Exploring the Bioactive Compounds in Lentils and their potential for Health

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Lentils

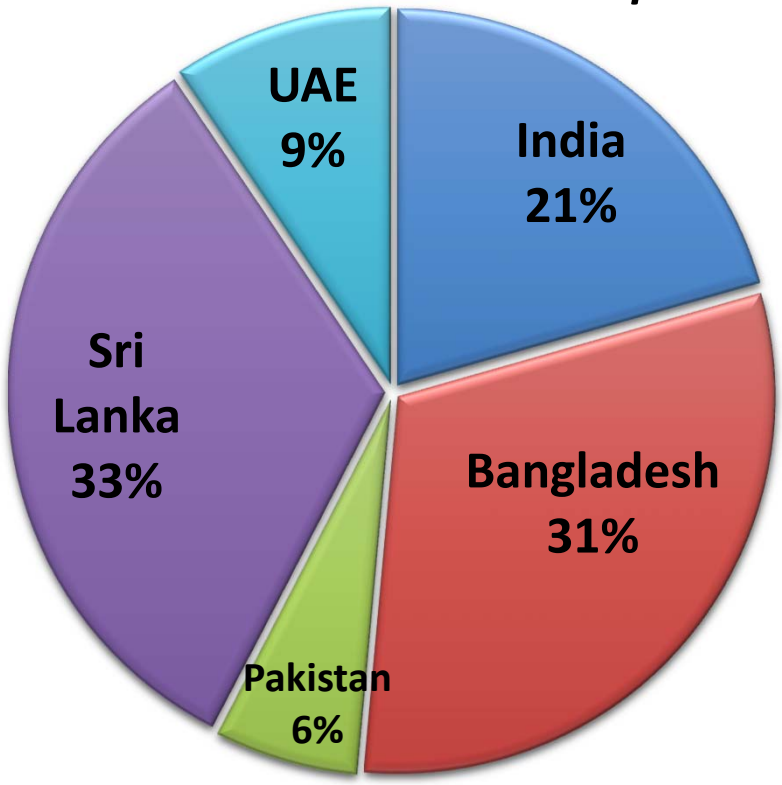
- **Indian green (large flat cotyledon)**
  - Eaten whole
- **Asian red (small cotyledon)**
  - Dahl, Flour, Purees, Soups, Stews, Thickening agents
- **Substitute food products**
  - Gluten intolerance
  - Vegans
  - Vegetarians

Australian Production

- **5 year average exports**
  - 279,000 tonnes
- **Export value**
  - $185 million
- 95% exported
- 90% are red lentil

(Pulse Australia, 2015)

2014-2015 Australian Lentil Export

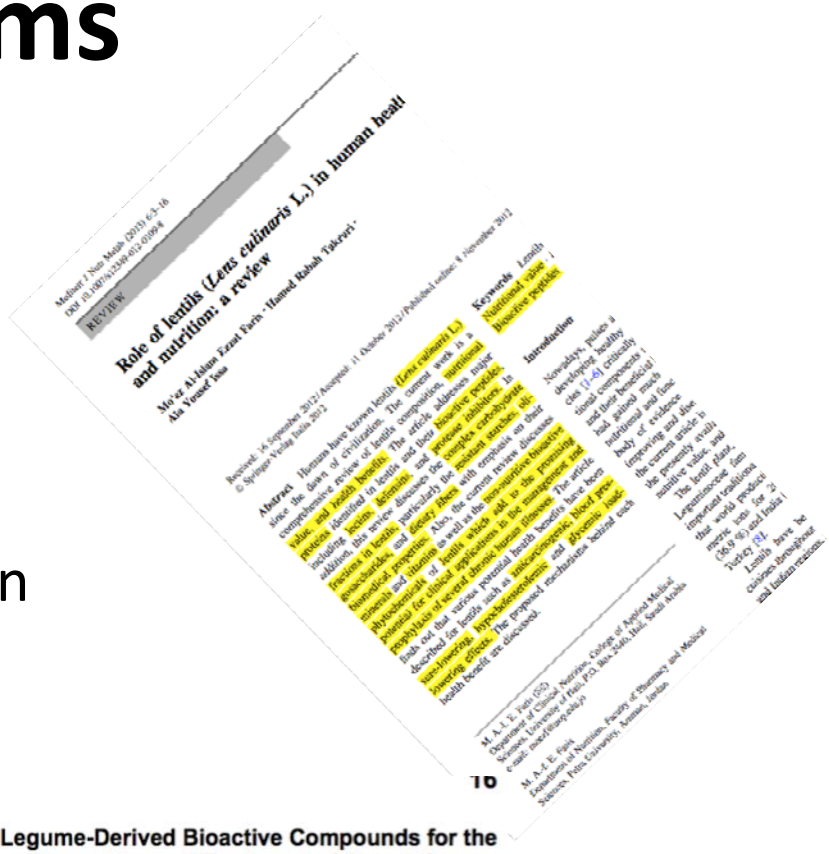


Health Claims

- Anti Cancer
- Anti Obesity
- Anti Hypertension
- Antioxidant

REVIEWS

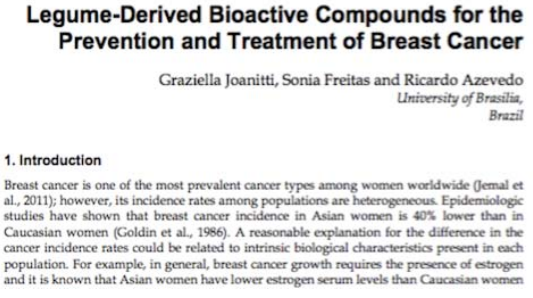
Phytochemicals for Health, the Role of Pulses



Role of lentils (*Lens culinaris* L.) in human health and nutrition: a review

Resveratrol: Anti-Obesity Mechanisms of Action

molecules



Legume-Derived Bioactive Compounds for the Prevention and Treatment of Breast Cancer

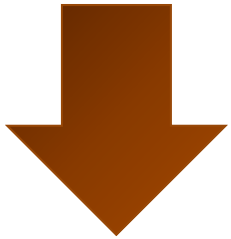
Graziella Joanitti, Sonia Freitas and Ricardo Azevedo
University of Brasília, Brazil

1. Introduction

Breast cancer is one of the most prevalent cancer types among women worldwide (Jemal et al., 2011); however, its incidence rates among populations are heterogeneous. Epidemiologic studies have shown that breast cancer incidence in Asian women is 40% lower than in Caucasian women (Goldin et al., 1986). A reasonable explanation for the difference in the cancer incidence rates could be related to intrinsic biological characteristics present in each population. For example, in general, breast cancer growth requires the presence of estrogen and it is known that Asian women have lower estrogen serum levels than Caucasian women

Bioactive Composition

Any primary or secondary metabolite that has an impact on cell function and maintenance

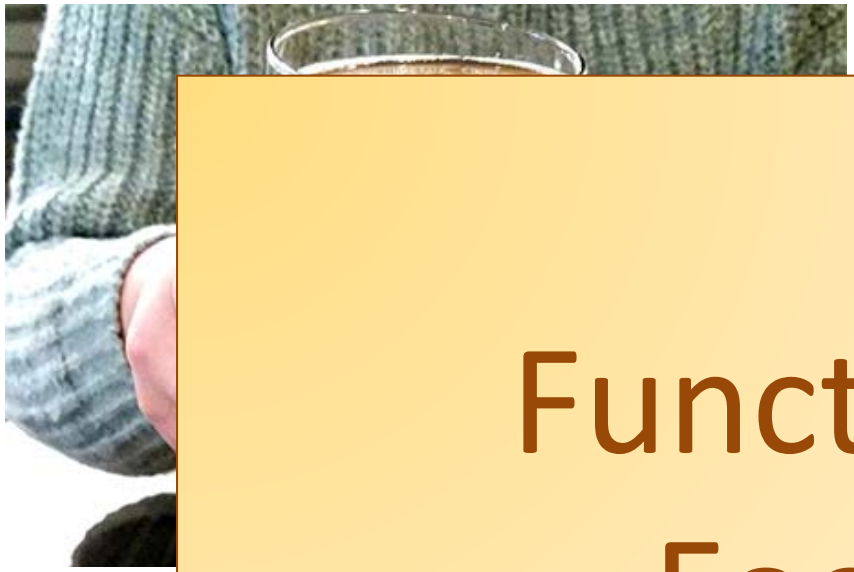


Functional food

Cardiovascular Disease (CVD): Lentils significantly lowered blood pressure in a hypertensive rat model (Kendall, de Souza, Jayalath Cozma & Sievenpiper, 2014).

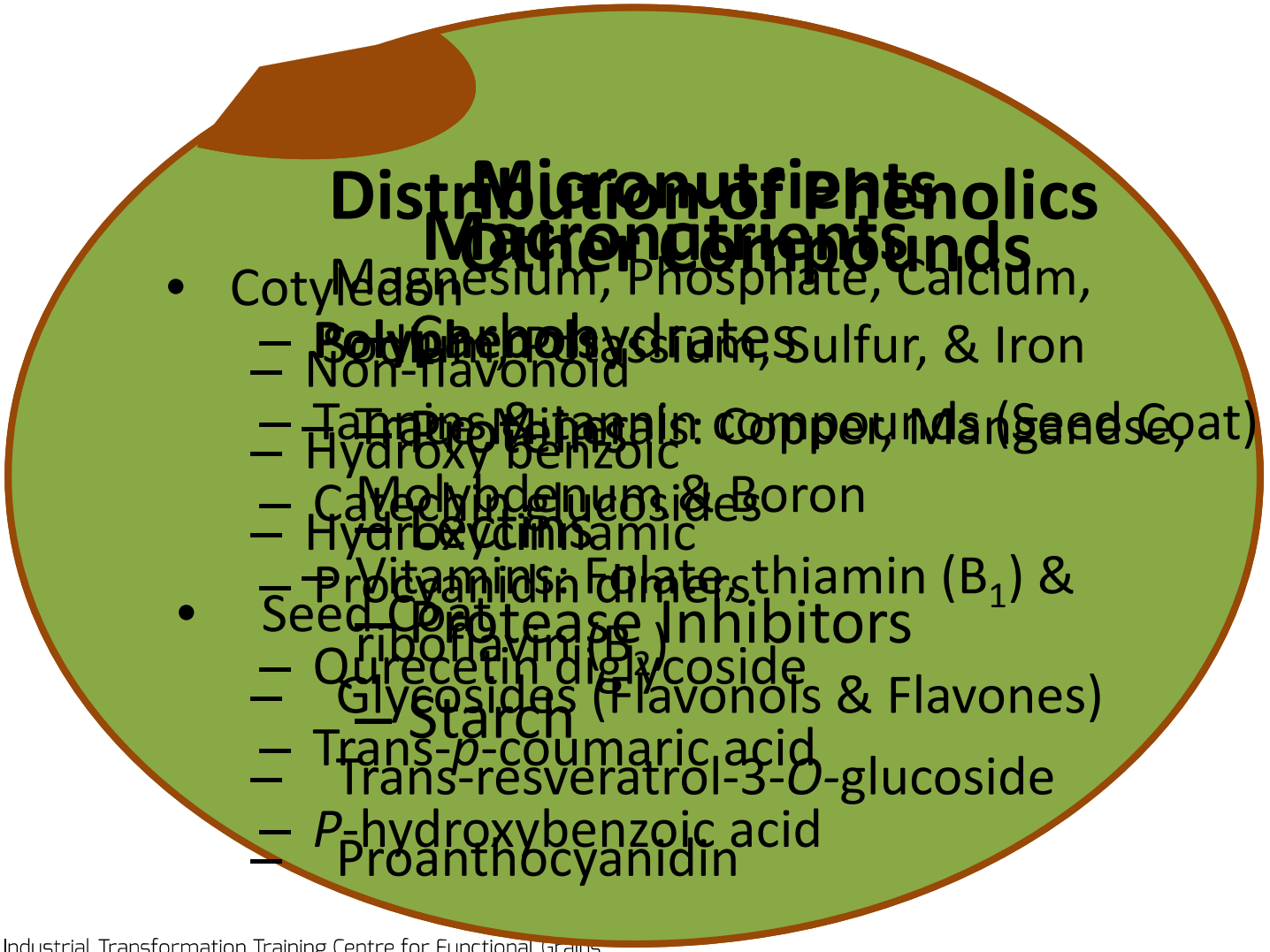
Obesity: Human cohorts fed lentils leading to noticeable weight loss and improved glycemic control (Hanson, Zahradka & Taylor, 2014).

FGC
Functional Grains Centre



Functional Food?

Lentil Composition



Project Overview

FGC
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- **Identification of the bioactive compounds in lentils.**
- **Comparison of bioactives compounds between lentil cultivars.**
- **Changes in bioactives.**
  - Germination
  - Environment
  - Processing
- **Presence of inhibitors & inhibitory actions of lentil extracts.**
- **Chemometric model**

Investigation of Inhibitors

- Hypertension
  - **ACE Inhibitors (ACEi)**
  - O-aminobenzoylglycine fluorescence assay.

- Obesity
  - **Pancreatic Lipase Inhibitors**
  - Porcine pancreatic lipase inhibition assay.

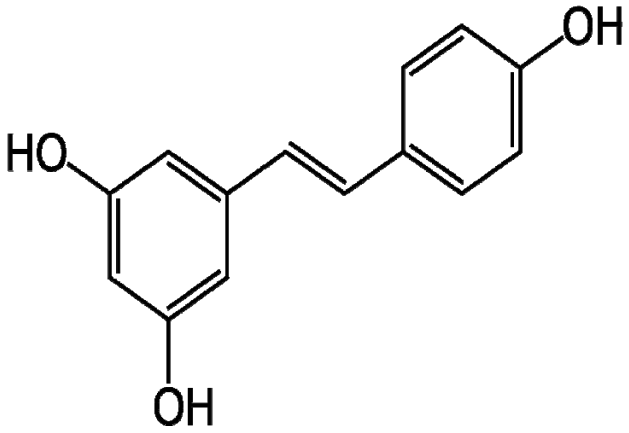
Investigation of Chemical Composition

- **Determination of Total phenols (TPC)**
  - Folin Ciocalteau assay.

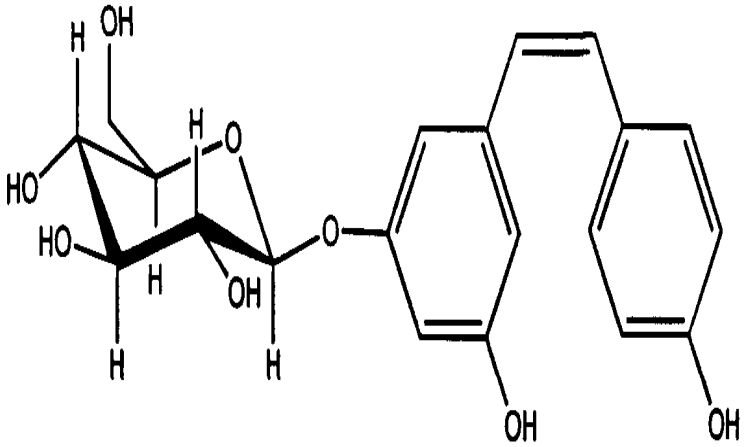
- **High Performance Liquid Chromatography**
  - RPLC-DAD.

- **Liquid Chromatography & Mass Spectrometry**
  - LCMS.

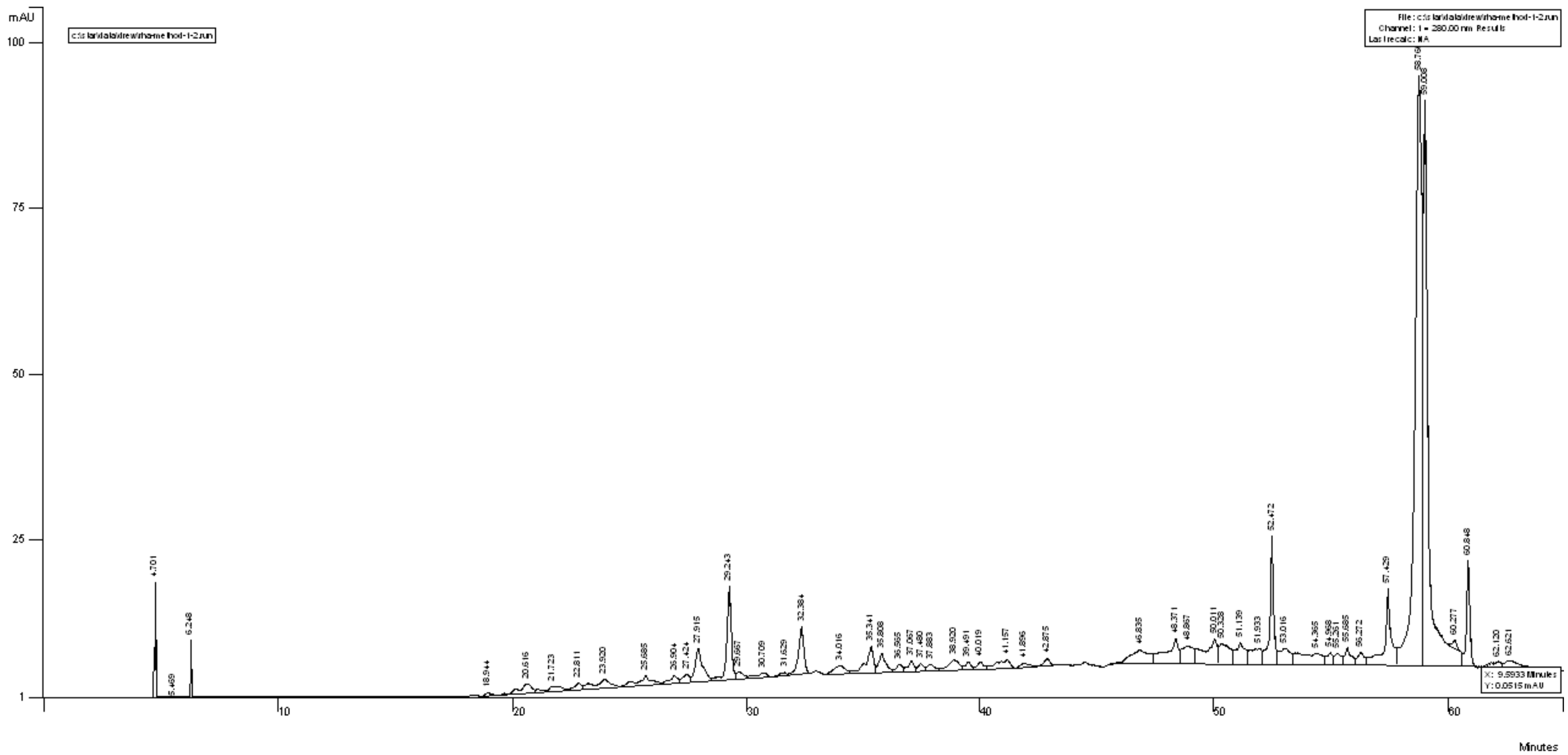
To hydrolyze or not ?



Resveratrol



Resveratrol glucoside


mAU
100
75
50
25
1
10
20
30
40
50
60
Minutes
4.701
6.248
29.243
32.384
52.472
57.429
60.848

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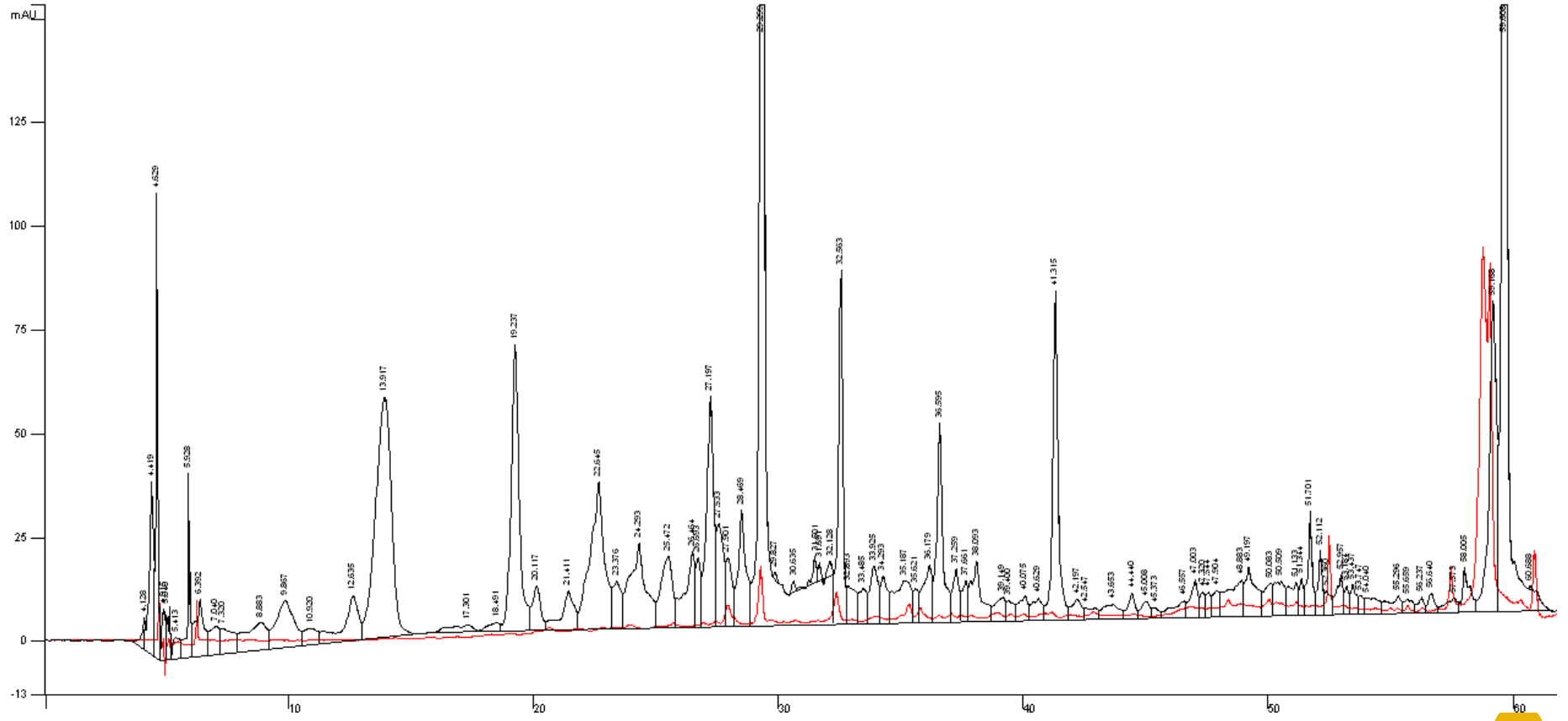

ARC Industrial Transformation Training Centre for Functional Grains

Lentil Samples

Australian Red	Canadian Red	Australian Green	Canadian Green
Nipper	Blaze	Flash	Milestone
Bounty	Red Bow	Cobber	Sedley
Herald	Red Chief	Aldinga	
Hurricane	Rosebud	Matilda	
Northfield	Ruby	Boomer	
Nugget		Greenfield	
Ace		Giant	
Blitz			
Bolt			
Digger			
Jumbo			

(Green n= 10, Red n= 16, Sample Size n= 25)

Charles Sturt University

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Functional Grains Centre

Thank you for listening

Questions?

State Government Victoria
Department of Economic Development, Jobs, Transport & Resources

Federation University Australia

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csu.edu.au/research/fgc