

Redox vs. nutrigenomic activity of ascorbic acid and its derivatives

Jakubek P., Suliborska K., Baranowska M., Asaduzzamana M., Przychodzeń W., Kusznerewicz B., Chrzanowski W., Bartoszek A.

Faculty of Chemistry, Gdańsk University of Technology, Poland



Background

- Ascorbates and erythorbates are **food additives**
- Ascorbigen is a **plant derivative** of vitamin C
- To date no systematic investigations comparing electrochemical properties of ascorbates as well as their antioxidant and nutrigenomic activity have been performed

Aim of the research

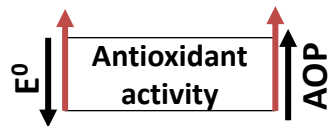
- Determination of the **relationship between chemical properties and antioxidant activity**

Methods

Electrochemical

Chemical

Biological

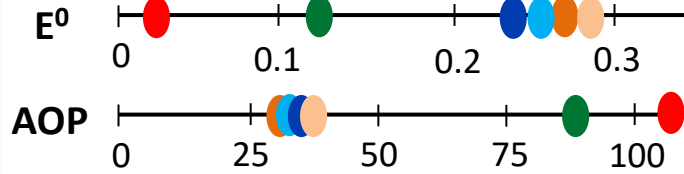


ABTS
DPPH

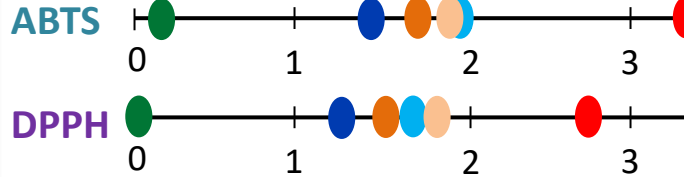
MTT & CAA tests
Comet assay
Microarrays

RESULTS

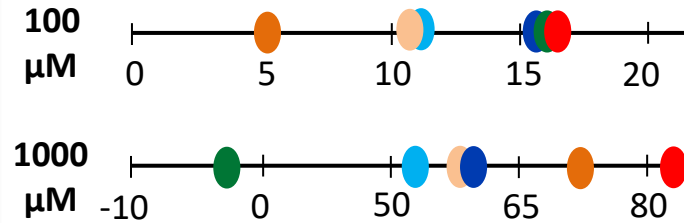
Electrochemical parameters (at 37°C)



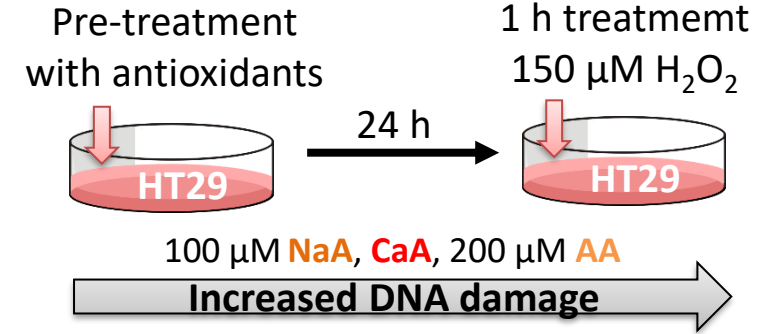
n₁₀ series (at 37°C)



CAA values in HT29 cells



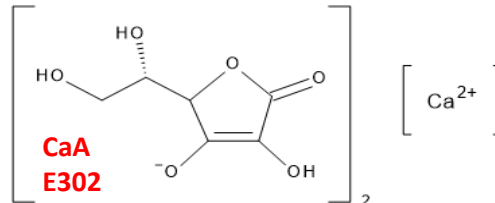
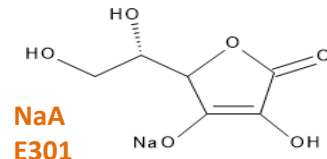
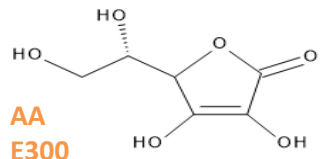
(No) protection against DNA damage



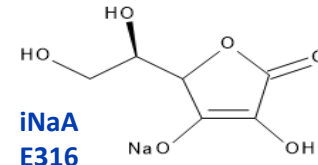
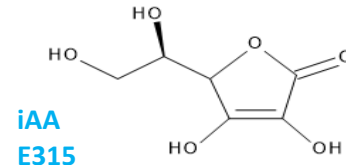
Modulation of redox-related genes

[μM]	AA 50	AA 200	CaA
		GCL PRDX3,4 SOD1 TXN	CaA did not affect gene expression (except ↑CCL5)
		PDLIM1 PRDX6 PTGS2 RNF7	Too strong antioxidant to induce endogenous antioxidant protection?
	OXSRI		
	CYBB RNF7		

Ascorbates (vitamin C activity)



Erythorbates (no vitamin C activity)



Plant-derivative of vit C

