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Metabolomics application : profiling novel aquaculture feeds and assessing their impacts on rainbow trout (*O. mykiss*) plasma

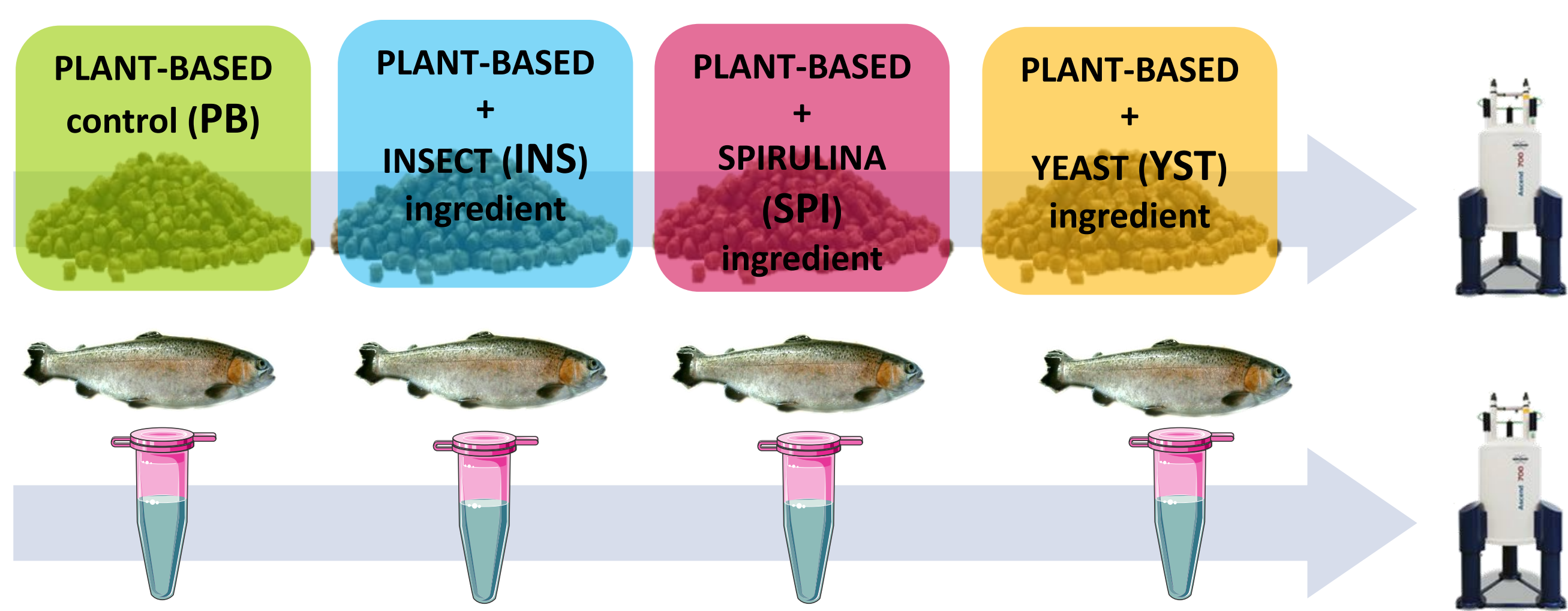
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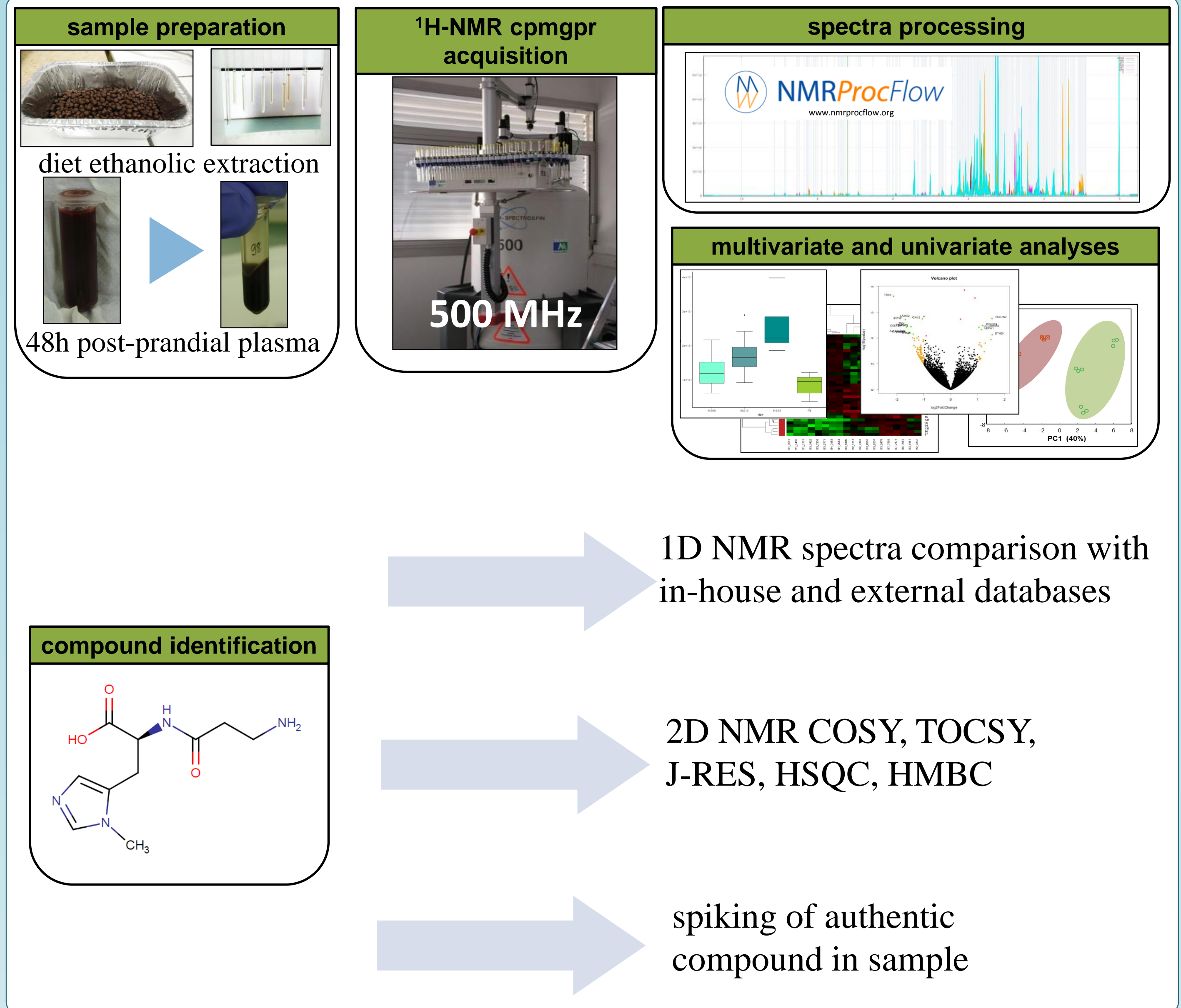
Context

Fish meals in fish feeds are optimal for an efficient development of carnivorous species such as rainbow trout. However, its supply by fisheries quotas is limited to support further development of aquaculture. The full substitution of marine resources by plant ingredients has shown reduced growth performances and altered metabolism in rainbow trout^{1,2,3}. Alternative protein ingredients are tested to complement full plant-based diets.

Objective: Identify **discriminant compounds** from alternative ingredients in the profiles of experimental **fish feeds** and depict the **metabolic state** of the fish through NMR-metabolomic approaches on **plasma**.

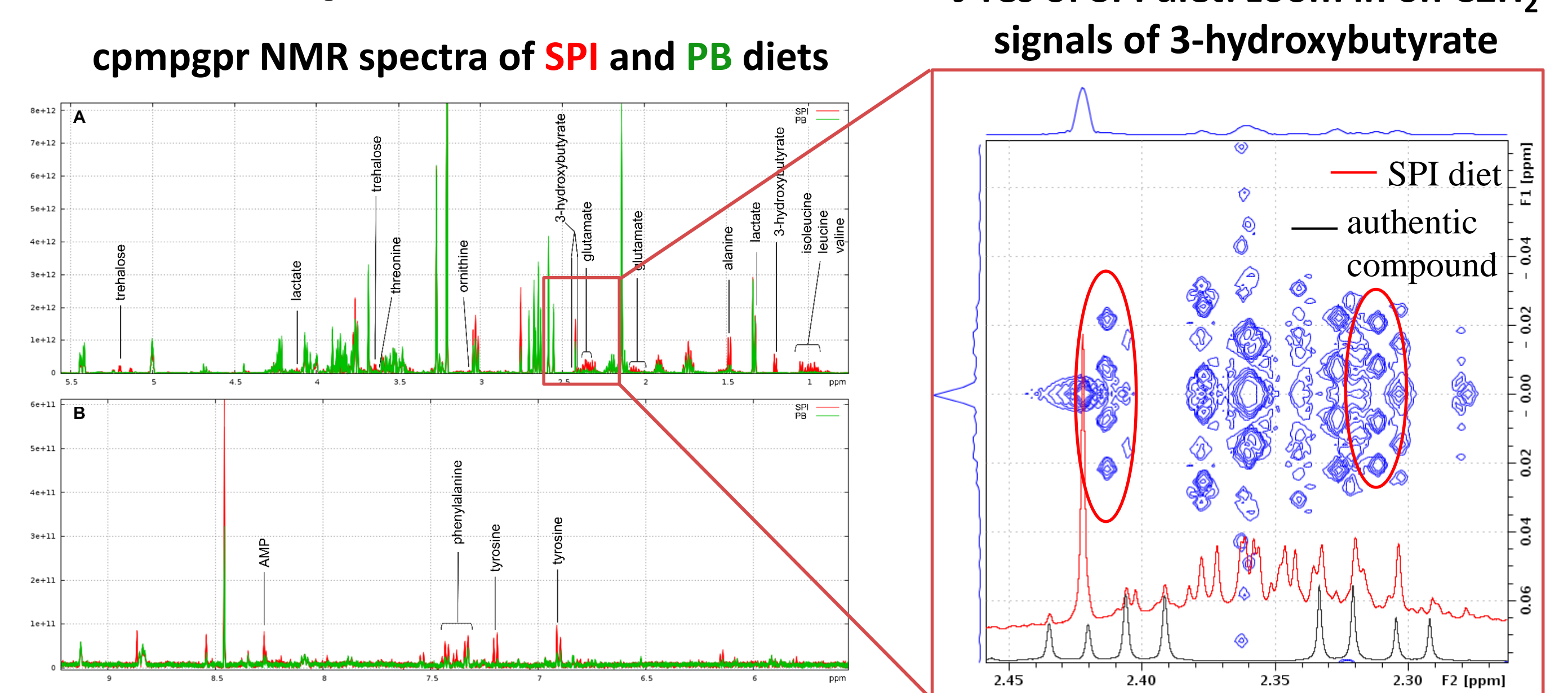
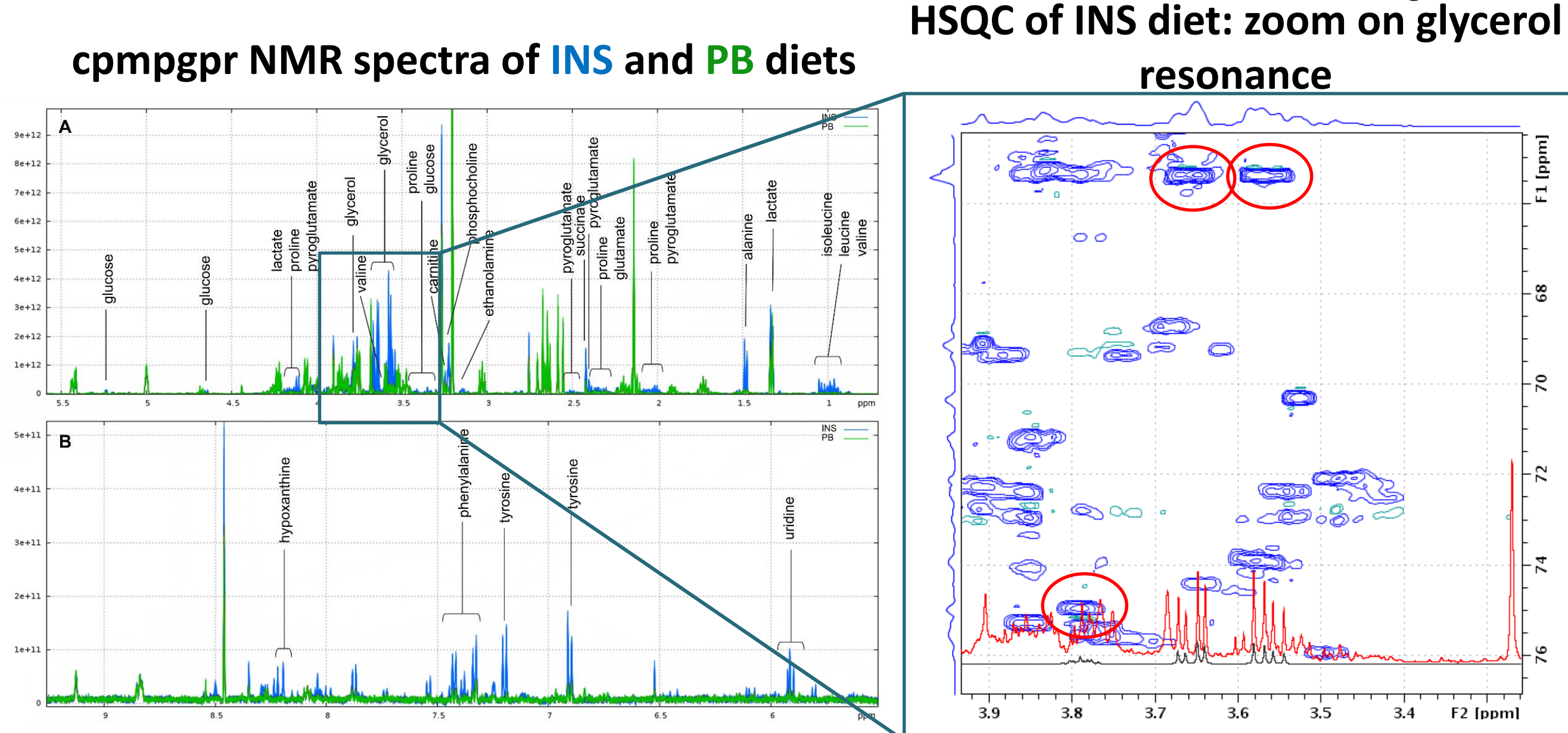


Approach

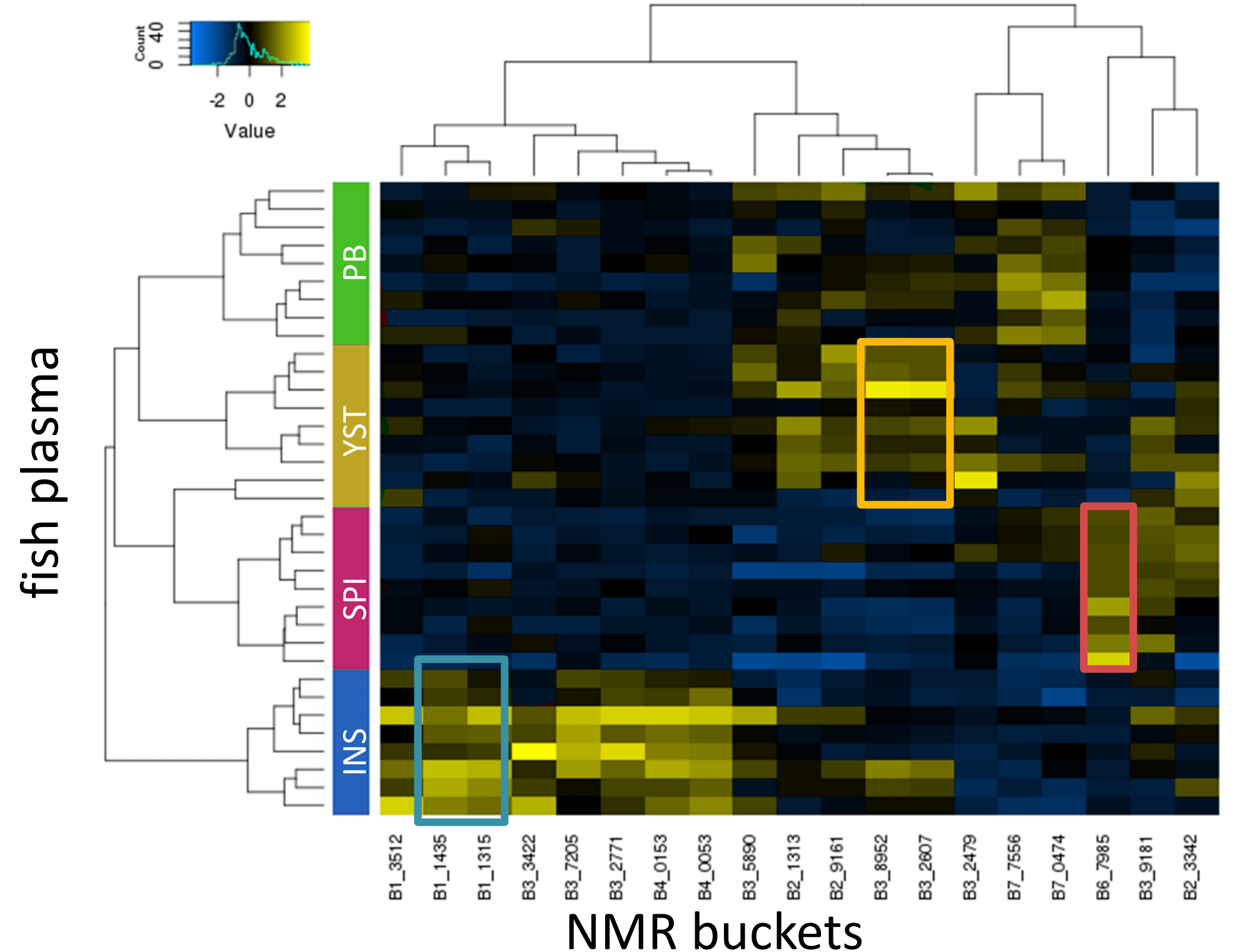


Major findings

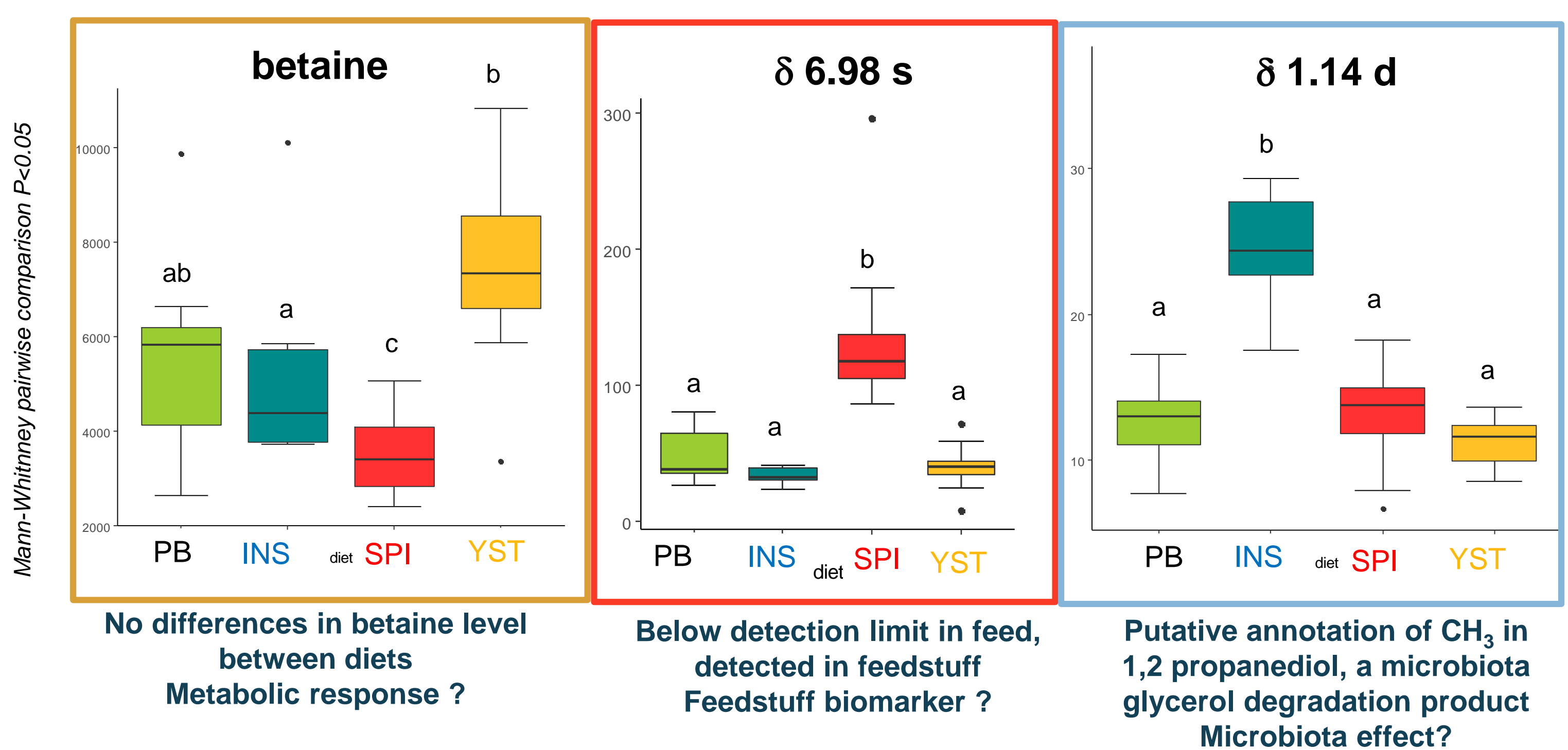
Identification of specific soluble compounds in diets



Hierarchical clustering analysis of 1H-NMR spectral buckets of trout plasma after ANOVA filtration



Markers in plasma



Conclusions

- An NMR-based metabolomic approach on feed has led to the identification of **unsuspected compounds** in insect and spirulina diet while only an unidentified singlet was discriminating yeast diet.
- Metabolomics on plasma highlighted **diet effect on plasma metabolome**. Signal identification is in progress for discriminant variables.
- Combining the characterization of diet and metabolic response in plasma **illustrate the interest of integrative metabolomics** to generate new hypotheses on the impact of alternative ingredient.

Perspectives

- Widen our integrative approach by profiling **liver and muscle**
- Establish **relationships** with zootechnical parameters for the development of new alternative diets

References

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