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REPUBLIKA HRVATSKA  
Ministarstvo znanosti  
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Primjena inovativnih tehnologija u izolaciji bioaktivnih spojeva iz organskog otpada u proizvodnji vina  
RC.2.2.08/0058







# PREGLED DOSADAŠNJIH ISTRAŽIVANJA NA IZOLACIJI FENOLA IZ POKOŽICE KOMINE GROŽĐA

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**2. Znanstveno-stručna radionicu Prehrambeno-biotehnološkog fakulteta  
Sveučilišta u Zagrebu,  
Impact centar, Zadar, 20.11.2015.**

# Specifični ciljevi projekta:

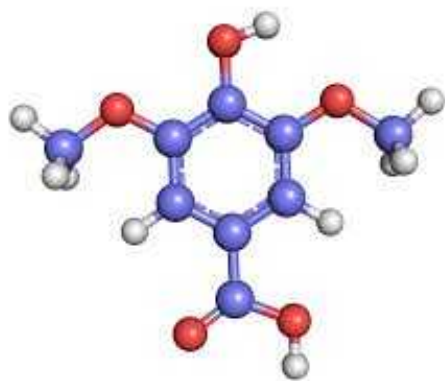
-  Ekstrakcija BAS iz OOPV – konvencionalne i nove tehnike
-  Optimiranje uvjeta proizvodnje ekstrakata
-  3. Optimiranje uvjeta proizvodnje praha fenolnih spojeva
-  4. Primjena prahova u modelnim i realnim sustavima

# EKSTRAKCIJA BAS IZ OOPV

**KONVENCIONALNE TEHNIKE**



**SOXHLET**



**NOVE TEHNIKE**

**ASE**

**HHPE**

**HVED**

**SFE**

# MATERIJAL ZA ISTRAŽIVANJE

Komina grožđa sorti: *Teran*

*Merlot*

*Cabernet Sauvignon*

**agrolaguna**

Liofilizirana  
komina  
grožđa



Sjemenke

Pokožica



Prah

# KONVENCIONALNE TEHNIKE

## -SOXHLET EKSTRAKCIJA-

### Plan eksperimenta

Broj pokusa	Tip otapala	Udio otapala (%)	T (°C)	HCl (%)	t (min)
1	EtOH	50	80	0	30
2	EtOH	50	80	0	45
3	EtOH	50	80	0	60
4	EtOH	50	80	0,5	30
5	EtOH	50	80	0,5	45
6	EtOH	50	80	0,5	60
7	EtOH	50	80	1	30
8	EtOH	50	80	1	45
9	EtOH	50	80	1	60



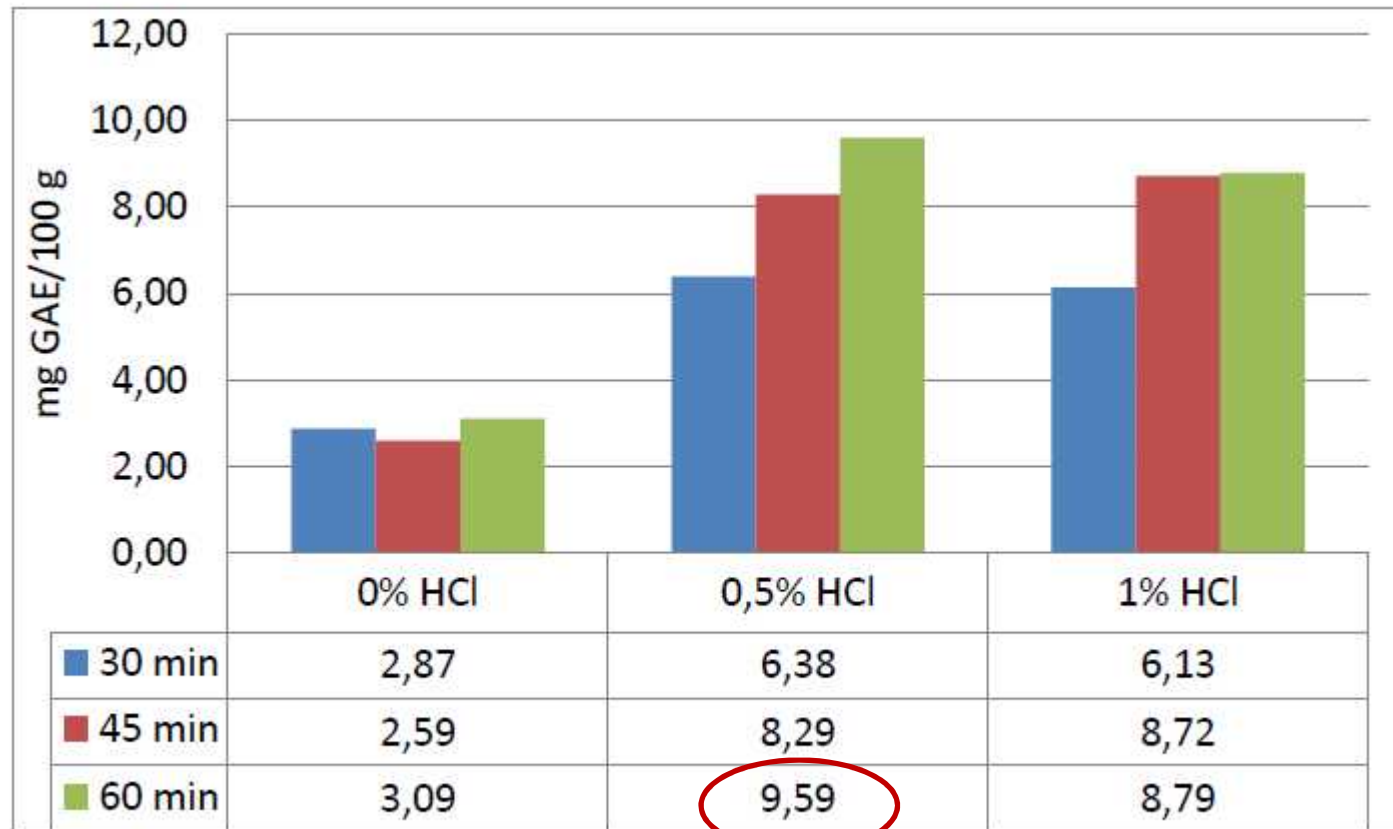
# Metode određivanja:

- ukupni fenoli
- ukupni antocijani
- ukupne flavonoidi
- ukupne hidroksicimete kiseline
- ukupni flavonoli
- polimerni proantocijanidini
- antioksidacijski kapacitet



VWR UV-1600PC Spectrophotometer

# Rezultati ukupnih fenola:



EtOH 50%  
HCl =0,5%  
T= 80 °C  
t= 60 min

sorta *Teran*

**Optimizing acidity and extraction time for polyphenolic recovery and antioxidant capacity in grape pomace skin extracts with response surface methodology approach**

Journal:	<i>Journal of Food Processing and Preservation</i>
Manuscript ID	JFPP-07-15-0596.R1
Manuscript Type:	Original Article
Date Submitted by the Author:	n/a
Complete List of Authors:	Putnik, Predrag; Faculty of Food Technology and Biotechnology, Department of Food Engineering Bursac Kovacevic, Danijela; Faculty of Food Technology and Biotechnology, Dragović-Uzelac, Verica; Faculty of Food Technology and Biotechnology, Department of Food Engineering
Keywords:	hydroxycinnamic acids, total phenols, acidity, extraction time, grape pomace skin extracts



# 4th International Conference Sustainable Postharvest and Food Technologies INOPTEP 2015, Divčibare, Srbija, 19-24.04.2015.



# NOVE TEHNIKE

## - UBRZANA EKSTRAKCIJA PRI VISOKOM TLAKU - -ASE (Accelerated Solvent Extraction)-

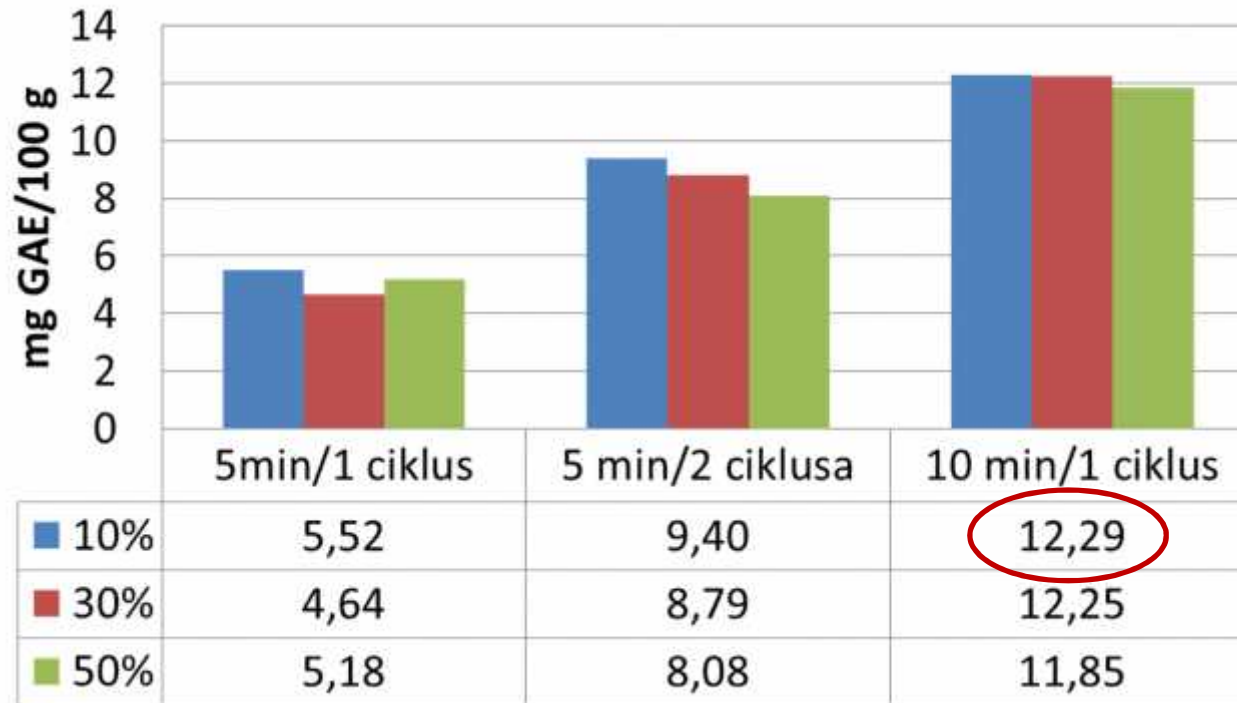
### Plan eksperimenta



ASE DIONEX 350

Broj pokusa	Tip otapala	Udio otapala (%)	T (°C)	t (min)	Broj ciklusa
1	EtOH	50	30	10	1
2	EtOH	50	30	5	1
3	EtOH	30	30	10	1
4	EtOH	10	30	5	2
5	EtOH	10	30	10	2
6	EtOH	30	30	5	2
7	EtOH	50	30	10	2
8	EtOH	50	30	5	2
9	EtOH	10	30	10	1
10	EtOH	30	30	10	2
11	EtOH	30	30	5	1
12	EtOH	10	30	5	1

# Rezultati ukupnih fenola:



EtOH= 10%  
T= 30 °C  
t= 10 min  
ciklus= 1

sorta *Merlot*

# NOVE TEHNIKE

## - EKSTRAKCIJA POTPOMOŽNUTA VISOKIM TLAKOM - -HHPE (High Hydrostatic Pressure Extraction)-

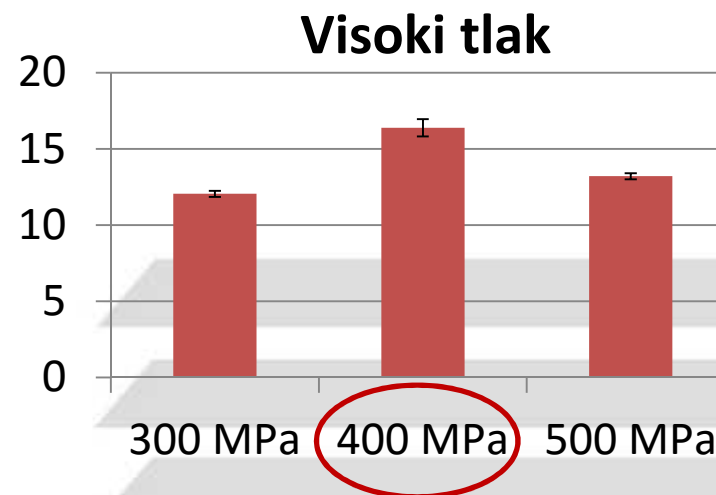
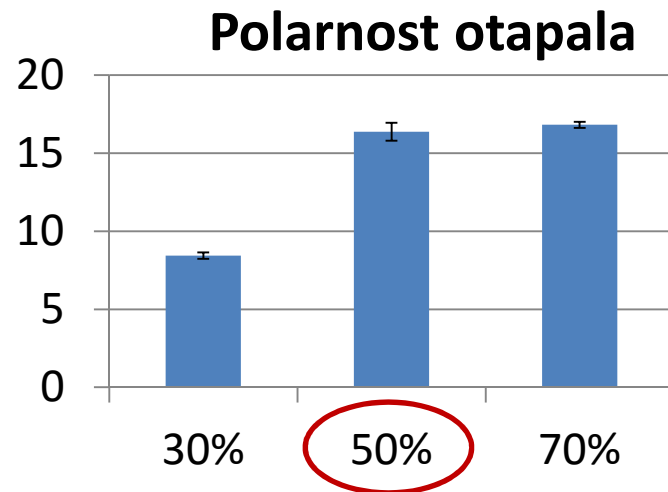
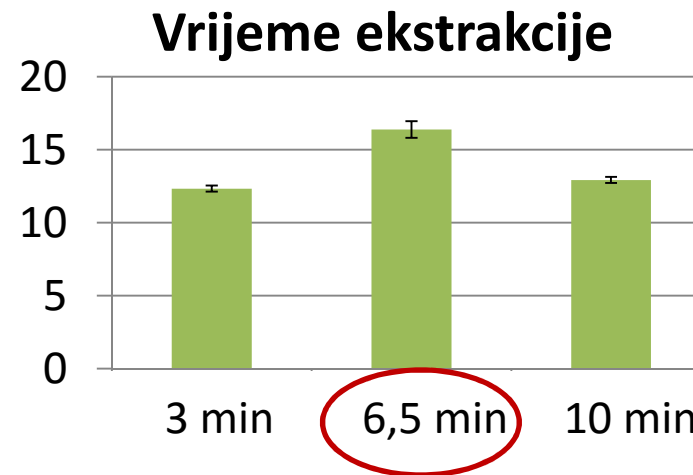
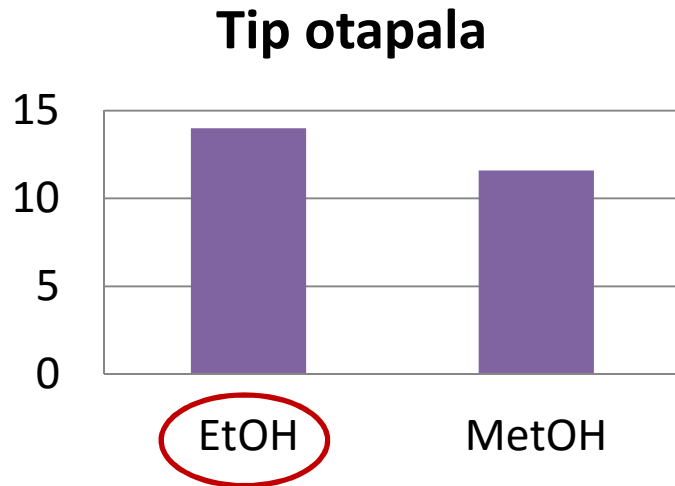


Ureaj za visoki tlak  
Stansted Fluid Power

### Plan eksperimenta

Vrsta otapala	Polarnost otapala (%)	Vrijeme trajanja ekstrakcije (min)	Tlak (MPa)
Etanol	30	3	300
			500
	10	300	
		500	
	50	6,5	400
			400
70	3	300	
		500	
	10	300	
		500	
Metanol	30	3	300
			500
	10	300	
		500	
	50	6,5	400
			400
	70	3	300
			500
10		300	
		500	

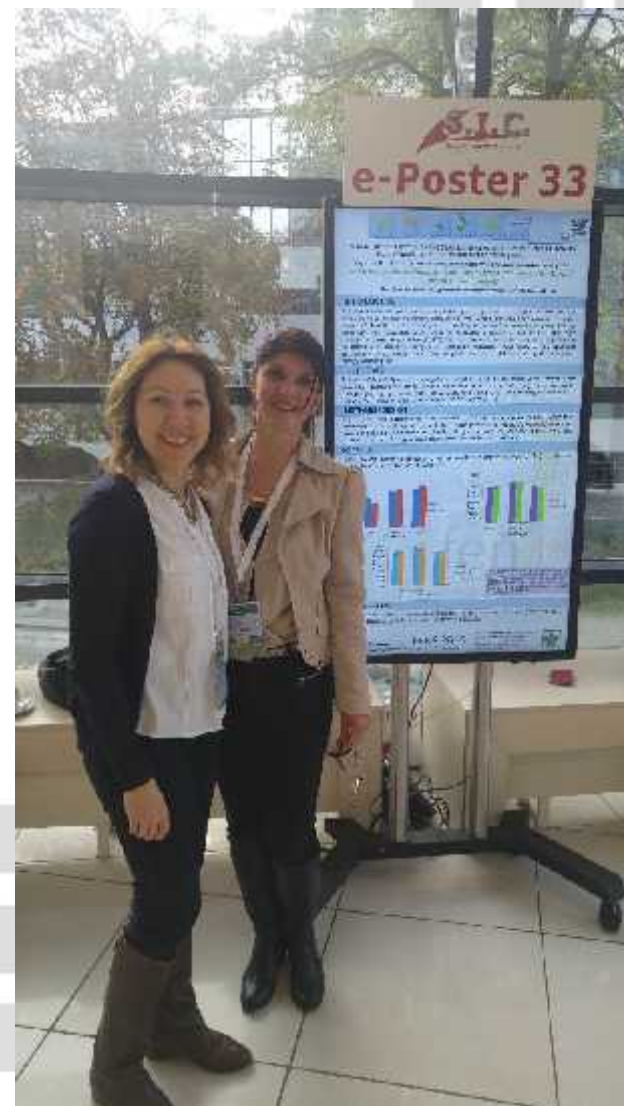
# Rezultati ukupnih fenola:



sorta *Merlot*

EtOH= 50%  
T= 26 °C  
t= 6,5 min  
P= 400 MPa

# 12th European Nutrition Conference FENS 2015, Berlin, Njemačka, 20.-23.10.2015.



# NOVE TEHNIKE

## - EKSTRAKCIJA POTPOMOŽNUTA VISOKONAPONSKIM ELEKTRIČNIM PRAŽNENJEM- -HVED (High Voltage Electrical Discharge)-

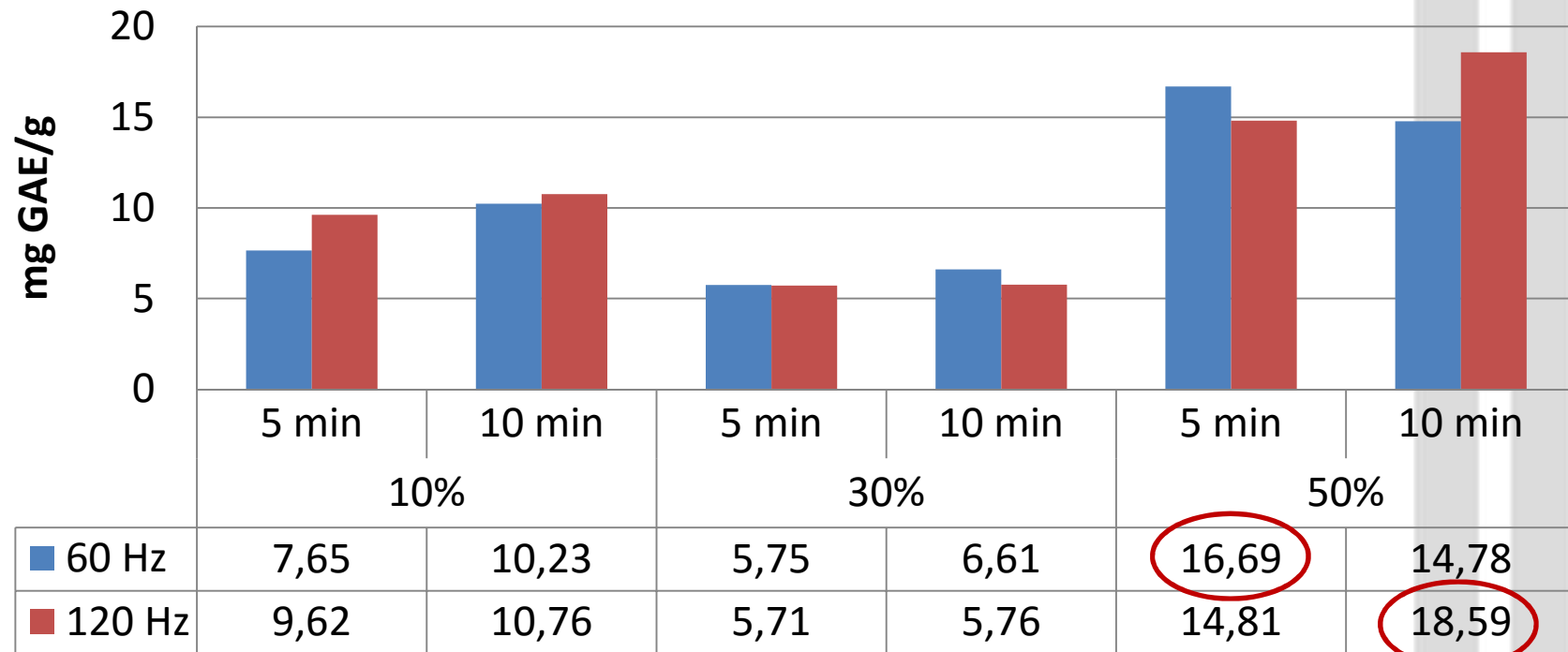


Pulsni visokonaponski generator (Spellman, UK)

### Plan eksperimenta

Udio etanola (%)	Vrijeme (min)	Frekvencija plazme (Hz)
30	5	60
30	5	120
30	10	60
30	10	120
50	5	60
50	5	120
50	10	60
50	10	120
70	5	60
70	5	120
70	10	60
70	10	120

# Rezultati ukupnih fenola:



sorta *Merlot*

**EtOH 50%**  
**t=5min/60 Hz**  
**t=10 min/120 Hz**





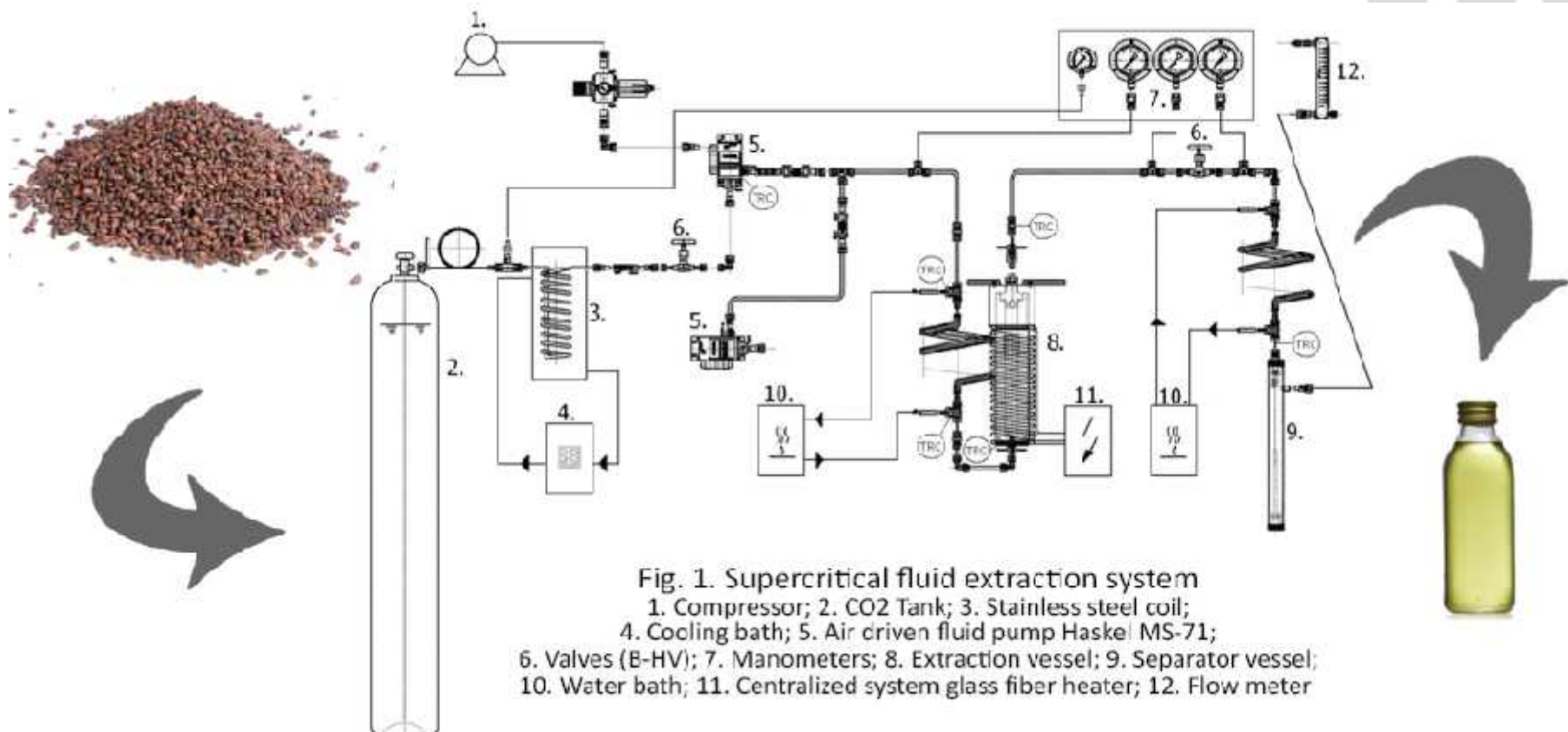
## **26th International Scientific-Expert Conference of Agriculture and Food Industry**

**Sarajevo, BIH,  
27-30.09.2015.**



# NOVE TEHNIKE




## - EKSTRAKCIJA POTPOMOŽNUTA SUPERKRITIČNIM UGLJIČNIM DIOKSIDOM- -SFE (Supercritical fluid Extraction)-



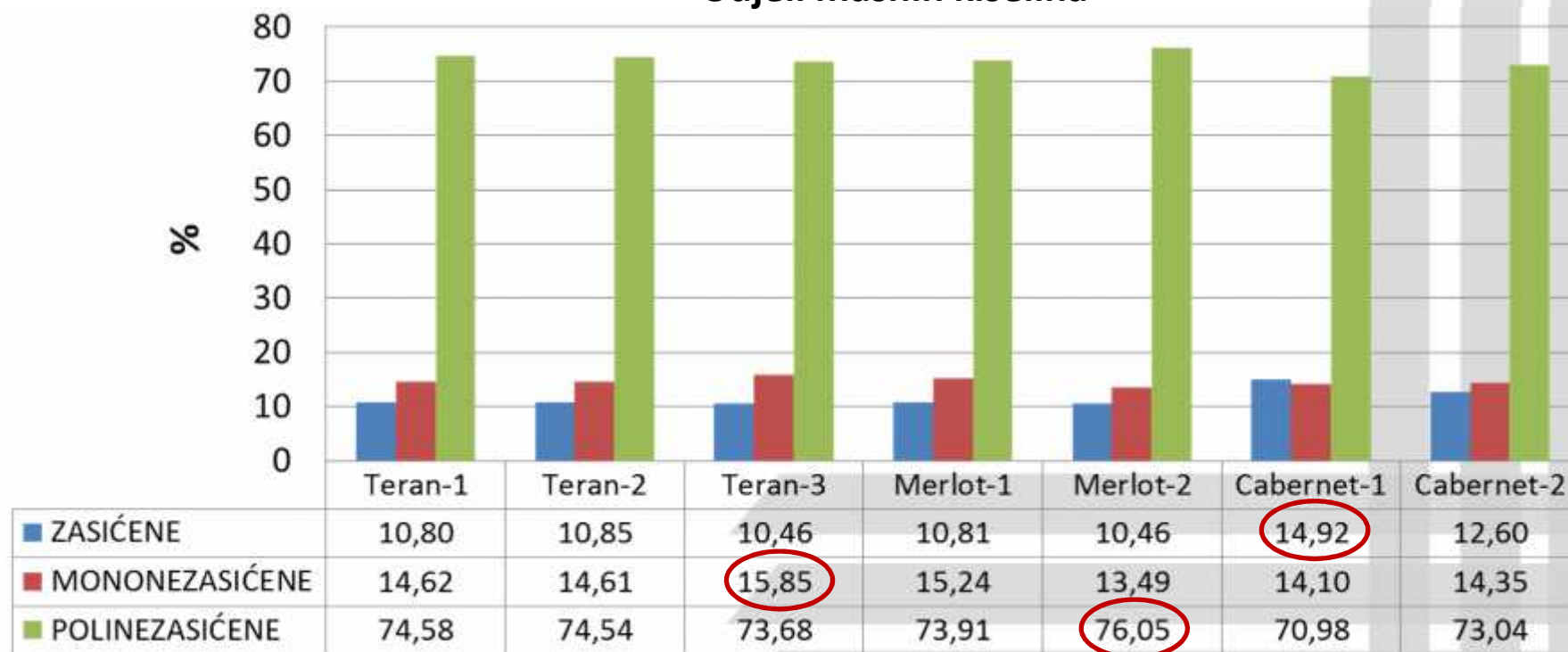
**Ekstrakcija:** 30 Mpa, 40°C, protok CO<sub>2</sub>=1.95 kg/h

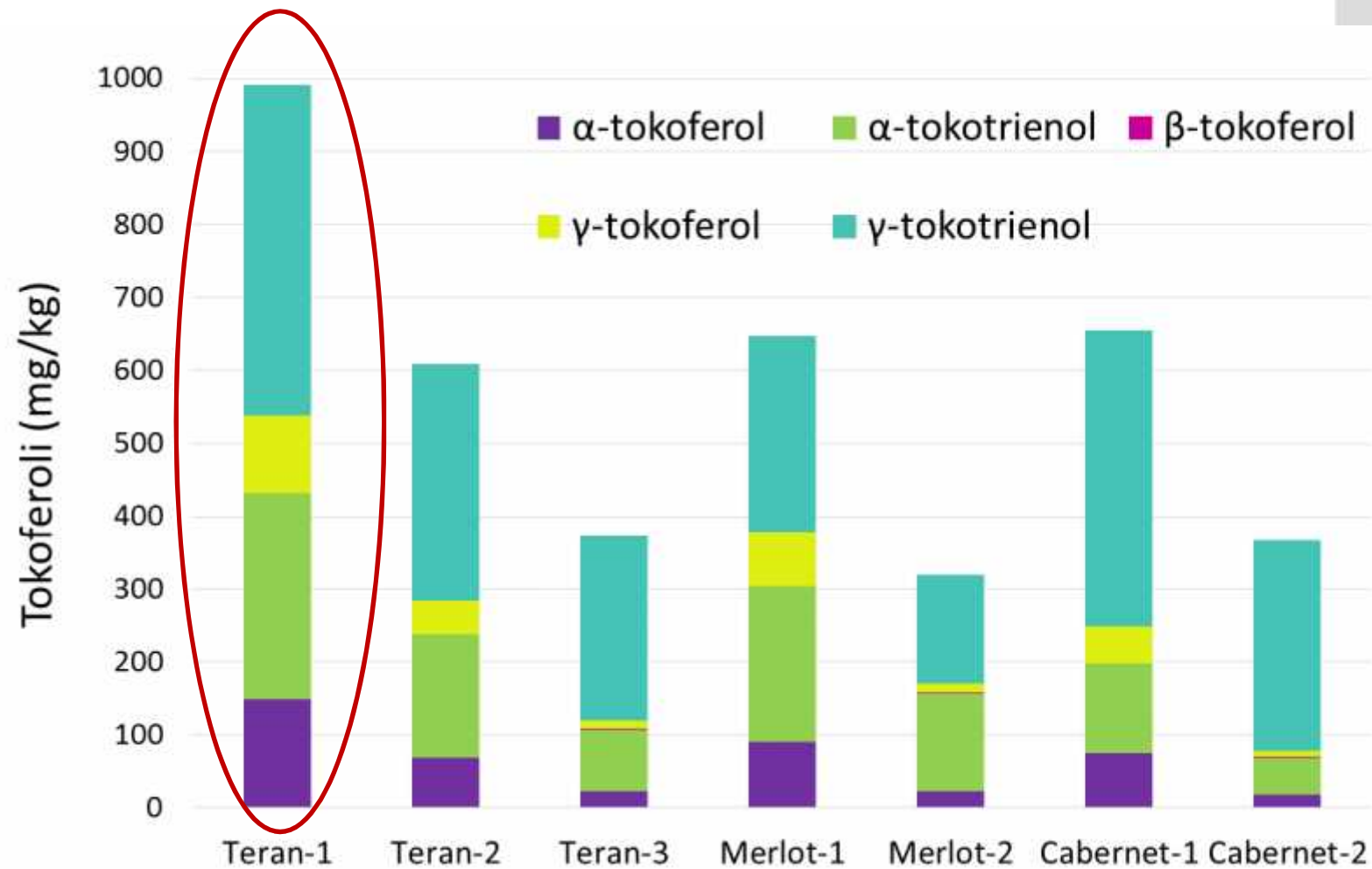
**3 uljne frakcije Terana:** 30, 60, 90 min

**2 uljne frakcije Merlot i Caberent Sauvignon:** 45 i 90 min

Sorta	Udio vode (%)	Udio ulja (%)	Prinos ulja (%)
TERAN	4,73	16,61 	92,66
MERLOT	6,29 	14,57	93,96
CABERNET SAUVIGNON	5,28	13,58	94,11 





### Udjeli masnih kiselina

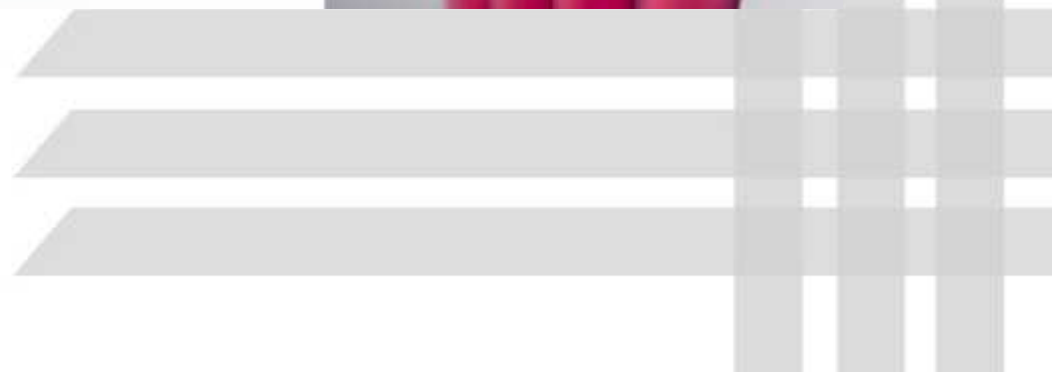
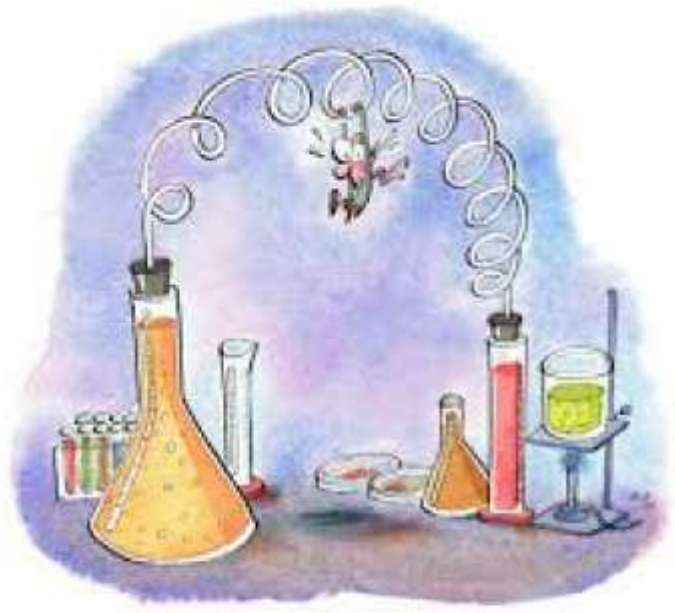




Koncentracije tokoferola i tokotrienola u sakupljenim uljnim frakcijama

# Specifični ciljevi projekta:

-  Ekstrakcija BAS iz OOPV – konvencionalne i nove tehnike
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-  Optimiranje uvjeta proizvodnje praha fenolnih spojeva
-  Primjena prahova u modelnim i realnim sustavima





KEEP  
CALM  
AND  
HVALA  
NA PAŽNJI

