



PG-02: Integration of UPLC-MS/MS-based Metabolomics and Activity Evaluation to Explore the Anti-inflammatory Bioactive Metabolites from *Bienertia cycloptera*

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Introduction

Bienertia is a genus of flowering plants, belonging to Chenopodiaceae, that grows wild in central and southern parts of Iran [1]. This plant occurs in hot climates and temperate and cold deserts [2]. *B. cycloptera* is used in folk medicine for its antihyperglycemic and lipid lowering effects [3]. There were little phytochemical and biological research work on this species. Consequently, this has prompted us to investigate this species for its anti-inflammatory activity and explore the bioactive compounds.

Materials and Methods

Bienertia cycloptera



Hydro-alcoholic extraction, then Fractionation step



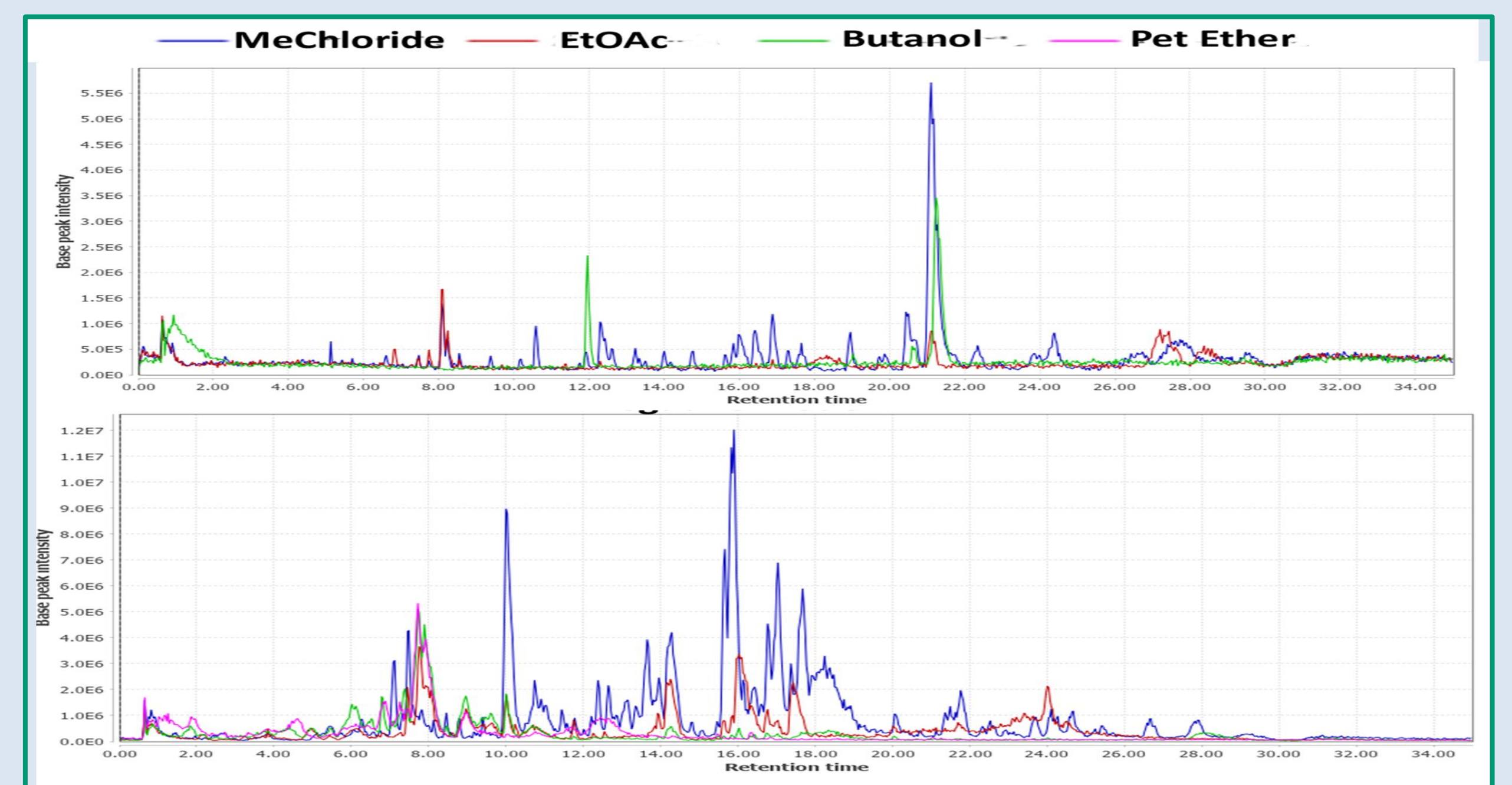
In-vitro anti-inflammatory activity on LPS-stimulated WBCs (TNF- α , IL-6, IL-1 β and IFN- γ)

Chemical profiling using UPLC/MS/MS & Annotation of secondary metabolites

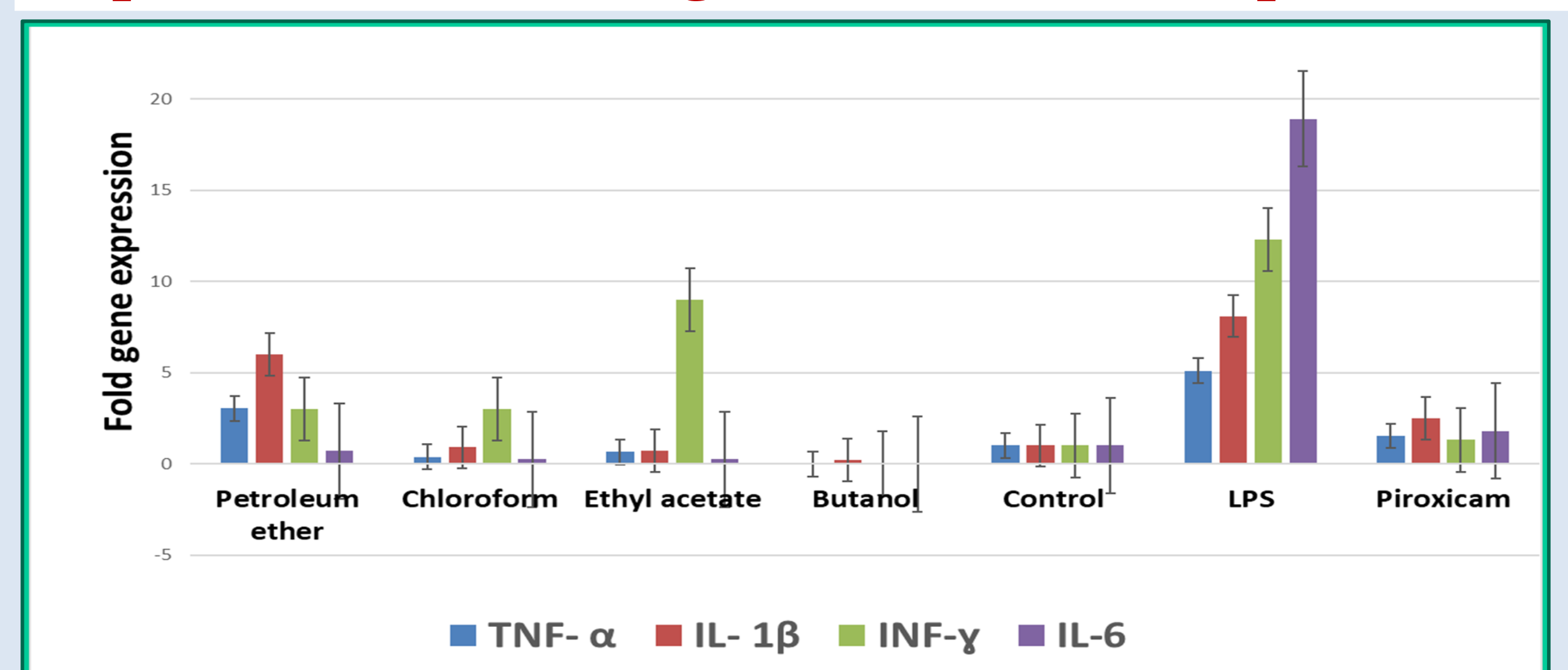
Multivariate data analysis

Results

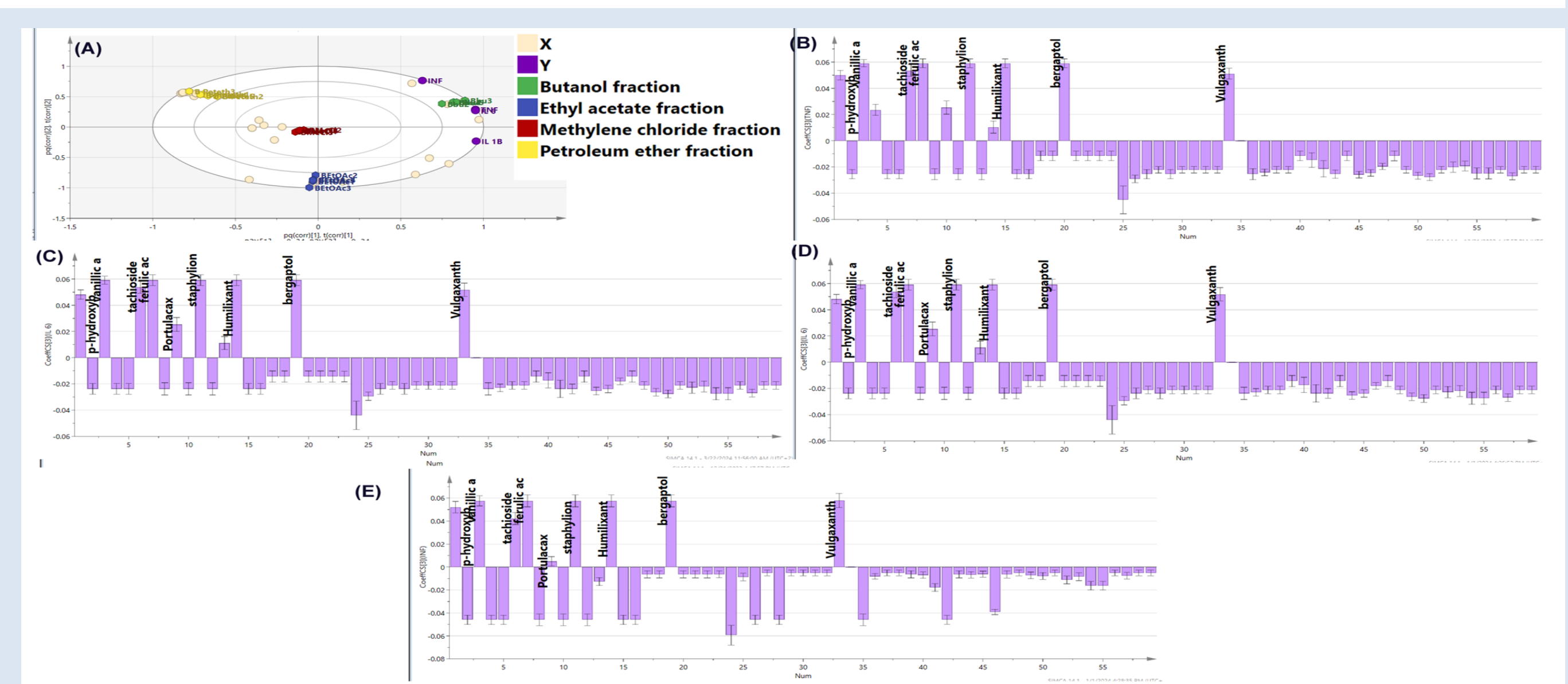
The base peak chromatograms of *B. cycloptera* samples in positive and negative ion modes



Bar charts showing TNF- α , IL-1 β , IFN- γ , IL-6 (expressed as fold change) of the tested samples



OPLS biplot and coefficient plots revealing bioactive metabolites correlated with the inflammatory markers



Conclusions

The anti-inflammatory activity results showed that the n-butanol, chloroform, and ethyl acetate fractions of *B. Cycloptera* reduced the upregulation of TNF- α to levels lower than those produced by piroxicam. The results of multivariate analysis showed that p-hydroxybenzoic acid, vanillic acid, tachioside, ferulic acid, staphylionoside D, humilixanthin, bergaptol, and vulgaxanthin I were the most potential metabolites downregulating the inflammatory cytokines. These results help to rapidly explore the active compounds from *B. cycloptera*.

References

- [1] Freitag, H., & Stichler, W. (2002). *Bienertia cycloptera* Bunge ex Boiss., Chenopodiaceae, another C4 plant without Kranz tissues. *Plant Biology*, 4(1).
- [2] Akhiani, H., Ghobadnehad, M., & Hashemi, S. M. H. (2003). Ecology, biogeography and pollen morphology of *Bienertia cycloptera* Bunge ex Boiss. (Chenopodiaceae), an enigmatic C4 plant without Kranz anatomy. *Plant Biology*, 5(2).
- [3] Safa, O., Soltanipoor, M. A., Rastegar, S., Kazemi, M., Nourbakhsh Dehkordi, K., & Ghannadi, A. (2013). An ethnobotanical survey on hormozgan province, Iran. *Avicenna Journal of Phytomedicine*, 3(1).