



DEPARTMENT OF
ANIMAL AND FOOD SCIENCES



Impact of probiotics on the metabolome of cow and goat milk yogurt

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Introduction

- Probiotics are micro-organisms that are beneficial for the human gut.
- The addition of probiotics to fermented dairy products such as yogurt produces health potentiating bioactive compounds.
- The role of metabolites in yogurt quality during storage might also reflect starter cultures' metabolic behavior.
- Metabolomics is one of the most promising approaches for investigating metabolite changes in fermented dairy products

Methodology

**Cow Milk and
Goat Milk**

Fermentation

**Yogurt + Probiotic
culture (20 DCU/L)**



**Incubation
(42°C)**



**Metabolite
extraction
and
derivatization**

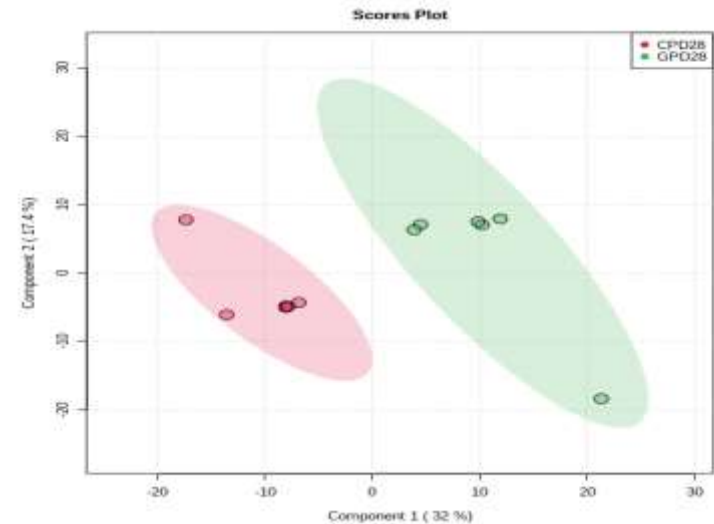
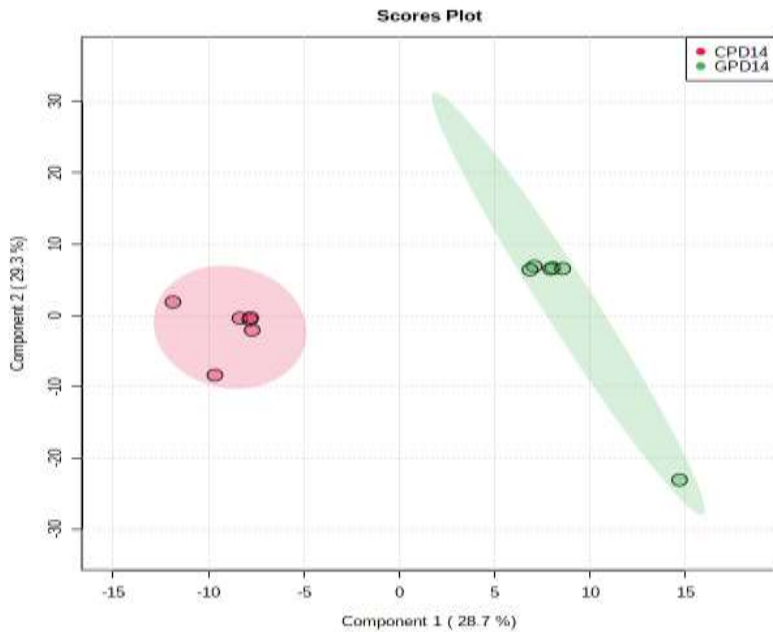
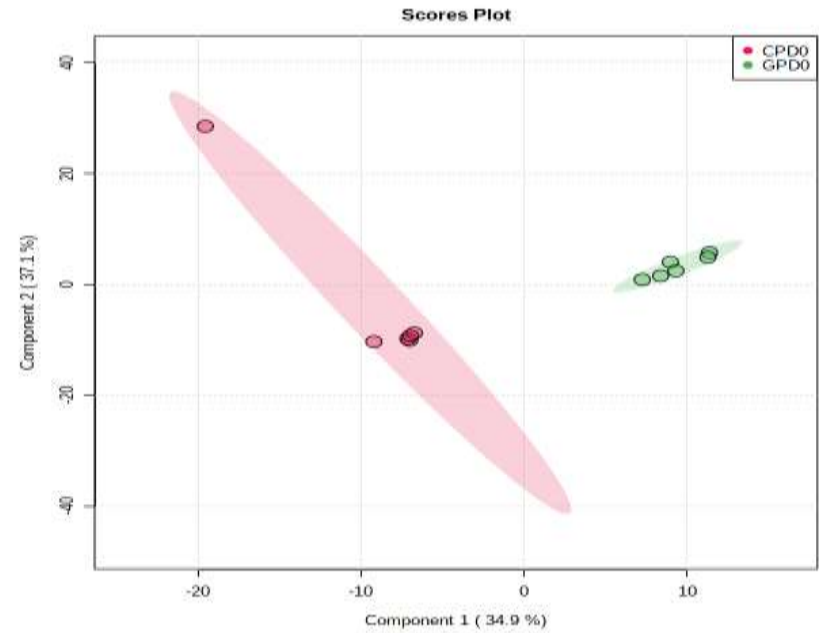


**GC-MS
analysis**

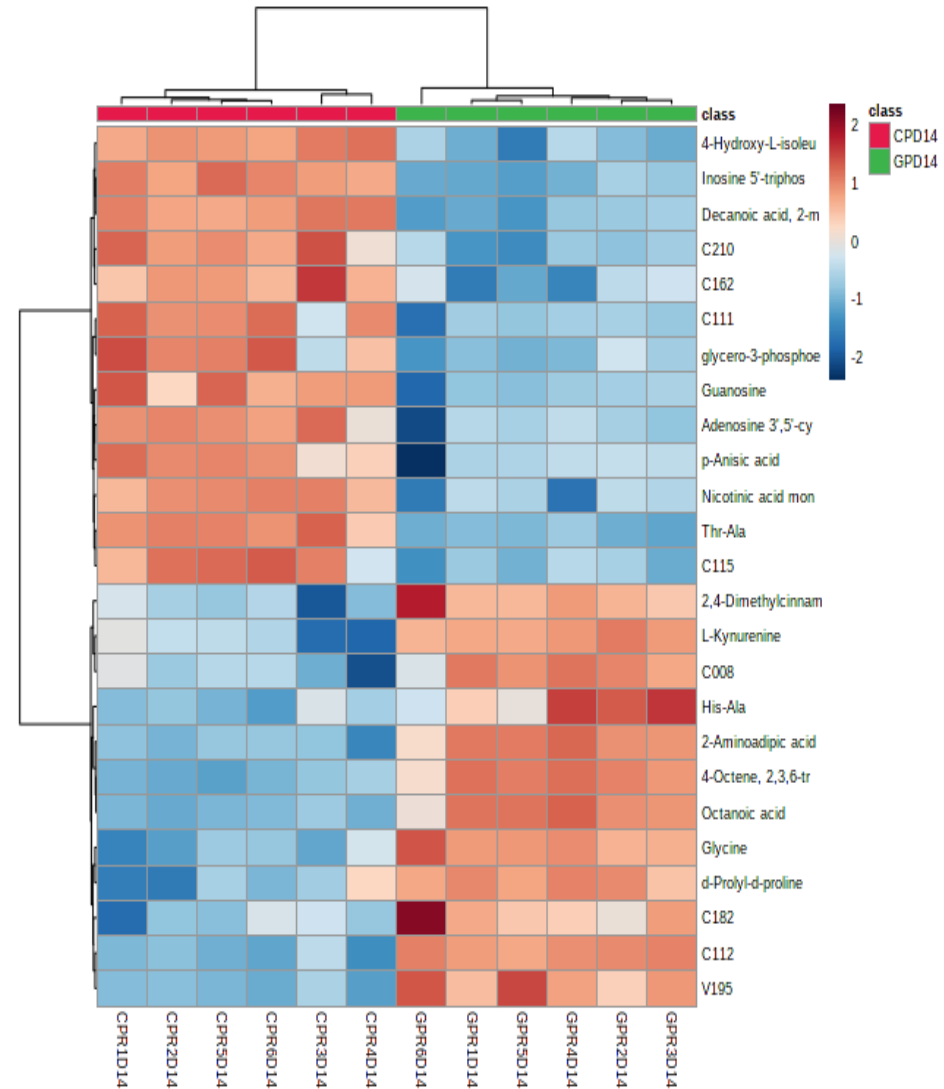
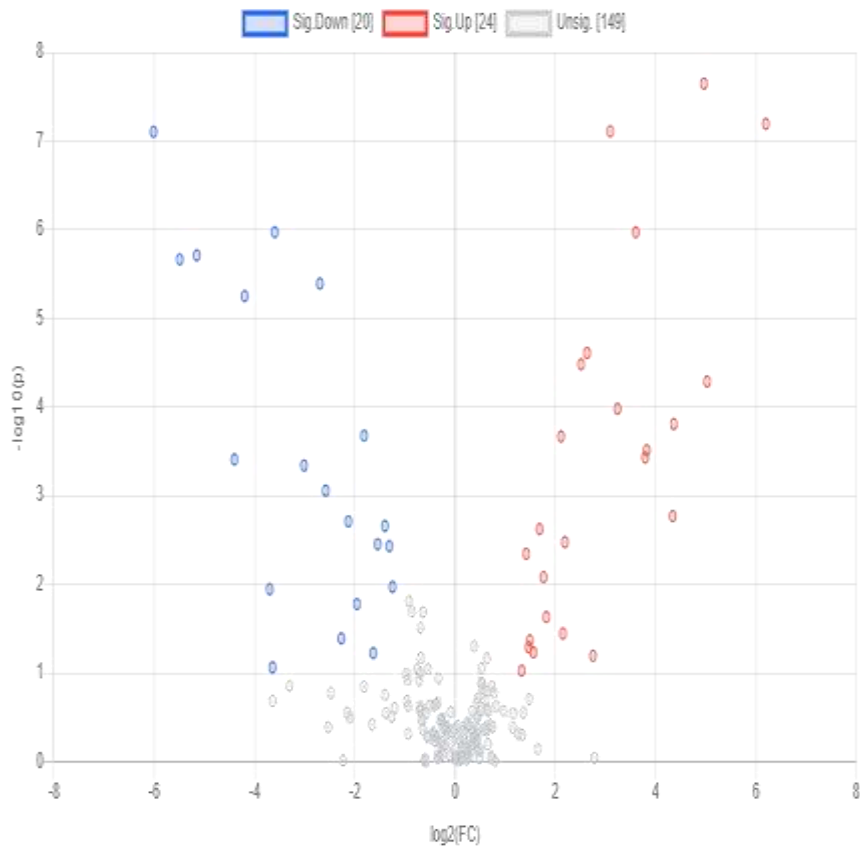


Principal Component Analysis of cow and goat milk yoghurt

A total of 192 metabolites were detected in probiotic yoghurt



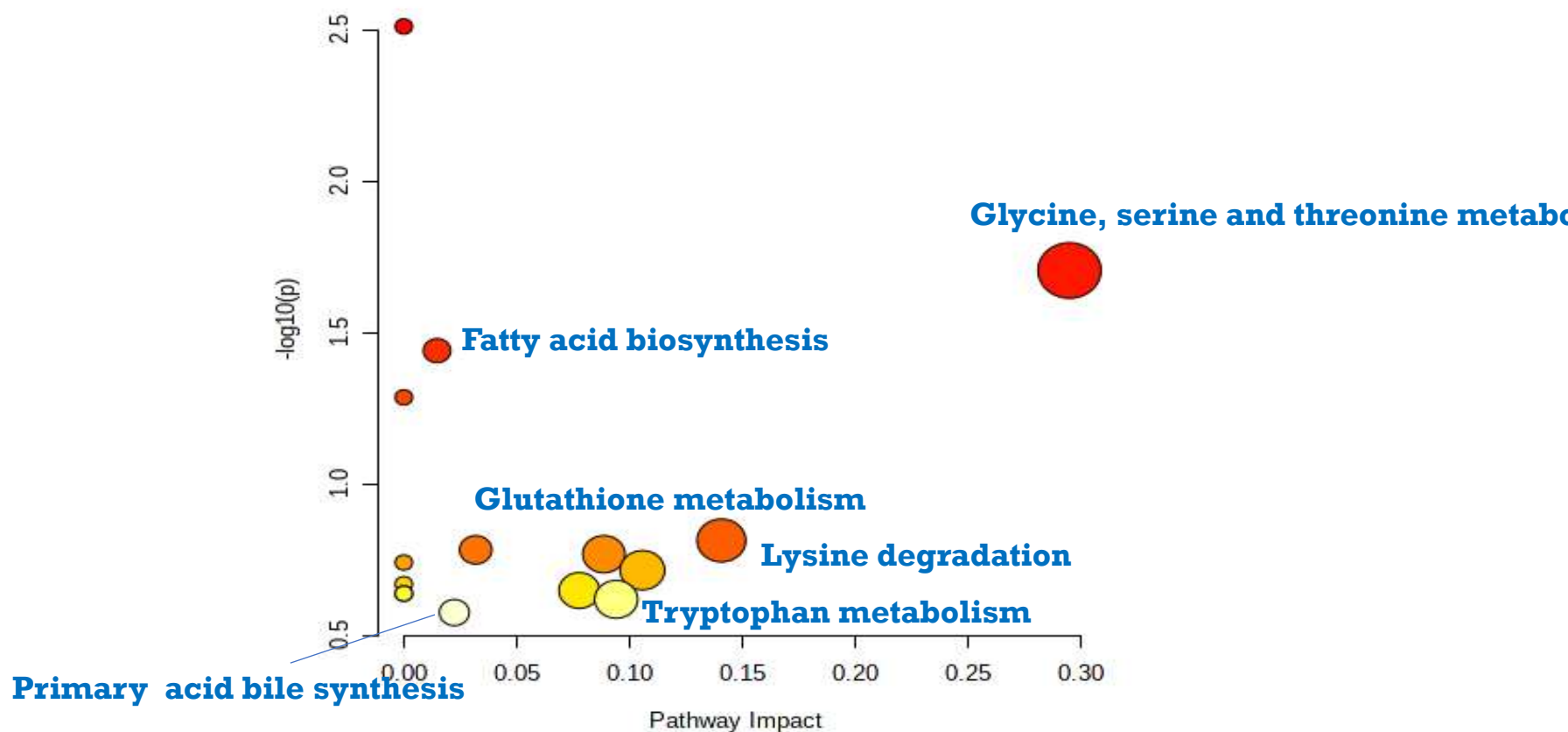
Volcano Plot and Heat Map of Significant Metabolites (Cow and goat probiotic yogurt on day 14)



Significant metabolites on Day 14 (G/C)

Metabolite	P-value	Fold change	Log 2 (FC)
4-Octene, 2,3,6-trimethyl-	<0.01	12.1	3.6
Octanoic acid	< 0.01	35.5	5.2
2-Aminoadipic acid	< 0.01	45	5.5
Glycine	< 0.01	18.3	4.2
d-Prolyl-d-proline	< 0.01	3.5	1.8
L-Kynurenine	< 0.01	21.1	4.4
2,4-Dimethylcinnamic acid	< 0.01	8.1	3
His-Ala	< 0.01	4.4	2.1
Ac-Val-Ala-Asp-CHO	< 0.01	2.9	1.5
Phosphonic acid	< 0.01	2.5	1.3
Met-His	0.01	13	3.7
S-Methyl-L-cysteine	0.01	1.9	0.9
D--Raffinose	0.01	3.9	2
Ile-Ile-Lys	0.02	1.8	0.9
D-Erythronic acid-gamma-lactone	0.02	1.6	0.6

Impact Pathway Analysis of Significant Metabolites (Cow and goat probiotic yogurt on day 14)



Significance of the results

- Amino acids and peptides predominated the cow milk yoghurt.
- Results revealed more proteolysis in cow milk yoghurt by probiotic culture on day 14.
- Higher pH of cow milk yoghurt than goat milk yoghurt reported in the literature also supported with more amino acids.

Significance of the study

- This study revealed the differences in behavior of probiotic culture in the cow and goat milk
- Association of post-acidification changes with metabolite formation during storage