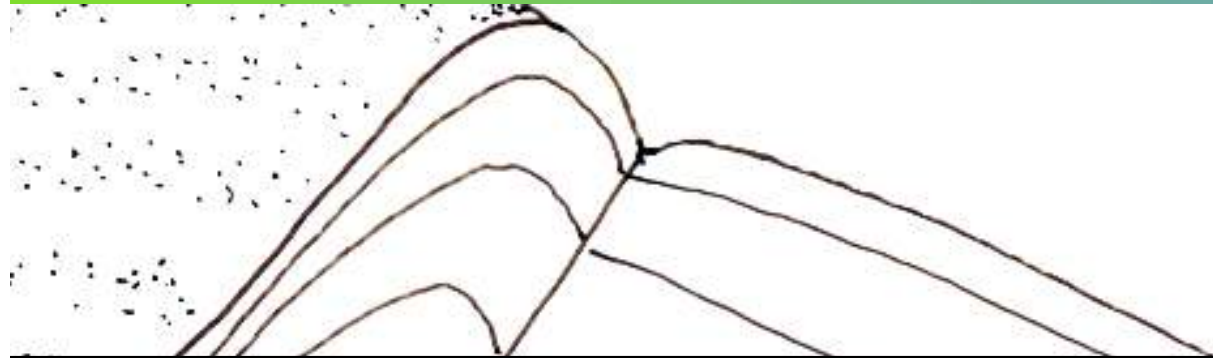
Otolith as life time recorder



- **Otolith** = ear stone
 - function: balance, hearing, orientation
 - metabolically inert
 - grows in discrete „tree-ring like“ layers



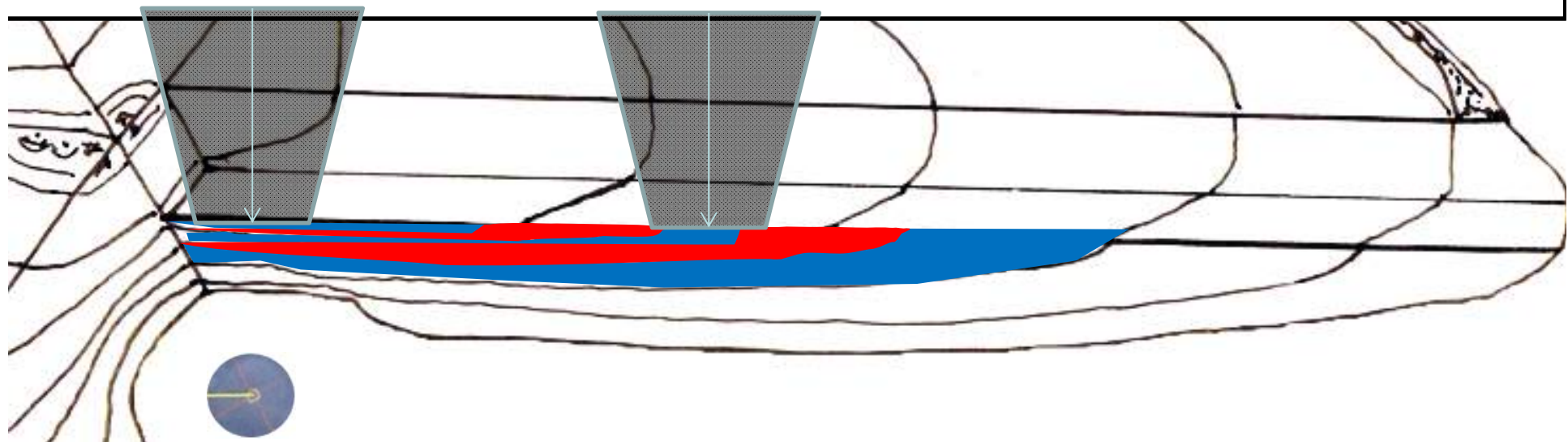
Spatial resolution of LA-ICP-MS



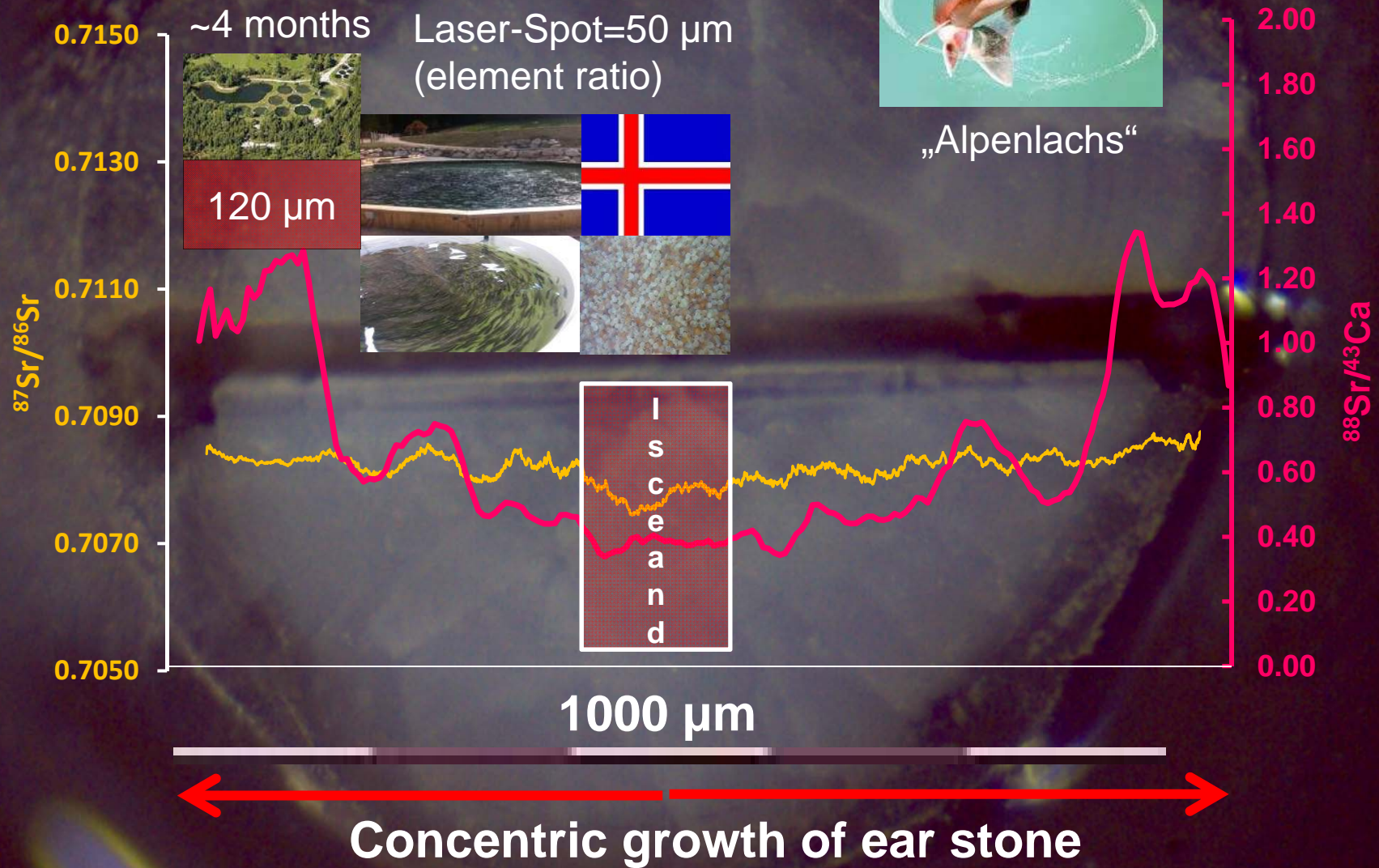
Farm 1

$^{87}\text{Sr}/^{86}\text{Sr}$

Farm 2



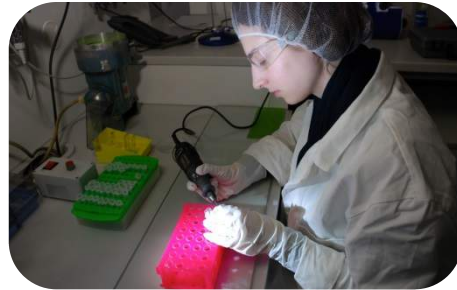
Chemical life history of a salmonid from aquaculture (Age: 12 months)



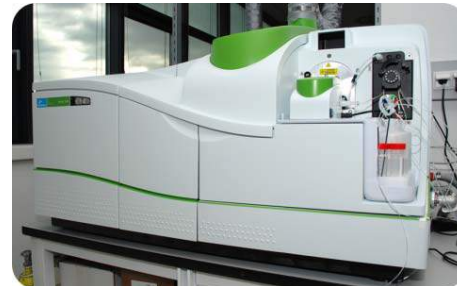
Analysis of elemental and isotopic patterns by ICP-MS



Sample preparation



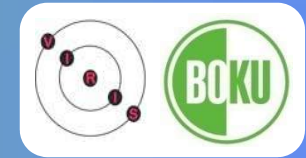
Measurement



Data evaluation, analysis and interpretation



How to connect BOKU with 10 schools in Austria and one school in Hungary?



Sparkling Science >
Science linking with School
School linking with Science



CSI:TRACE your FOOD



WP 1. Management and organisation

Andreas Zitek, BOKU-VIRIS, Thomas Prohaska, BOKU-VIRIS

WP 2. Knowledge transfer and communication

Andreas Zitek, BOKU-VIRIS
Thomas Prohaska, BOKU-VIRIS
Anastassiya Tchaikovsky, BOKU-VIRIS

T 2.1. Teaching material and evaluation (BOKU-VIRIS)

T 2.2 „Virtual Science Lab“ (BOKU-VIRIS, BG und BRG Klosterneuburg)

T 2.3 „Science Tours“ (BOKU-VIRIS, Schulen)

T 2.4 „Science Camps“ (BOKU-VIRIS, Schulen)

T 2.5 „Austrian snack“ (BOKU-VIRIS, AGES, AMA, Schulen)

Schools

Sir Karl Popper Schule (W)
BG/BRG Klosterneuburg (NÖ)
HLW Frohnsdorf (NÖ)
HLW/HLT Pannoneum (B)
BORG Bad Radkersburg (ST)
HLW Bad Ischl (OOE)
HLT Bad Hofgastein (S)
HBLA Pitzelstätten (K)
Franziskaner Gymnasium (T)
HTL Dornbirn (V)



Alternativ Gymnazium
Budapest (H)

Cooperations

- AMA
- AGES
- BM:UKK IT/3

Subcontracting

- AIT
- IRV

WP 3. Scientific project

Anastassiya Tchaikovsky, BOKU-VIRIS
Christine Opper, Melanie Diesner, BOKU-VIRIS
Andreas Zitek, BOKU-VIRIS
Thomas Prohaska, BOKU-VIRIS
Karl Moder, BOKU-IASC
Christoph Höfer, BOKU-RHIZO

T 3.1 Selection of producers and regions (BOKU-VIRIS, AGES, AMA, Schulen)

Selected producers

1. Wien
2. Niederösterreich
3. Burgenland
4. Steiermark
5. Oberösterreich
6. Salzburg
7. Kärnten
8. Tirol
9. Vorarlberg



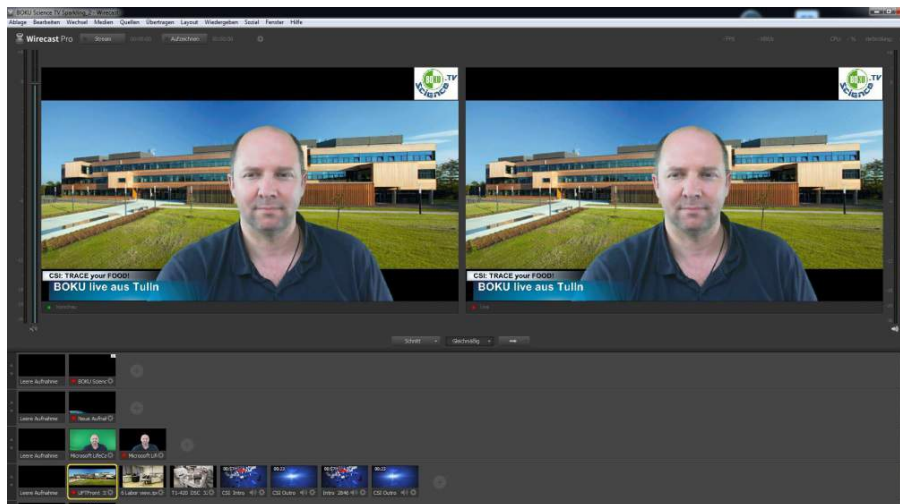
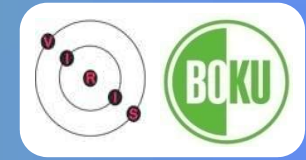
T 3.2 Field sampling and documentation (BOKU-VIRIS, BOKU-RHIZO, Schulen)

T 3.3 Sample preparation and analysis (BOKU-VIRIS, AIT)

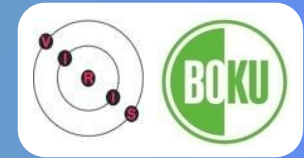
T 3.4 Data management and analysis (BOKU-VIRIS, IRV, BOKU-IASC)

T 3.5 Final evaluation of results (BOKU-VIRIS, AGES, AMA)

Distant collaboration and lecturing - BOKU Science TV – Virtual Science Lab



Possibilities for integrating different information sources into BOKU Science TV



Desktop Presenter
Computer screen within the same network



Wowza GoCoder App (IOS, Android) – to local installation of Wowza streaming engine (WLAN, handy-net)



Webcam



Kamera und Teradec Cube (WLAN, handy-net)



Wirecast Cam (IOS) (within same network)



<http://...>

Any stream with known Url



From Wirecast to Webex, or youtube using the virtual camera and virtual microphone

BOKU Science TV

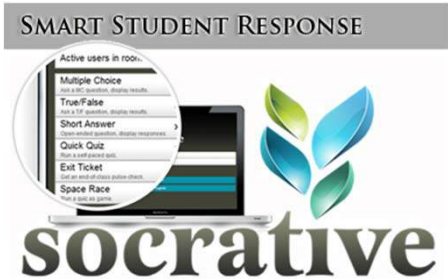
Virtual Science Lab – interactive lectures (4-6 x)



BOKU Science TV



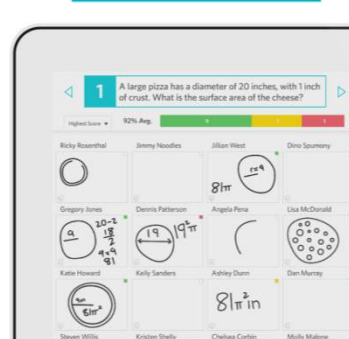
Wirecast/Telestream



formative

Intervene in the moments that matter most.

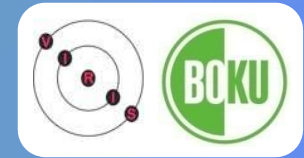
GET LIVE RESULTS!



IT classroom at school



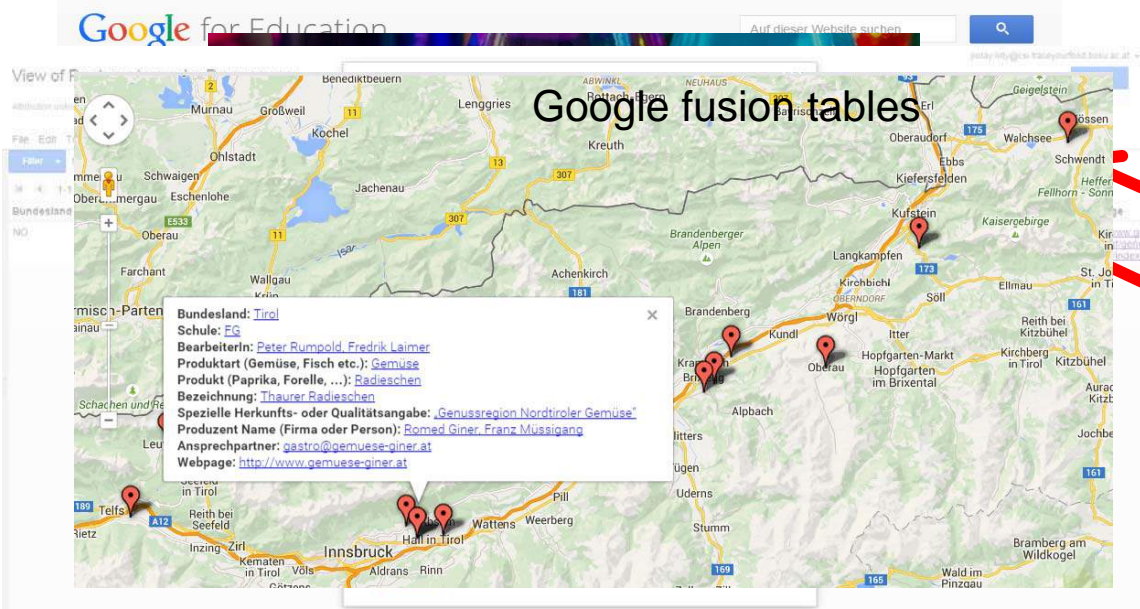
Virtual Science Lab – collaborative research work (2 x)



BOKU Science TV



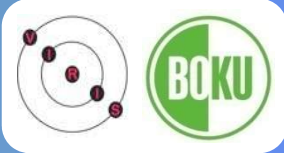
Wirecast/Telestream



IT classroom at school



Some virtual classroom i



Using google classroom



Eine Lösung für Kursleiter und Kursteilnehmer



Classroom ist für alle Nutzer von Google Apps for Education verfügbar, einer kostenlosen Reihe von Produktivitäts-Tools, zu denen u. a. Gmail, Drive und Docs gehören.

Classroom unterstützt Kursleiter bei der papierlosen Erstellung und dem Einsammeln von Aufgaben. Zu den zeitsparenden Funktionen gehört beispielsweise das automatische Erstellen der Kopie eines Google-Dokuments für jeden Kursteilnehmer. Pro Aufgabe und Kursteilnehmer wird zudem ein Drive-Ordner erstellt, damit Kursleiter und Kursteilnehmer bestens organisiert sind.

Die Kursteilnehmer können sich auf der Seite "Aufgaben" über die

Procedure:

- Users can be created centrally
- Tasks are "copied" to all invited students
- Login dates and time are distributed by teachers
- Google Fusion Tables can be used online (without local installation and without "own" google account)
- Google Fusion Table is automatically updated enabling real time collaboration

Advantage:

- No own google accounts for students needed to use Google Fusion Tables, Google Docs, etc.
- no sharing of private email addresses by students
- No additional email traffic for pupils

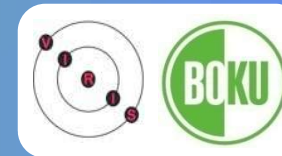
Involvement of scholars



1. Search producers
 - Enter data, such as product name, address, telephone number etc.
2. Search environmental data on production areas
 - Online maps (altitude, geology, soil)
3. Sampling
 - Food and environmental samples in the field
4. Visit the VIRIS laboratories
 - Path of the sample through the laboratory – from preparation, analysis to data interpretation



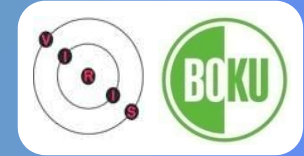
Important issues



- Technical conditions (number of computers, headsets and webcam availability, network capacity)
- Development of teaching units and synchronous interactions (BOKU Science TV, socrative, formative)
- Development "asynchronous" and other learning materials (record of teaching units, youtube channel, Cyber Lab, mass spectrometry learning material, conversion of an old mass spectrometer into a learning tool)
- Materials for learning management systems used at schools



Cyber Lab and MINT

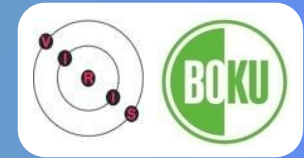


- **Cyber Lab**
 - Target: An interactive "virtual" learning tool
 - sampling
 - selection of instrumentation
 - sample preparation
 - measurement
 - Interpretation of the results
 - Problem Based Learning
 - Step by step
 - Virtual and interactive!
- **Workshop for women in analytical chemistry by women**

Please select one of the instruments below



Project finalization – Austrian snack



- All schools linked together
- Live broadcast from each school
 - WOWZA GoCoder to WOWZA Streaming Server (locally installed) to Wirecast
- Wirecast live stream to Webex and YouTube



Streaming Products Pricing Downloads Customers Partners

Home > Products > Wowza GoCoder

Wowza GoCoder

Wowza® GoCoder™ is a live audio and video encoding application for iOS and Android devices.

Downloads



Web presence

<http://csi-traceyourfood.boku.ac.at>



Herkunftsbestimmung von Nahrungsmitteln aus regionaler Produktion in Österreich anhand des Multielement- und Isotopenfingerabdrucks



PROJEKT MINT CYBER LAB TEAM ZEITPLAN MATERIAL und METHODEN PUBLIKATIONEN ZUWEISUNGSTOOL LINKS BLOG

CSI:TRACE your FOOD!

Der thematische Schwerpunkt des Projektes Classroom-Science-Interaction „CSI: TRACE your FOOD!“ liegt auf der systematischen Bestimmung von eindeutigen chemischen Fingerabdrücken in Nahrungsmitteln aus unterschiedlichen Regionen in Österreich zur eindeutigen Herkunftsbestimmung.

Ein wesentliches Ziel ist die Ermittlung des Zusammenhangs zwischen Umweltfaktoren (Geologie, Boden, Wasserchemie, Seehöhe, etc.) und der chemischen Zusammensetzung der Lebensmittel (Abb. 1).

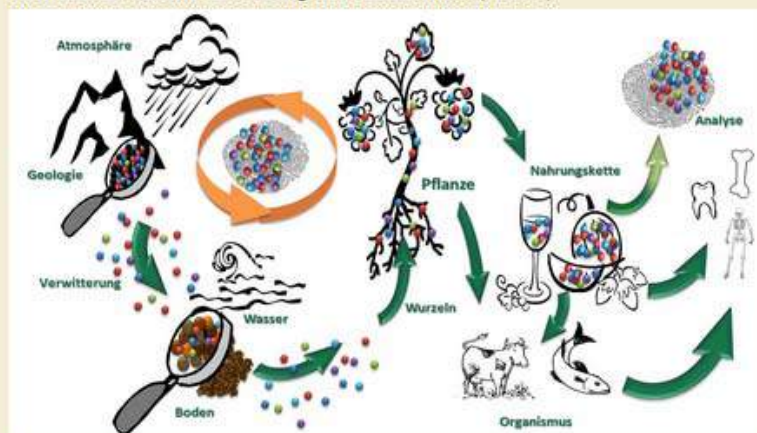


Abb. 1: Der Weg der Elemente und Isotope ins Nahrungsmittel.

AKTUELLES

NEWS von CSI:TRACE your FOOD!

[Google Classroom goes mobile!](#)

Google Classroom ist nun auch als IOS und Android App. verfügbar. Damit wird das Management und die Teilnahme an virtuellen Klassenzimmern für LehrerInnen und SchülerInnen noch flexibler!

<http://googleforeducation.blogspot.co.at/2015/01/A-Classroom-mobile-app-and-new-teacher-goodies.html>

[Artikel in der Presse über CSI: TRACE your FOOD!](#)

Heute ist ein Artikel über unser ambitioniertes Forschungs- und E-learning Projekt in der Presse erschienen. Wir freuen uns sehr über die gute Öffentlichkeitswahrnehmung.

<http://diepresse.com/home/science/4640565/Spuren:in-regionalen-Produkten>

[CSI: TRACE your FOOD! goes Google Apps for Education](#)

Heute wurde uns der Zugang zur Verwendung der [Google Education Apps](#) für unser Projekt freigeschaltet. Dies ermöglicht über alle Schulen hinweg ein vereinfachtes Nutzer-Management, d.h. die SchülerInnen müssen nicht selber google

Facebook -

<https://www.facebook.com/traceyourfood2>



This is a screenshot of a Facebook page. At the top, there is a search bar containing the text 'CSI: TRACE your FOOD' and a magnifying glass icon. To the right of the search bar, the user's name 'Andreas' is visible, along with 'Startseite 20+' and 'Freunde finden'. Below the search bar, there are navigation tabs: 'Seite' (selected), 'Aktivität', 'Statistiken', and 'Einstellungen'. The main content area features a large background image of a laboratory setting with a robotic arm and glassware. On the left side of this area, there are two smaller images: the top one is a promotional graphic for 'Sparkling Science' with the text 'Wissenschaft ruft Schule Schule ruft Wissenschaft' and the 'bmw' logo; the bottom one is the page's profile picture, which shows a tomato inside an atomic symbol with the text 'CSI:TRACEYOURFOOD' below it. To the right of the profile picture, the page name 'CSI: TRACE your FOOD' and 'Webseite' are displayed. Below the page name, there are three buttons: 'Gefällt dir' (with a thumbs-up icon), 'Abonniert' (with a checkmark icon), and 'Nachricht senden' (with a speech bubble icon). At the bottom of the page, there are more navigation options: 'Chronik', 'Info', 'Fotos', '„Gefällt mir“-Angaben', and 'Mehr'. A small 'Z' is visible in the top right corner of the page's content area.



CSI: TRACE your FOOD!

Nahrungsmittelherkunftsbestimmung mittels Element- und Isotopenfingerabdruck

Search

Differences



Forum - discussion



BLOG - author



Wiki - content



Home

Über diesen BLOG

Wiki

Forum

CSI: TRACE your FOOD! – The collaborative story

Anleitung

Search

Google Classroom goes mobile!

Posted on **Januar 17, 2015**

Neueste Artikel

- **Google Classroom goes mobile!**
- **Presse Artikel über CSI: TRACE your FOOD!**
- **CSI: TRACE your FOOD! goes Google Apps for Education**

Google Classroom ist nun auch als IOS und Android App. verfügbar. Damit wird die Teilnahme und das Management von virtuellen Klassenzimmern für LehrerInnen und SchülerInnen noch flexibler! <http://googleforeducation.blogspot.co.at/2015/01/A-Classroom->



CSI:TRACEYOU!

First impressions and questions

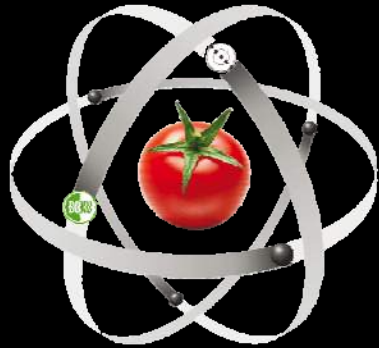


Student and teacher responses

- Widespread acceptance and great interest in the new learning and interaction form
- Difficulties with the internet connection are the biggest hurdles
- 3 pre-scientific student works (2 x fish ear stones and filets for tracing the origin of fish; 1 x selection criteria for girls for natural science studies)

Questions

- How can better Internet connections in schools be achieved/pushed?
- How can the educational content optimally be prepared for e-learning including alternating phases between input on the part of teachers and input and feedback from the learners?
- Final evaluations should yield structured information about the interests, needs, criticisms and ideas for development of e-learning scenarios and a sustainable connection between school and university

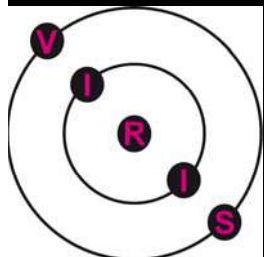


CSI:TRACEYOURFOOD

SPA 05/052 – **CSI:TRACEYOURFOOD!**



Project leader: Ao. Prof. DI Dr. Thomas Prohaska
Project coordination: DI DR. Andreas Zitek, MSc
Analytical coordination: DI Anastassiya Tchaikovsky
Analytical support: Christine Opper, Melanie Diesner
andreas.zitek@boku.ac.at
thomas.prohaska@boku.ac.at



University of Natural Resources
and Life Sciences Vienna
Department of Chemistry
VIRIS Laboratory for Analytical Ecogeochemistry

