



COMPARATIVE ANALYSES OF FATTY ACID COMPOSITION: *URTICA DIOICA* AND *LAMIUM PURPUREUM*

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Abstract: This study comparatively evaluated the fatty acid composition of *Urtica dioica* and *Lamium purpureum* using literature data. The results showed that *Urtica dioica* is richer in polyunsaturated fatty acids, especially linoleic and α -linolenic acids, while *Lamium purpureum* contains higher levels of saturated fatty acids and specific lipid compounds. Statistical analyses highlighted clear differences between plant organs and species.

Introduction

- ✓ Fatty acids are essential components of plant lipids.
- ✓ They influence membrane structure, metabolism, and stress response.
- ✓ *Urtica dioica* is rich in polyunsaturated fatty acids.
- ✓ *Lamium purpureum* is less studied but contains uncommon lipid compounds.
- ✓ Fatty acid composition may vary depending on plant organ, environmental conditions, and extraction methods.
- ✓ Comparative studies are important for understanding the nutritional and biological potential of medicinal plants.
- ✓ The aim of this study was to compare the fatty acid profiles of the two species.

Material and method

Literature data were collected from various sources: ScienceDirect, PubMed Studies containing qualitative and quantitative fatty acid data were selected.

Statistical analysis was performed using PAST software version 3.2.

Results and discussions

Table 1. Main fatty acids identified in *Urtica dioica* and *Lamium purpureum*

Fatty Acid	<i>Urtica dioica</i> (UD)	<i>Lamium purpureum</i> (LP)
Palmitic acid (C16:0)	12–23%	11–24%
Palmitoleic acid (C16:1)	0.2–4%	2–4%
Stearic acid (C18:0)	1–9%	2–12%
Oleic acid (C18:1)	2–35%	11–25%
Linoleic acid (C18:2)	11–44%	14–34%
α -Linolenic acid (C18:3)	12–40%	15–28%
Arachidic acid (C20:0)	1–7%	2–4%
Lamenallic acid	Not detected	Present

- *Urtica dioica* showed higher levels of polyunsaturated fatty acids.
- Linoleic and α -linolenic acids were predominant in UD samples.
- *Lamium purpureum* contained higher proportions of saturated fatty acids.
- Palmitic and stearic acids were more abundant in LP organs.
- Lamenallic acid was identified only in *Lamium purpureum*.
- Fatty acid composition varied depending on species and plant organ.

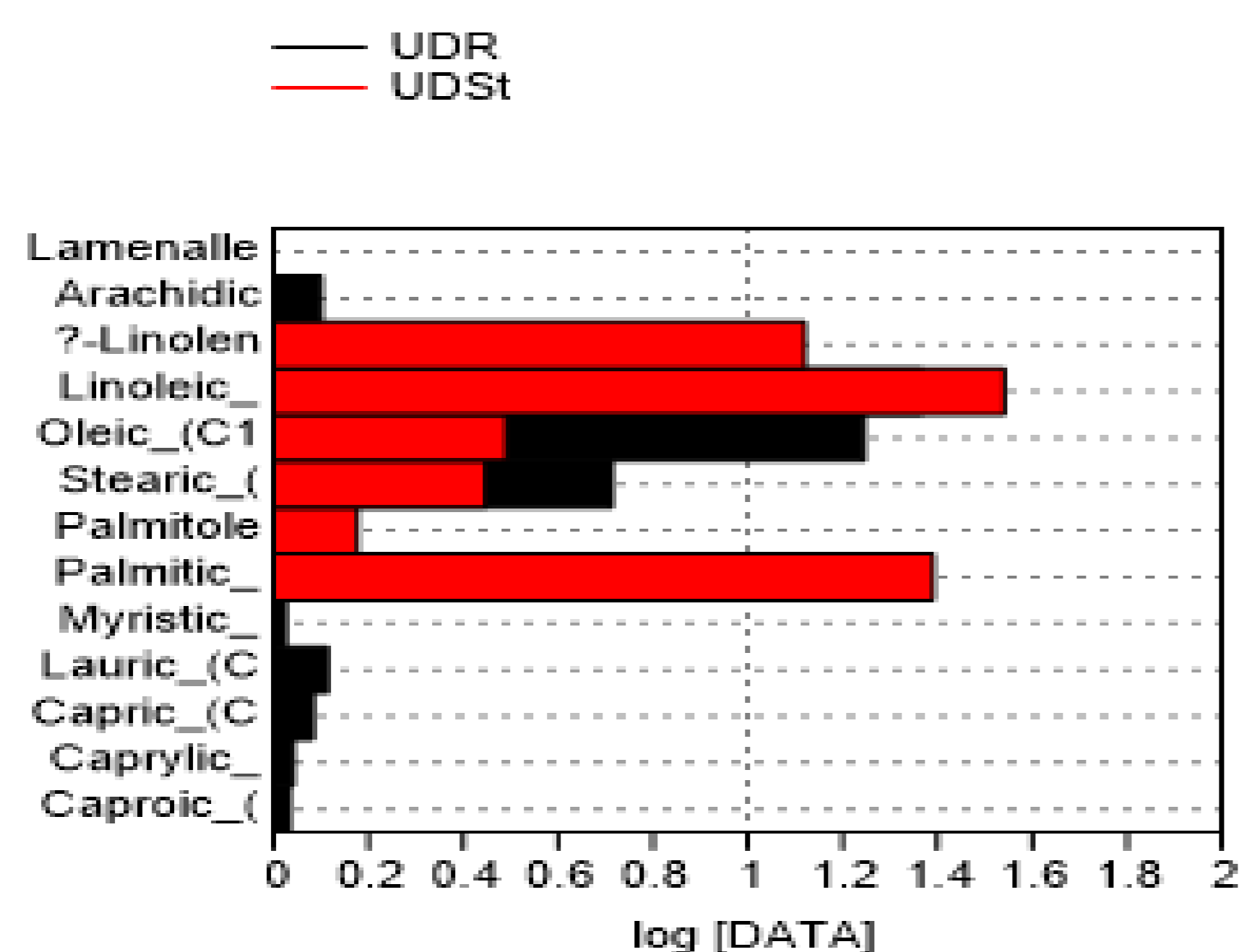


Figure 1. Fatty acid composition in roots and stems of *Urtica dioica*
 Legend:UDR=*Urtica dioica* root; UDSt=*Urtica dioica* stem

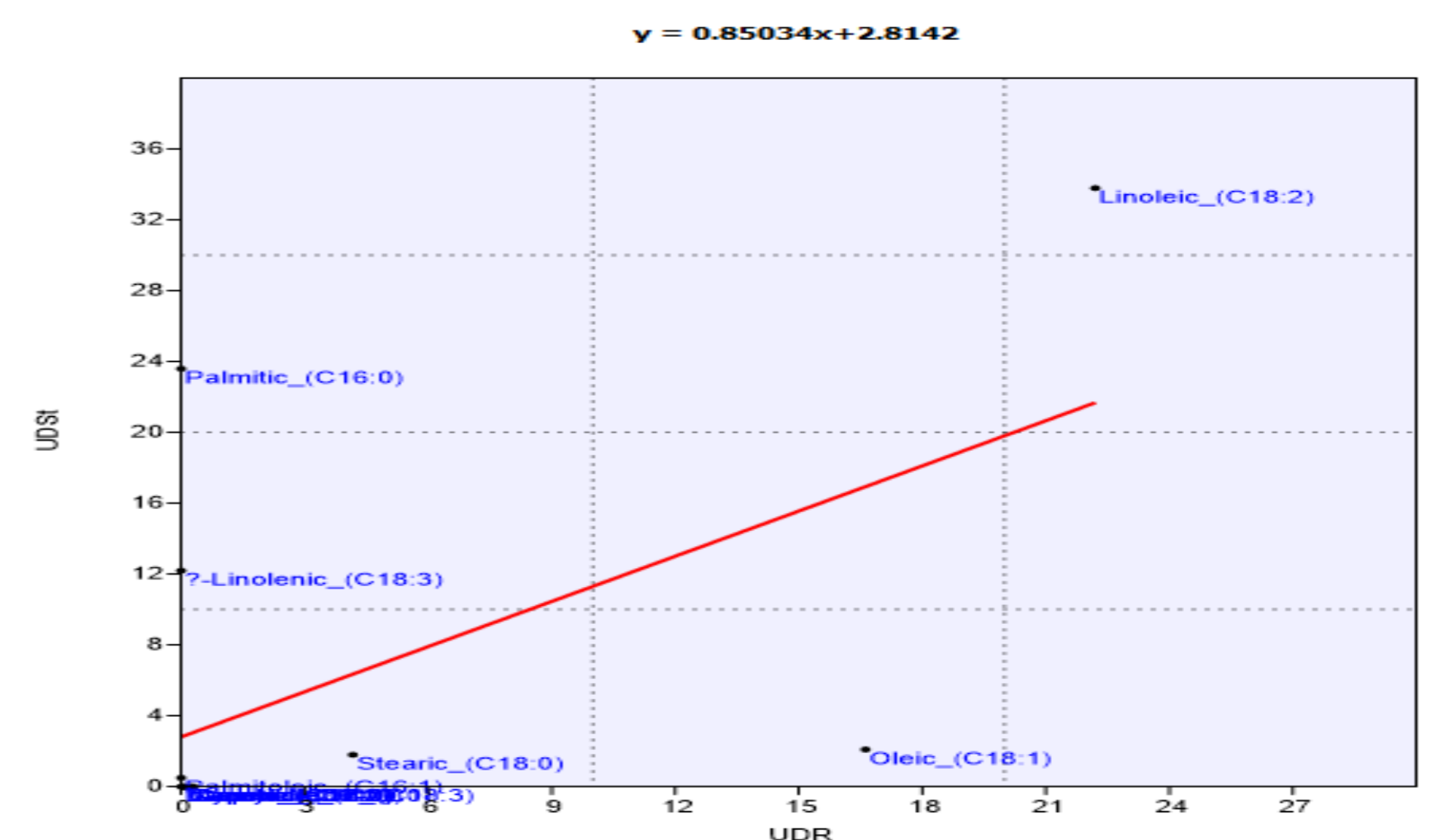


Figure 2. Linear relationship of fatty acid distribution between roots and stems of *Urtica dioica*
 Legend:UDR=*Urtica dioica* root; UDSt=*Urtica dioica* stem

A positive linear relationship was identified between fatty acid composition in roots and stems of *Urtica dioica*. The model showed statistical significance ($p < 0.001$).

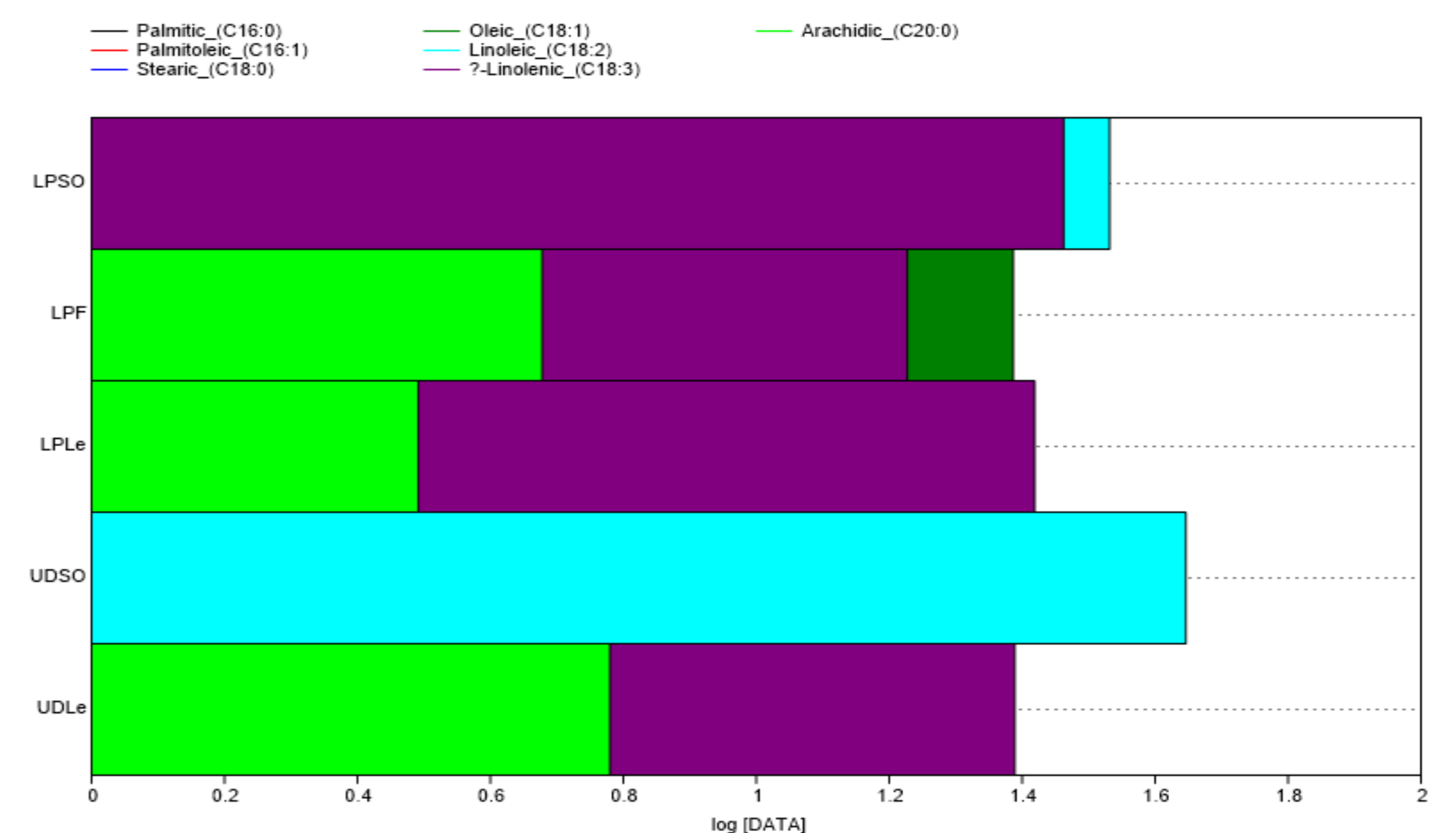


Figure 3. Distinct fatty acid signatures across organs of *Lamium purpureum* and *Urtica dioica*
 Legend: UDLe=*Urtica dioica* leaves, UDSO=*Urtica dioica* seeds oil, LPLE=*Lamium purpureum* leaves, LPP=*Lamium purpureum* flowers, LPSO=*Lamium purpureum* seeds oil

Fatty acid composition differed between roots and stems of *Urtica dioica*, indicating organ-dependent lipid distribution. Both saturated and unsaturated fatty acids contributed to the observed variability. Distinct fatty acid signatures were observed among plant organs and species. Seed oils presented unique lipid profiles compared to leaves and flowers.

Conclusions

- ✓ Both species contain nutritionally important fatty acids.
- ✓ *Urtica dioica* showed higher levels of polyunsaturated fatty acids.
- ✓ *Lamium purpureum* presented more specific and uncommon lipid compounds.
- ✓ Fatty acid composition varied depending on plant organ and species.
- ✓ Further studies on *Lamium purpureum* are needed.
- ✓ These findings support the potential use of both species as valuable sources of bioactive compounds for nutritional and pharmaceutical applications.
- ✓ The obtained results also contribute to a better understanding of the chemical diversity of wild edible and medicinal plants.

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