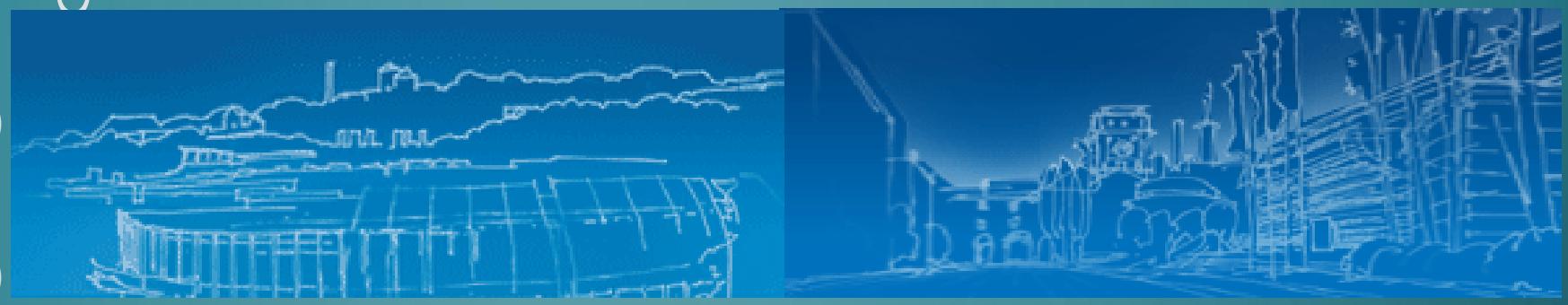


Lehrstuhl für
Analytische
Lebensmittelchemie

Technische
Universität
München **TUM**



Das Metabolom von Bier erforschen und die molekulare Signatur verschiedener Materialien, Technologien und Reaktionsabläufe aufklären

Michael Rychlik, Stefan Pieczonka,
Philippe Schmitt-Kopplin
Analytical Food Chemistry
Technical University of Munich

RAFA Prague 2021





Bier Metabolomics: Mögliche Differenzierung?

Complexity

alcohols, aldehydes, amino acids, carbohydrates, esters, fatty acids, ketones, Maillard reaction products, monoterpenes, nucleotides, organic acids, phenolic acids, polyphenols, sesquiterpenes, sulfides, thiols

Hops

aroma & bitterness, type of extraction, dry hopping, isomerisation, oxidation, genotypes, varieties

Storage

bacterial deterioration, bottle fermentation, Maillard reaction, oxidation, Strecker degradation

Brewing process

mashing, lautering, hopping, boiling, whirlpool, fermentation, filtration, pasteurization,

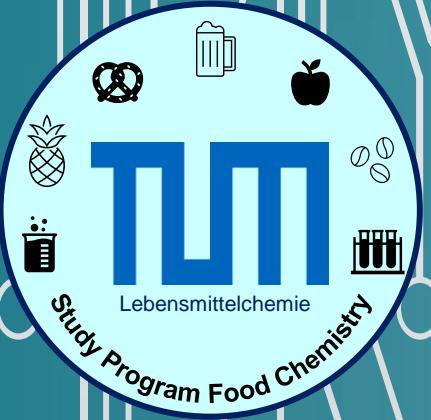


Yeast

aroma, exometabolome, filtration, temperature, sort of yeast (ale, lager, wheat), strains

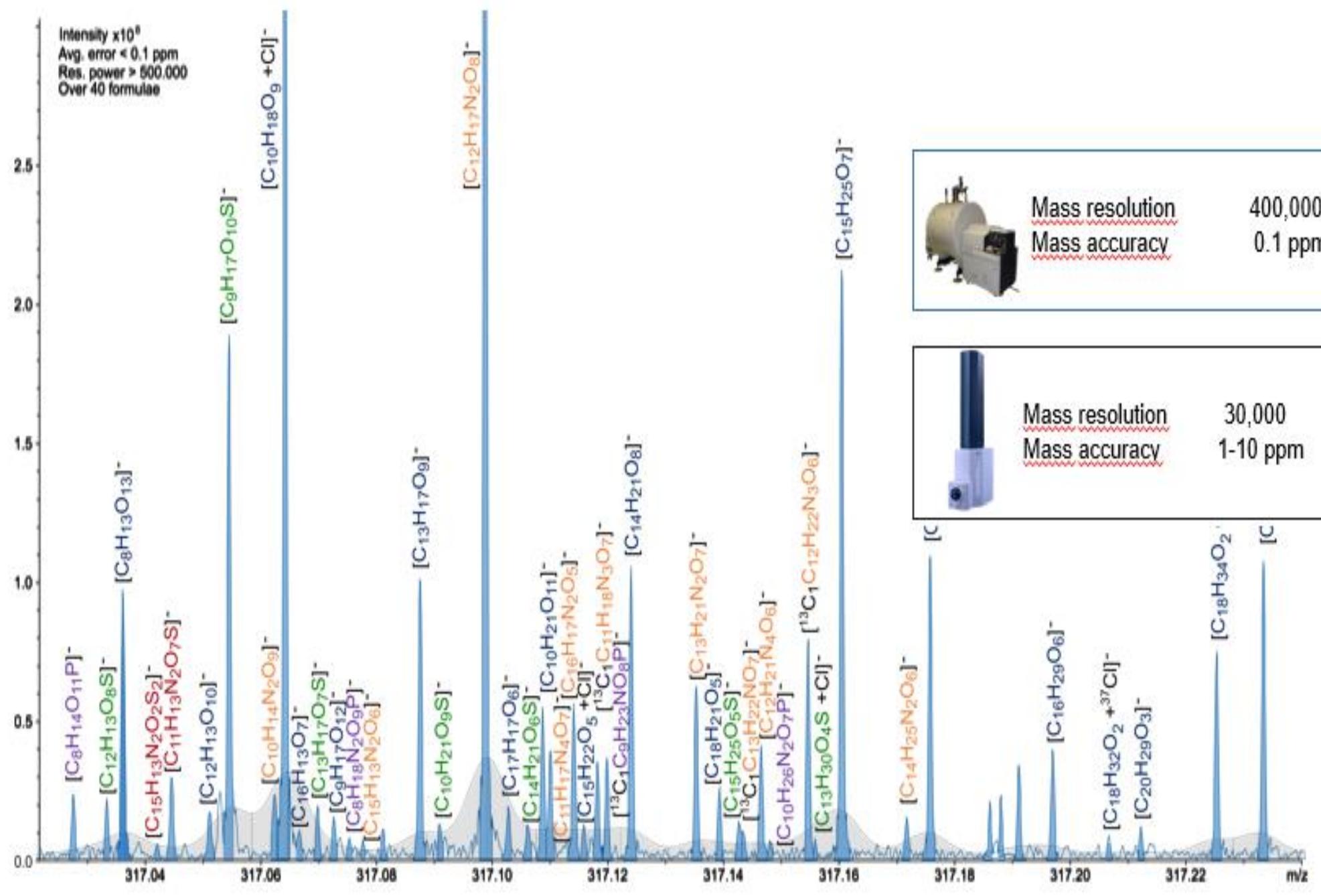
Grain

steeping, germination, kilning/roasting, adjuncts hydrolysis, oxidation, Maillard reaction



Ultra-hochaufgelöste Massenspektrometrie von Bier: FTICR-MS

(Fourier-Transform Ionenzyklotronresonanz Massenspektrometrie)



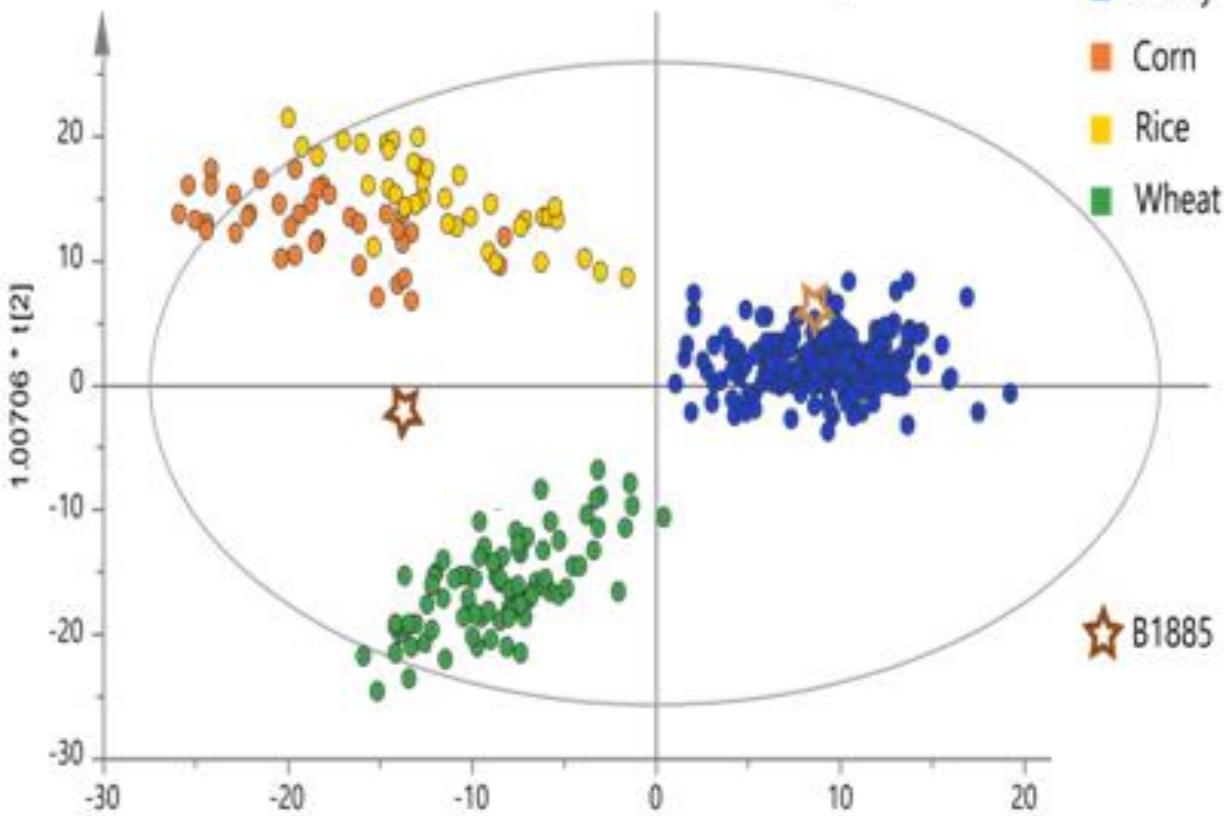
Mass resolution 400,000
Mass accuracy 0.1 ppm

Mass resolution 30,000
Mass accuracy 1-10 ppm

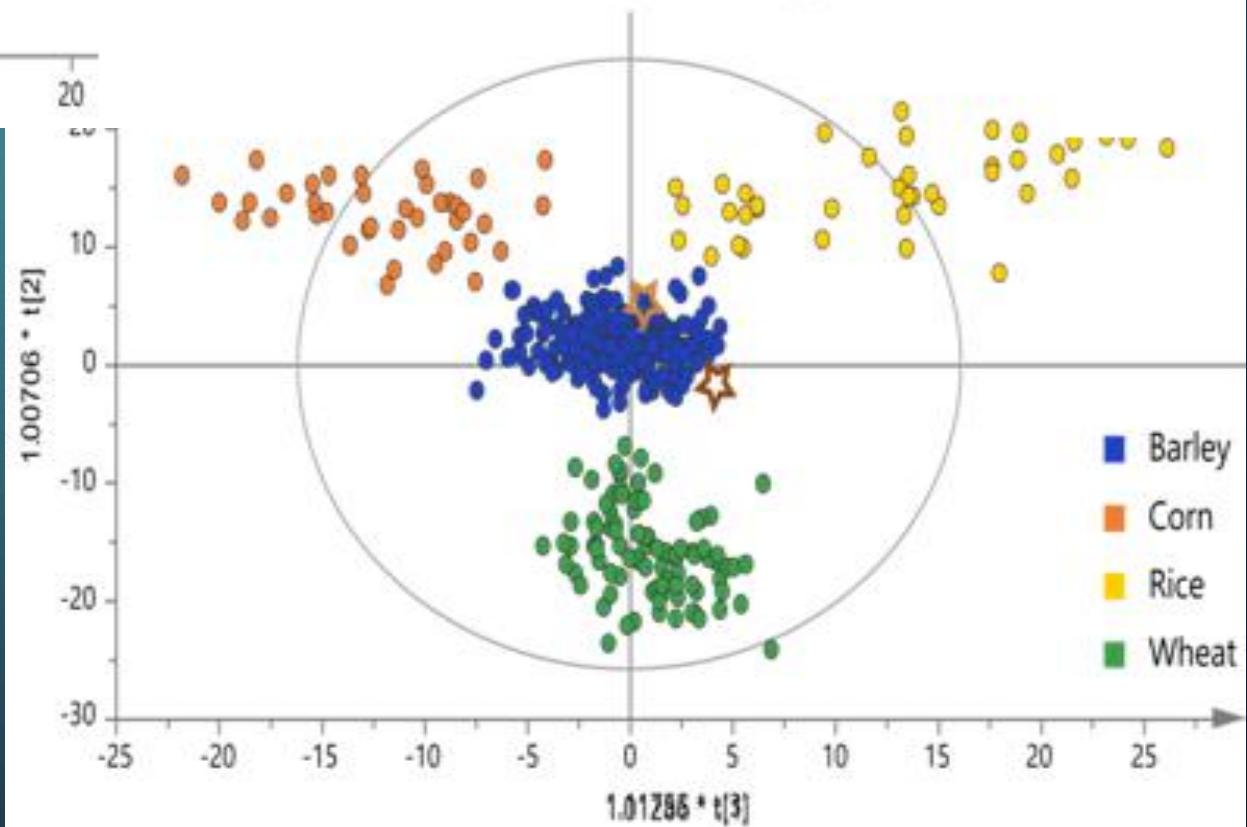


Unterscheidung verschiedener Getreidesorten mittels statistischer Auswertung (OPLS-DA)

Grain (1st and 2nd component)



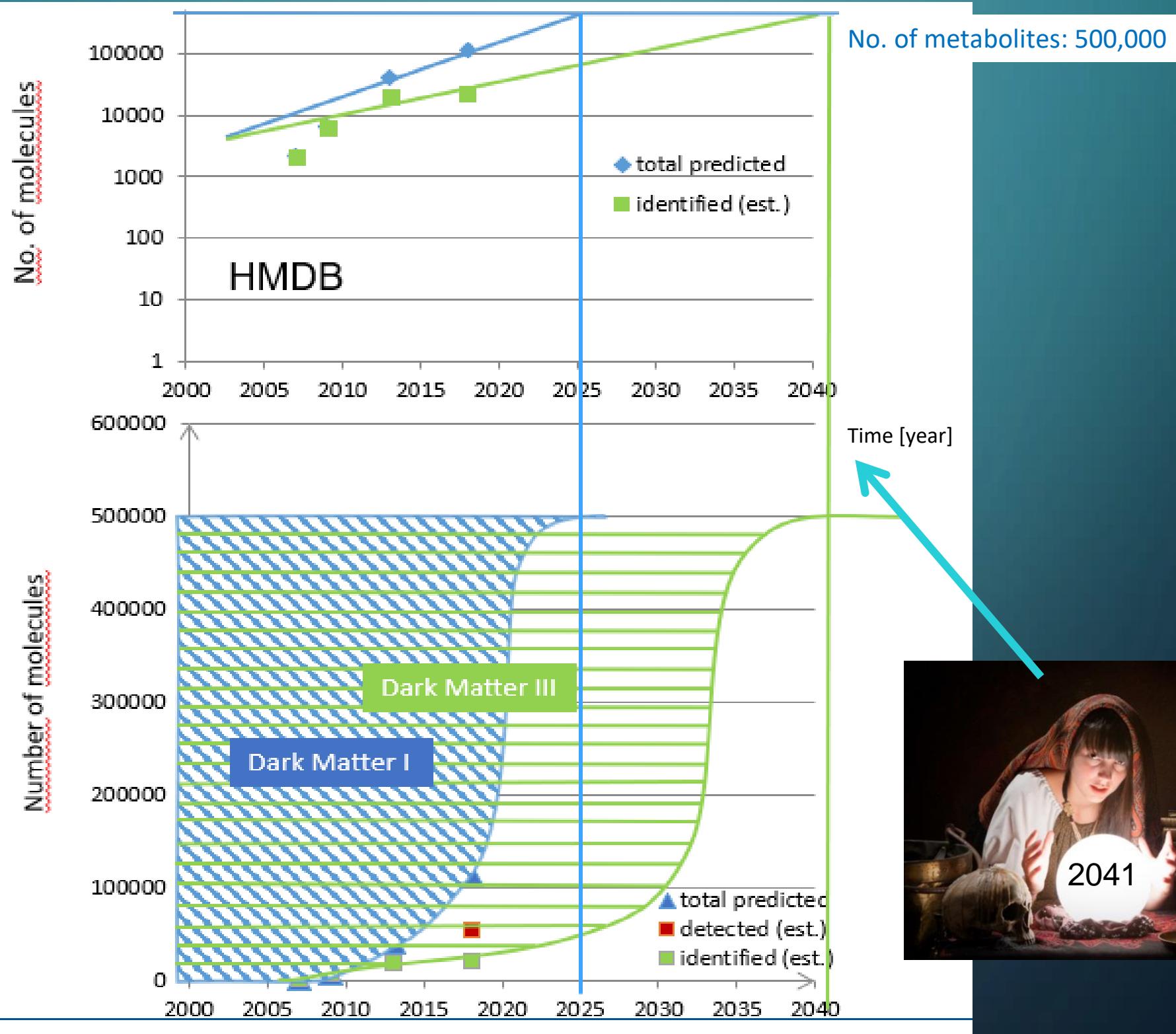
Grain (2nd and 3rd component)



Quelle: Pieczonka et al. (2021) On the Trail of the German Purity Law: Distinguishing the Metabolic Signatures of Wheat, Corn and Rice in Beer (2021) Front. Chem. 9:715372



Ein Blick in die Zukunft – das Wissen über identifizierte Metaboliten



Mehr Information dazu: <https://www.youtube.com/watch?v=KveS7Of1Ex4>