

Chemical profiling of South African honey: establishment of a regional reference dataset for origin determination and adulteration identification

Cesarina Edmonds-Smith¹, Janais Delport², Christopher Thurling¹, Neil Ravenscroft¹

¹Department of Chemistry, University of Cape Town, Cape Town, South Africa

²Melimetric, Department of Chemistry and Department of Biological Sciences, University of Cape Town, Cape Town, South Africa.

Due to the diverse and unique properties of honey, numerous markers qualifying a honey as authentic have been identified. Technologies required to analyse these markers has become more accessible and there are local facilities that offer screening tests. However, these services are limited by outdated South African legislation, which does not take into consideration significant advancements in honey adulteration. This legislation does not provide benchmarks for verifying the botanical and geographical origin of honey leaving the local industry vulnerable to honey fraud. The most common form of which occurs when authentic local honeys are blended with sugar syrups or cheaper, imported honeys, yet sold under the pretence of being a pure South African product.

Proton Nuclear Magnetic Resonance (¹H NMR) is a fast, reproducible method of sugar profiling, needing small quantities and little to no sample pretreatment. The various chemical shifts of unique compounds in different honey types can be used for the botanical and geographical origin identification as well as detection of adulterants and quality control.

Using ¹H-NMR over 150 unique honeys collected from various South African regions, with a focus on the Western Cape - a region with unique flora, have been profiled. Chemical profiles of the local honeys identified key sugars and trace chemical compounds that allow for origin checking and validation. This has resulted in the development of a reference data set that will aid in the identification and differentiation of honey by origin at a local and national level.

This reference set was used to evaluate commercially available honeys. Fermentation and processing indicators were detected and the key identifying sugars revealed a number of mislabelled and incorrectly classified honeys.

These sugar profiles combined with melissopalynological and physicochemical analyses, will result in greater quality control of the honey on South African shelves and gives consumers confidence in the product they are purchasing as well as providing the much-needed origin validation opening the door for the exploration of the export market.

A close-up photograph of a bee with orange and black stripes on its abdomen, positioned on a bright yellow flower. The background is a soft-focus yellow.

Chemical Profiling of South African Honey

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origin determination and adulteration identification**



Dr Cesarina Edmonds-Smith







Melimetric Collection

**GCFR – 9500 plant species
70 % not found anywhere else in the
world**

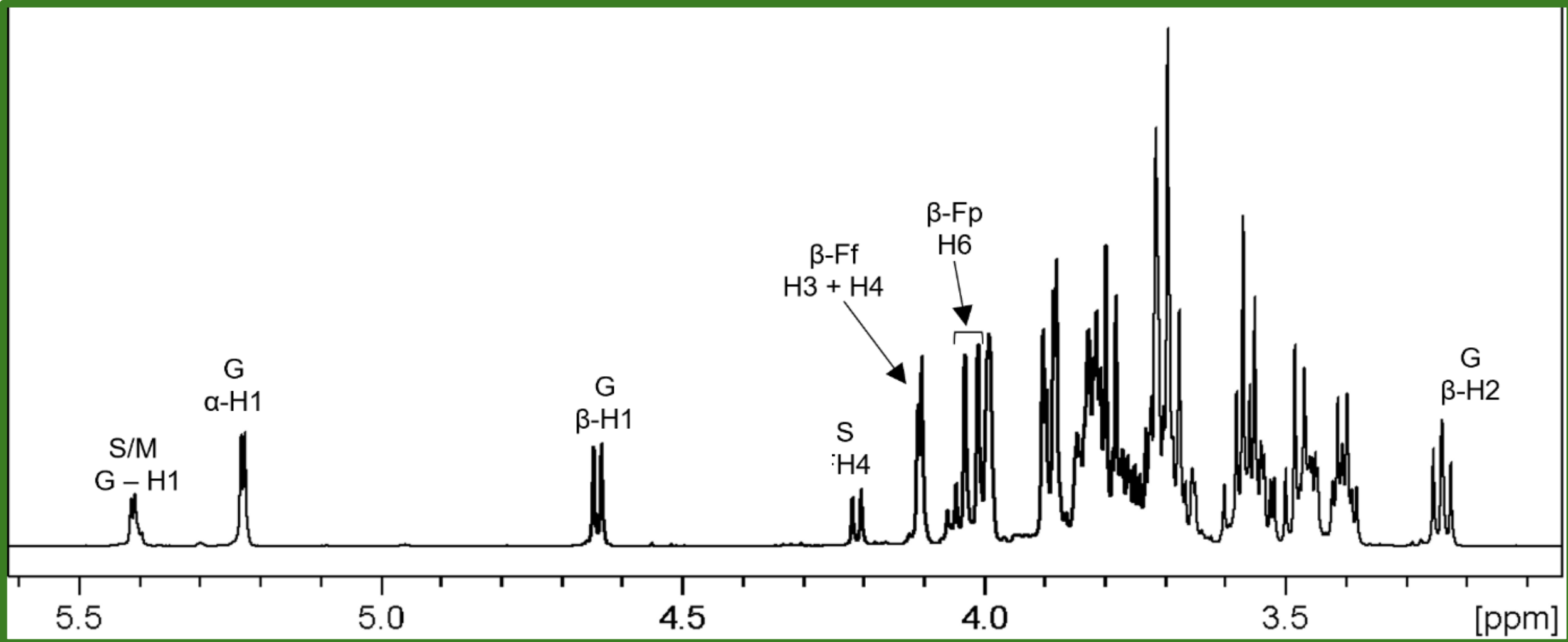


**191 samples from SA
151 samples from W Cape**



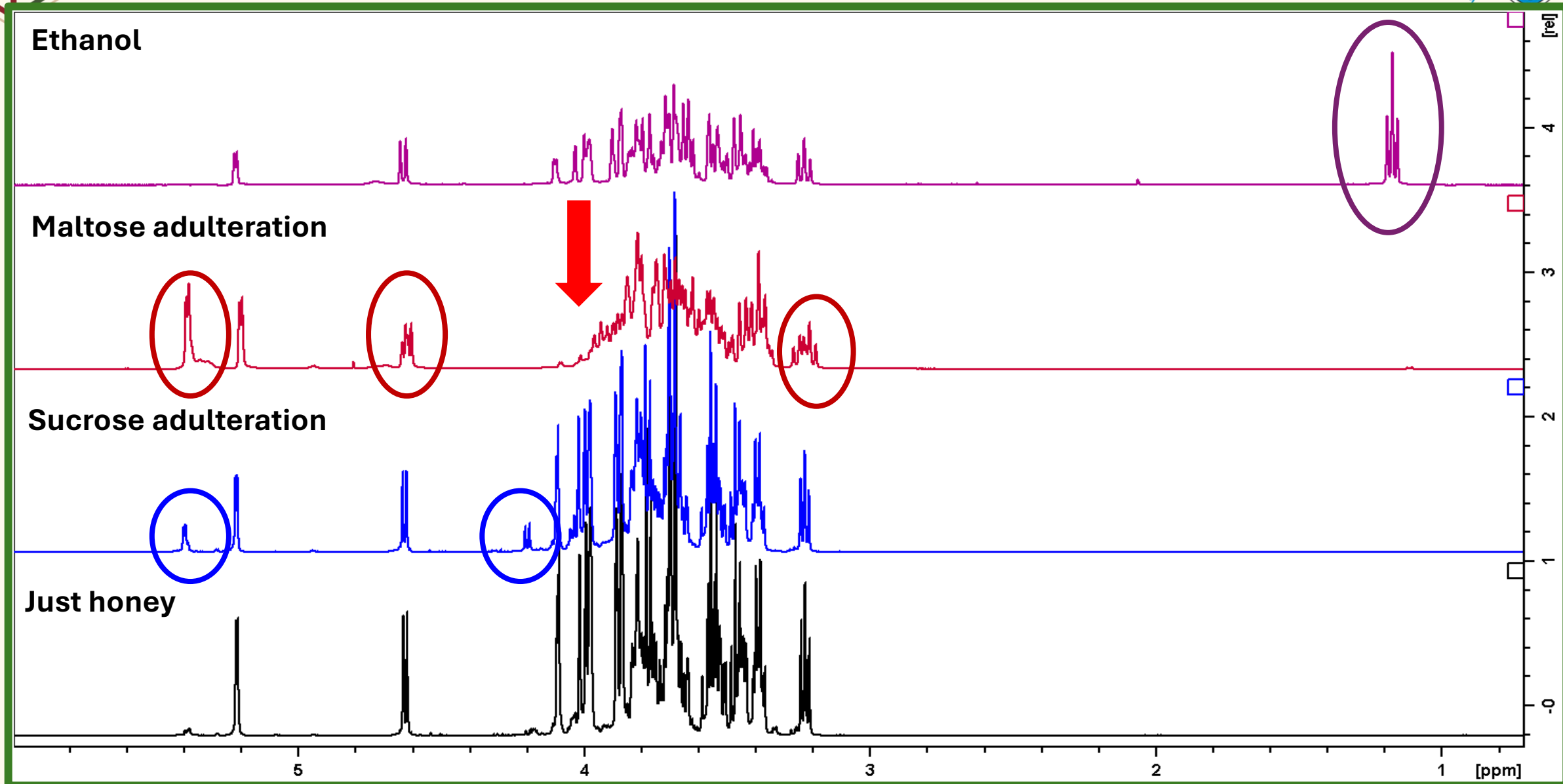


Sugar Profiles



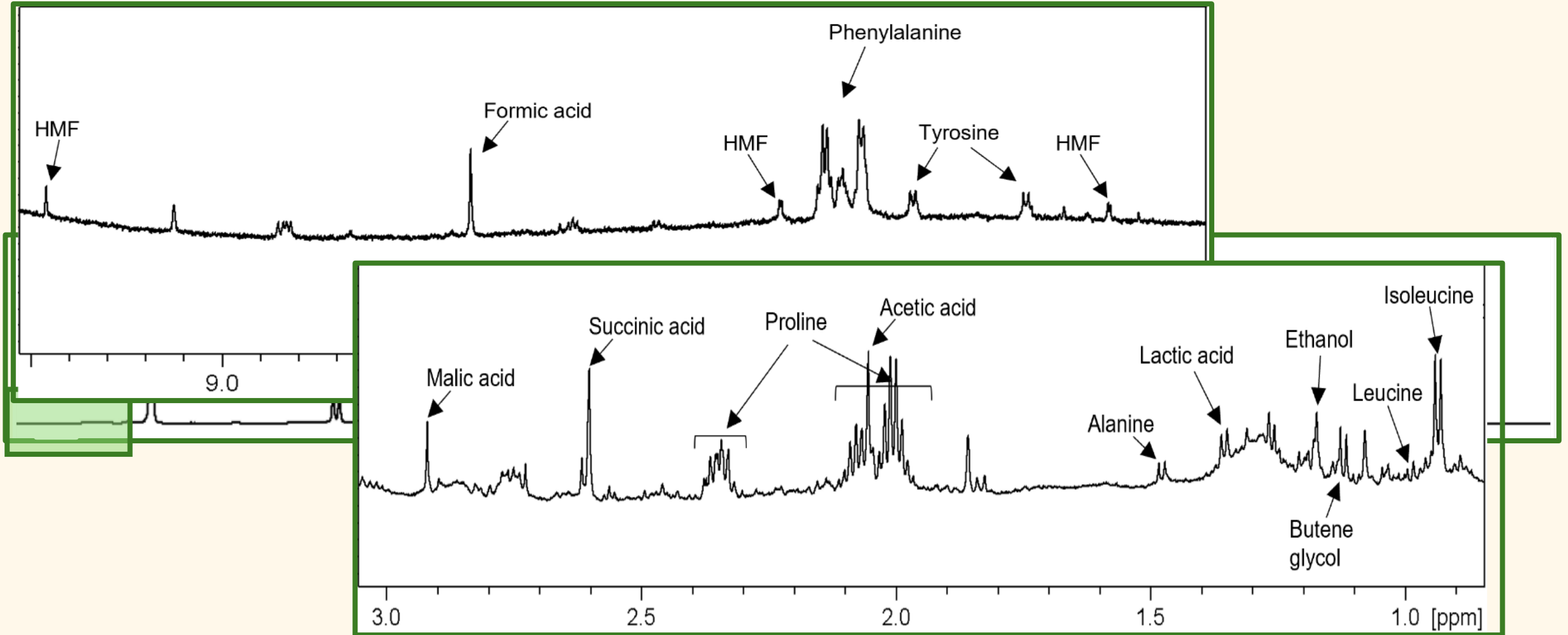


Spot the difference



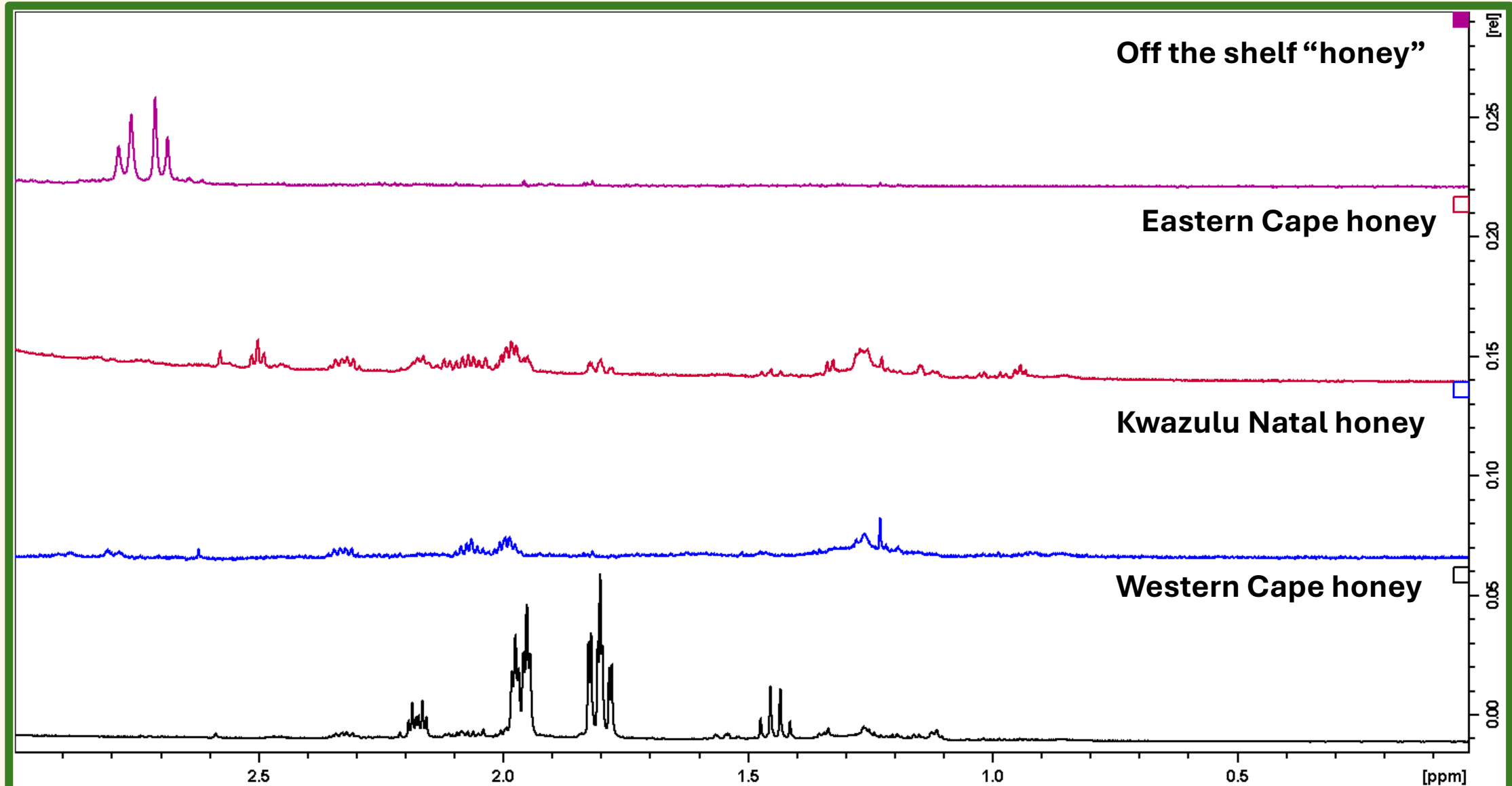


Trace components





Trace components

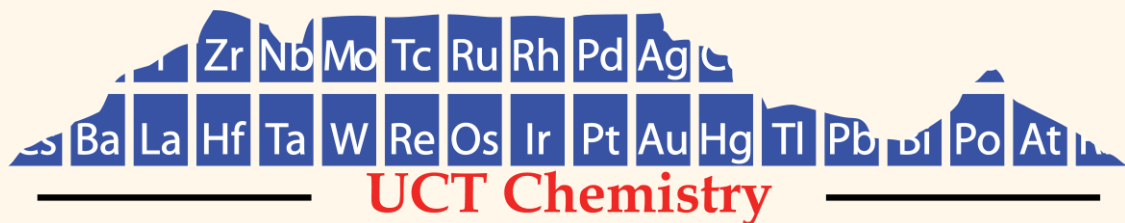


Thank You!

C.Edmonds-Smith@uct.ac.za



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