

Can Aquaphotomics ascertain the authenticity of tomato powder extracts?

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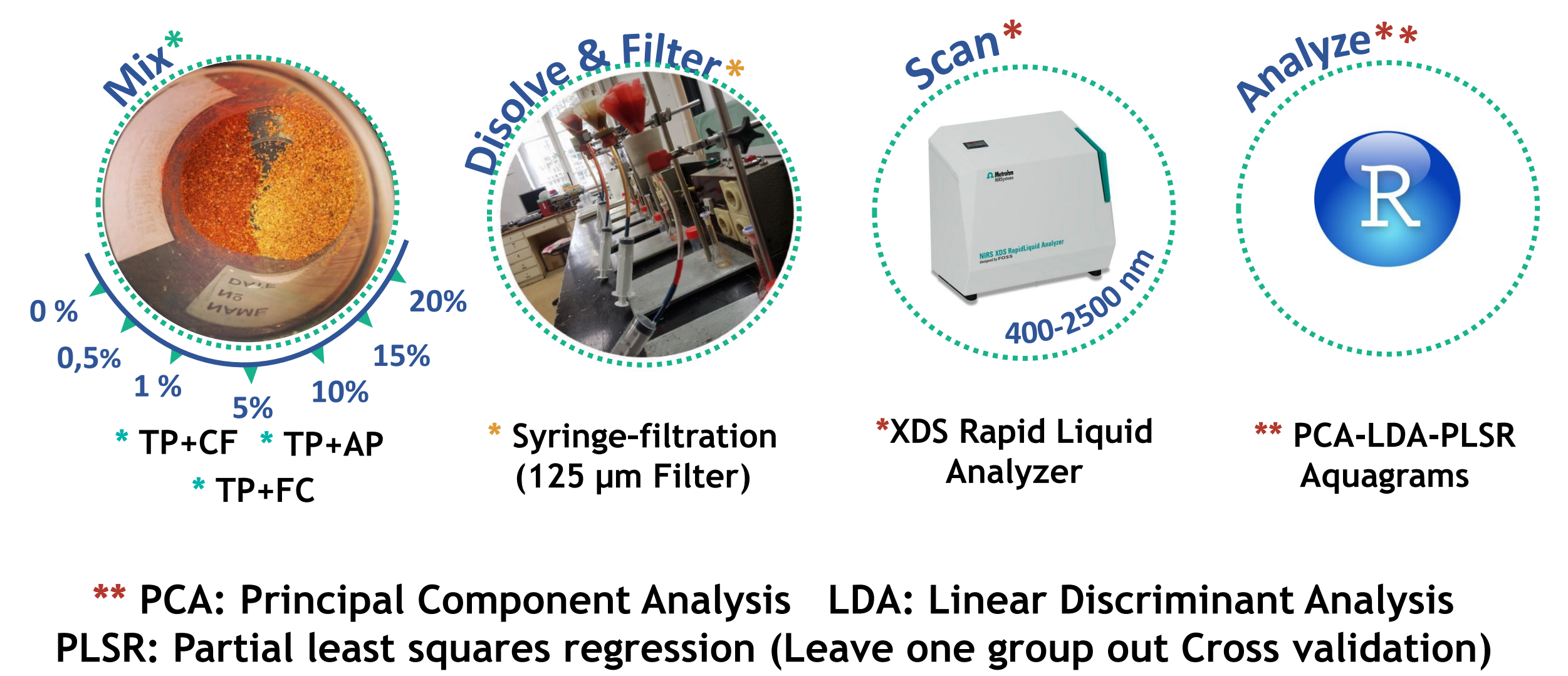
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STUDY OBJECTIVES

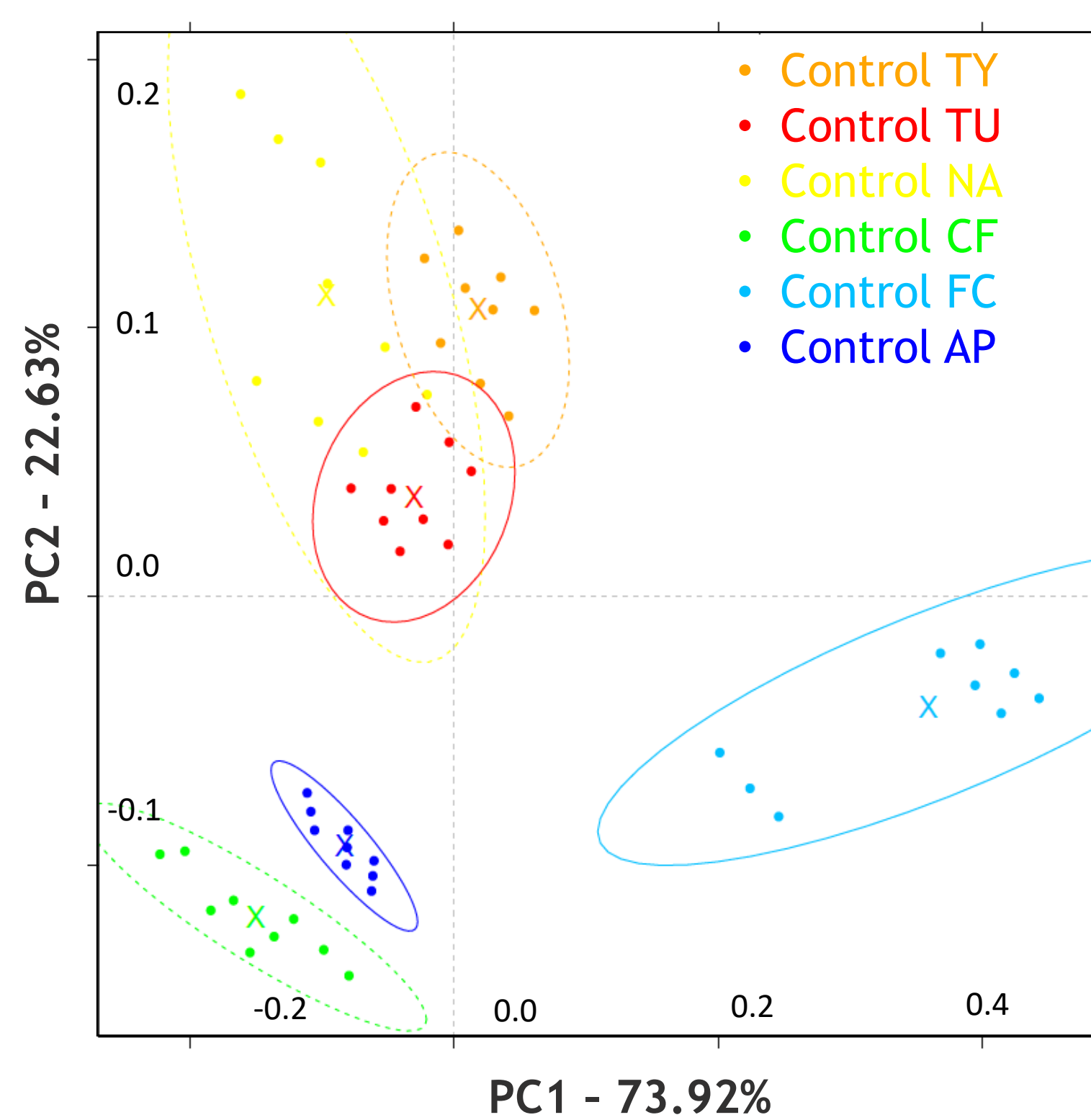
- Discriminate Authentic Tomato powder (TP) extracts from those adulterated with Corn flour(CF), Annatto seed(AP) and food colorant (FC)
- Accurately Predict the concentration of added adulterant(s)
- Assess the efficiency of Aquaphotomics in assigning distinctive WASP to the extracts

MATERIALS&METHODS



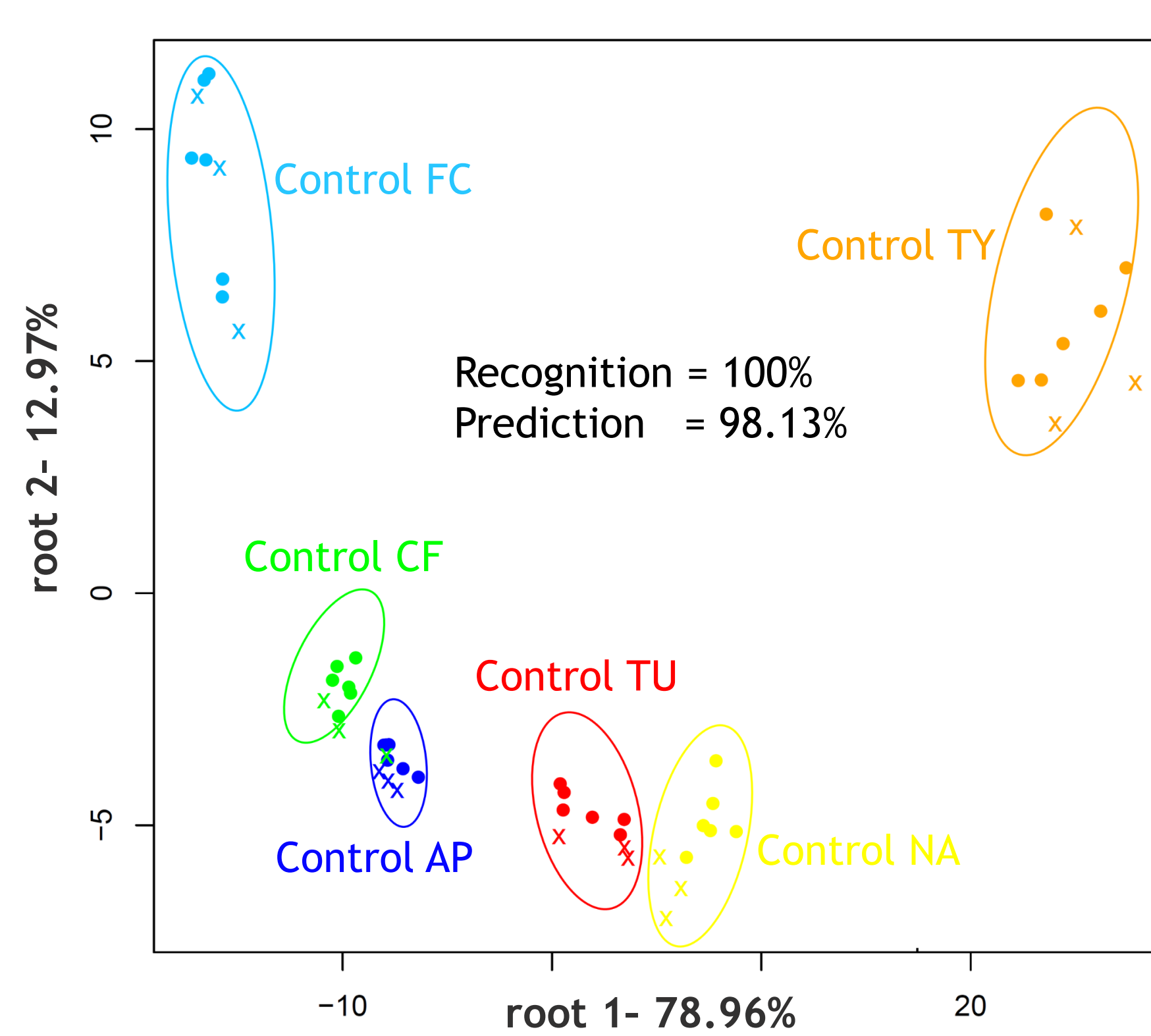
RESULTS

1 Principal Component Analysis (PCA)



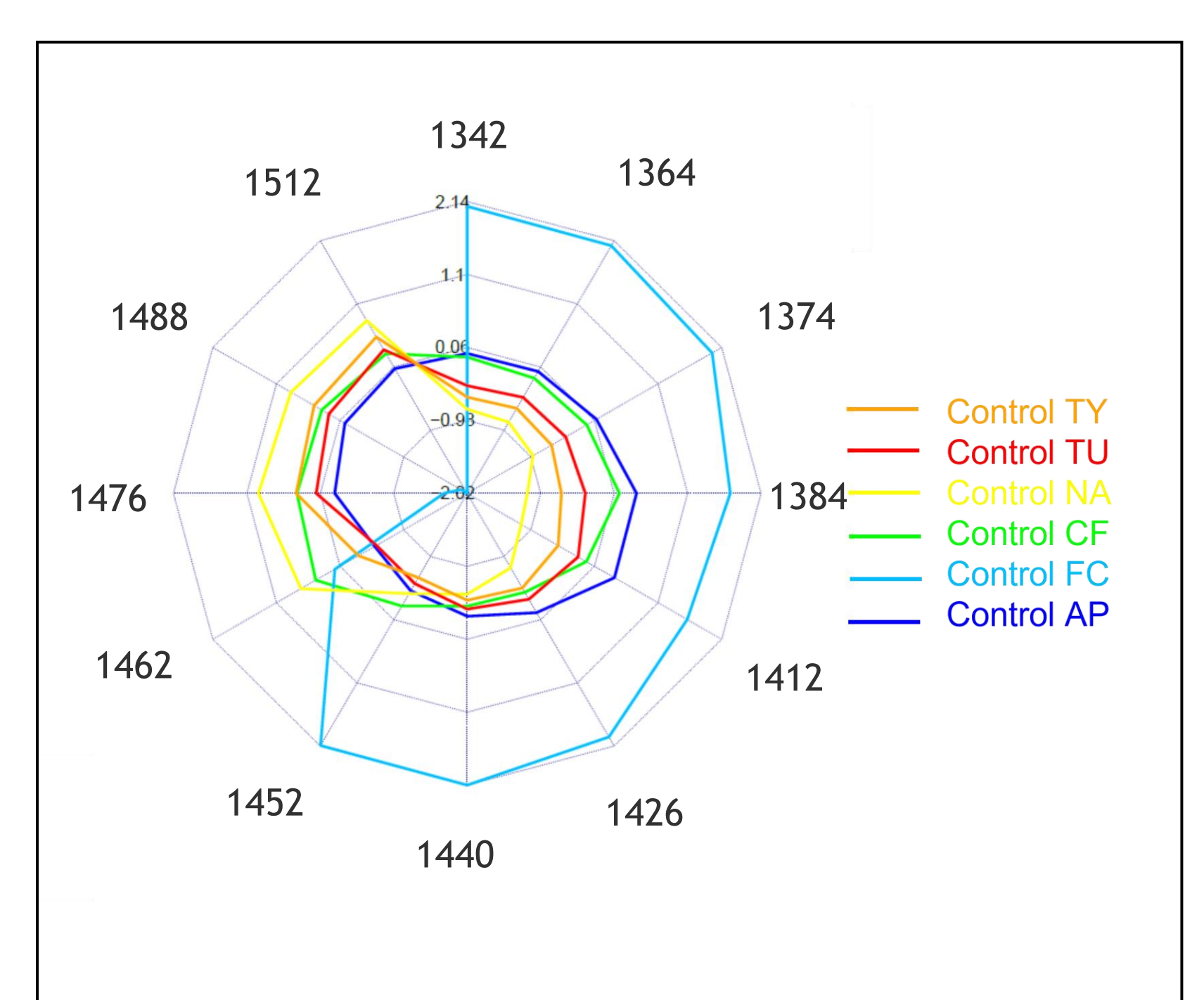
PCA on pure TP extracts and pure adulterants (CF, FC, AP) in the 1300-1600 nm range. N=54

2 Linear Discriminant Analysis (LDA)



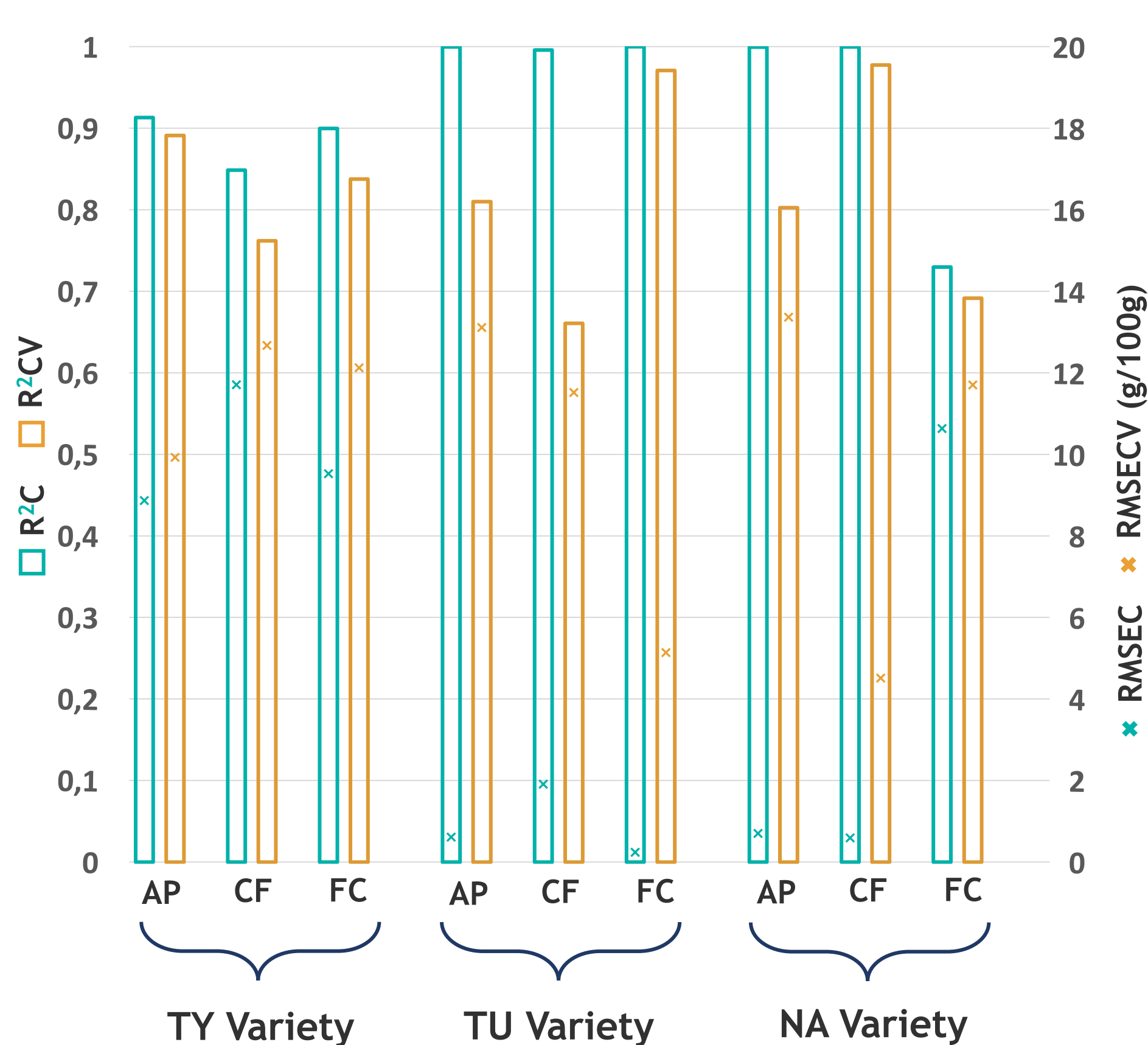
Classification plot of pure TP extracts (NA, TU, TY) and pure adulterants (CF, FC, AP), N=54, 3-fold CV

3 Aquagram of pure extracts and adulterants



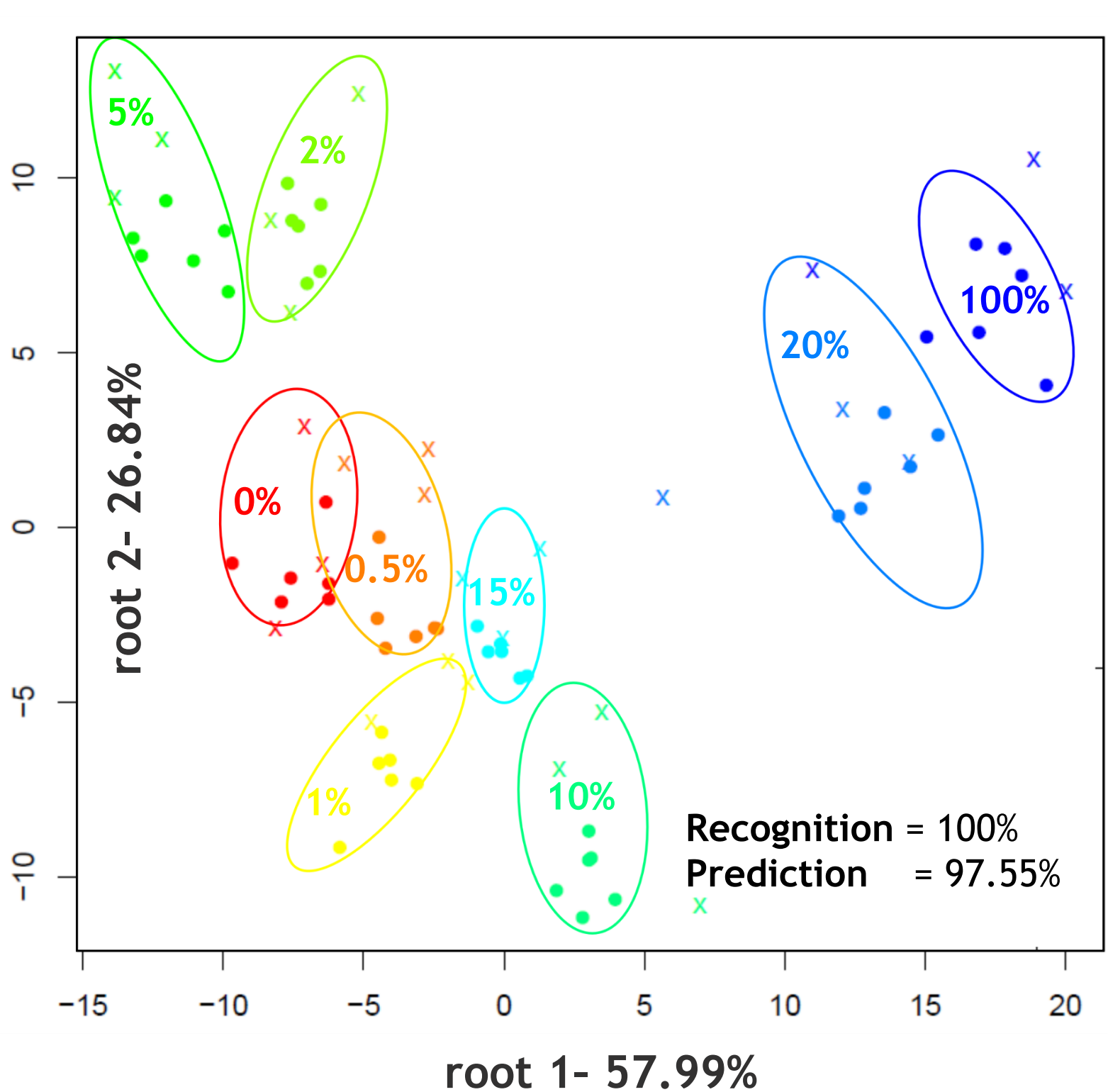
Aquagrams of pure TP extracts (NA, TU, TY) and pure adulterants (CF, FC, AP), N=54

4 Prediction of added CF, AP, FC in TP Extracts



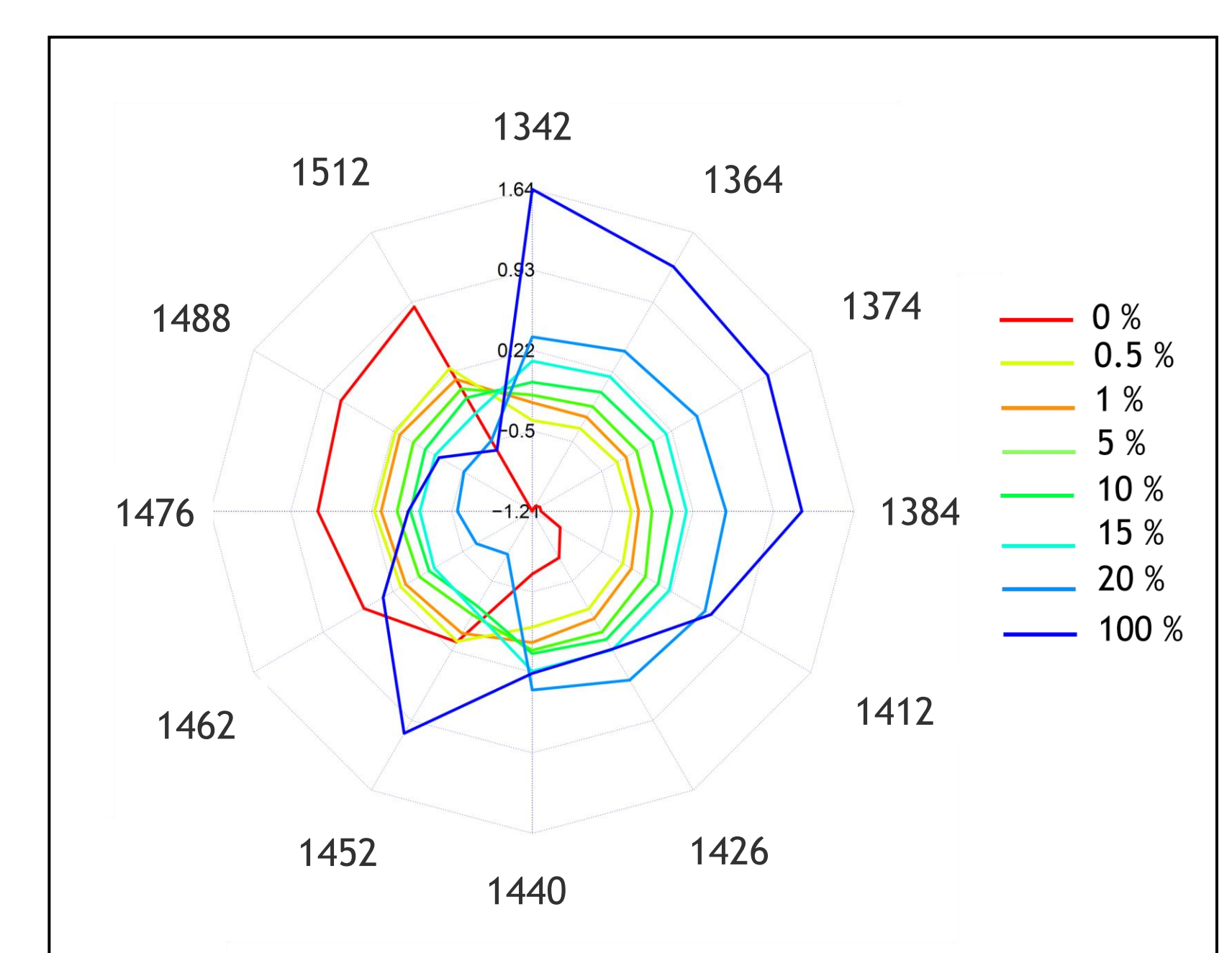
Bar chart illustration of the accuracy of prediction of CF, AP and FC in each of the TP extracts (TY, TU and NA)

5 LDA of CF-adulterated TP Extracts



Classification plot of CF-adulterated TP extracts by adulteration levels, N=81, 3-fold CV, Spectral pre-processing: Savitzky Golay (SG, 17pts)

6 Aquagram of CF-adulterated TP Extracts



Aquagrams of CF-adulterated TP extracts in the concentration range of 0.5-20% and pure TP (0%) and pure CF (100%)

Conclusion

- LDA model accurately classified the CF-adulterated tomato powders depending on their adulteration level.
- PLSR models accurately predicted the concentration of added CF, AP and FC in each of the TP extracts (TY, TU and NA).
- The water spectral pattern highlighted the gradual adulteration levels.
- The findings confirm the efficiency of NIR-based Aquaphotomics in authenticating tomato powder extracts

Acknowledgments

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