

FERMENTATION PROCESS OPTIMISATION AND CHARACTERISATION OF PEAR FRUIT WINE

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INTRODUCTION

This study aimed to investigate the influence of two commercially available oenological yeasts (Uvaferm BDX and Cross Evolution) on the fermentation kinetics, physicochemical properties, and the total polyphenols content of organic pear juice with and without the addition of industrial pectolytic enzyme (Lallzym OE) and their respective wines.

MATERIAL AND METHODS

The alcoholic fermentation (AF) kinetics was monitored on a laboratory-scale (microfermentations), while the controlled fermentation (CF), as well as induced malolactic fermentation (MLF) of pear juice, was carried out on a pilot-scale custom made fermentation system. The pure culture of lactic acid bacteria (LAB) *Oenococcus oeni* was used for pear wine fermentation with the establishment of temperature optimum for selected LAB type. Fermentation activity was monitored by measuring CO₂ evolution and CO₂ production rate during microfermentation of organic pear juice performed at 21°C.



Microfermentations experiments

Pilot-scale custom made fermentation system (the controlled fermentation)

RESULTS

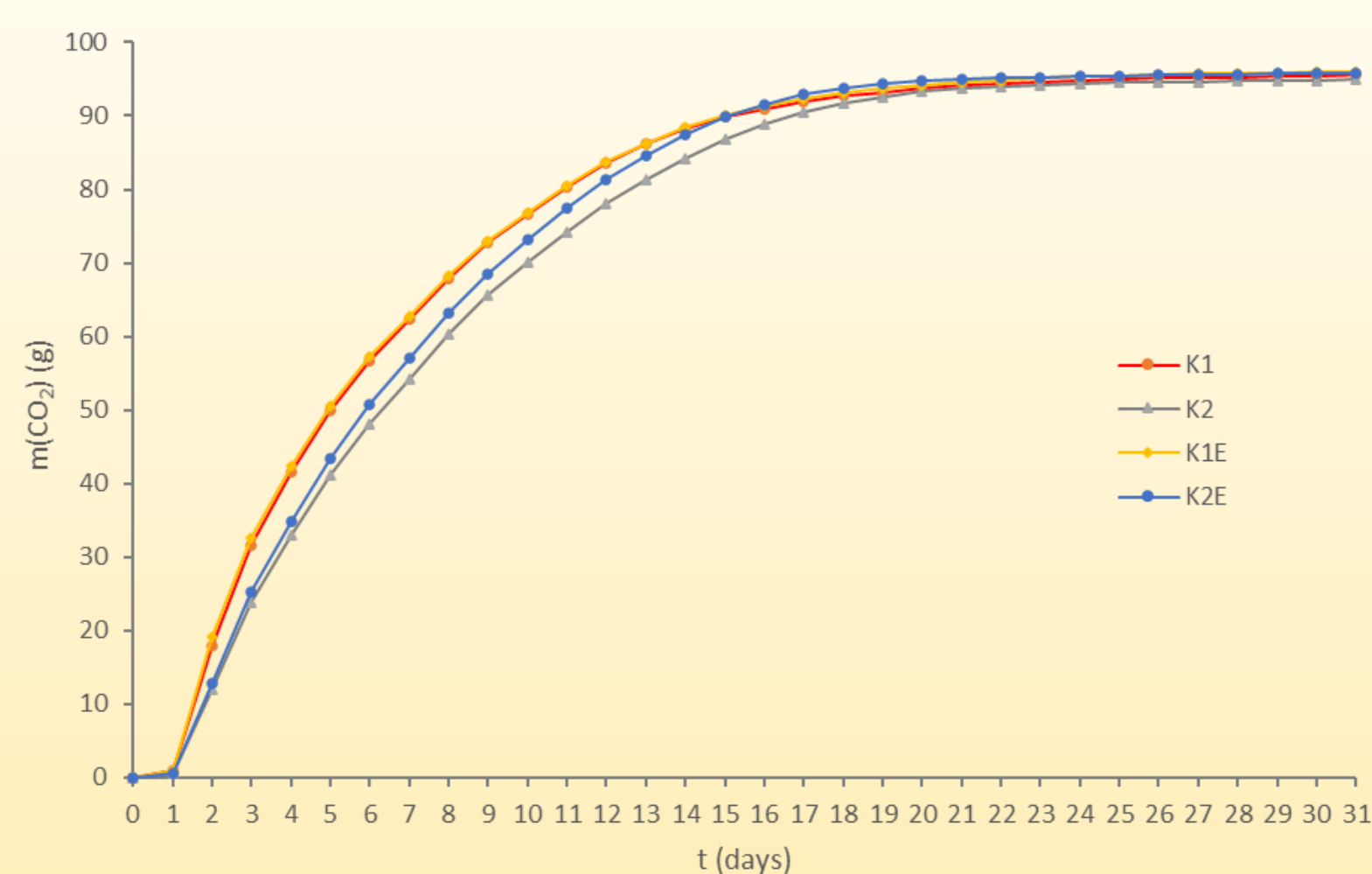


Figure 1. Fermentation activities of two commercial yeast strains during production of pear wine at 21°C (with and without the addition of industrial pectolytic enzyme)

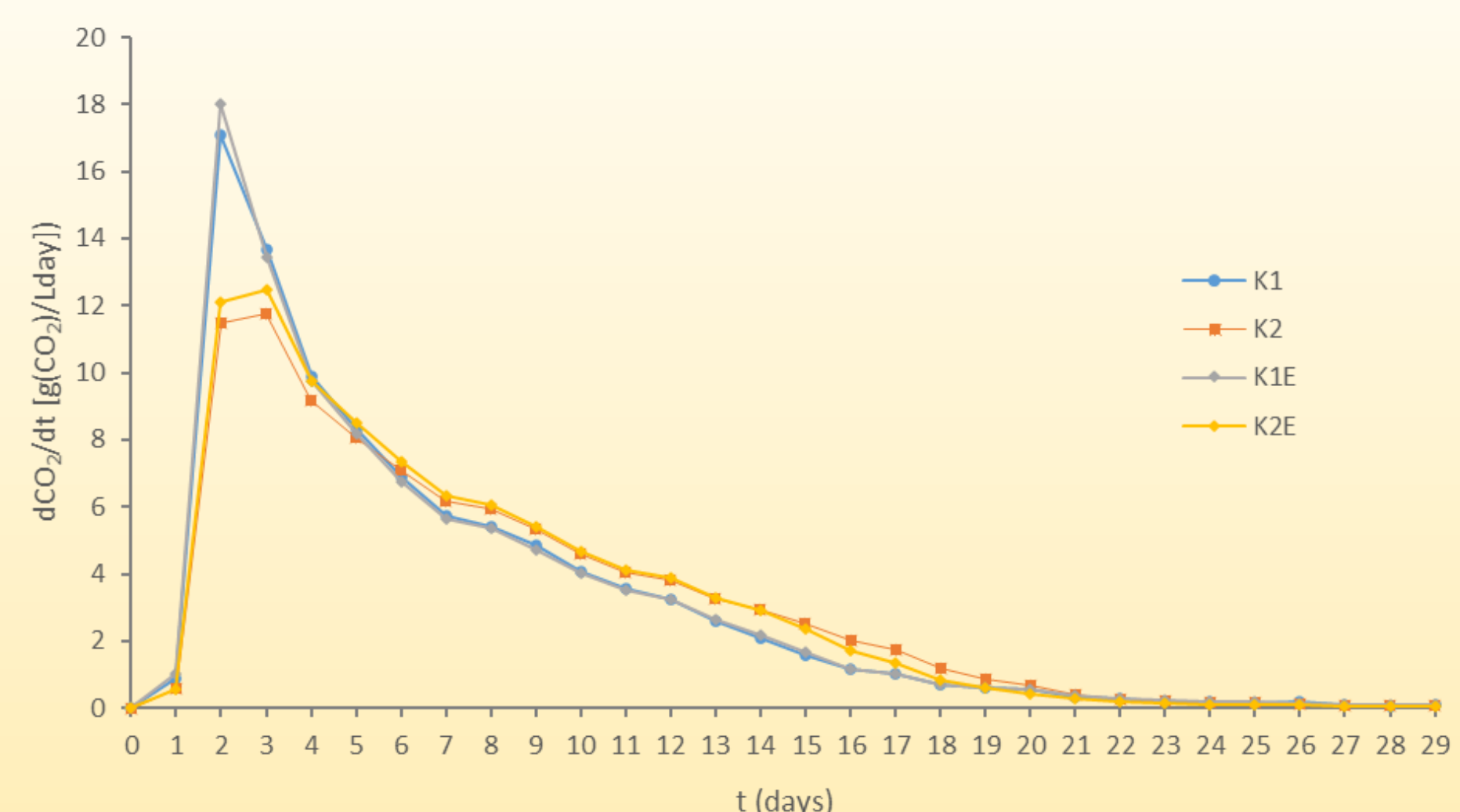


Figure 2. CO₂ production rate of two commercial yeast strains during production of pear wine at 21°C (with and without the addition of industrial pectolytic enzyme)

Table 1. Concentration of total polyphenols in the samples expressed as mg/L gallic acid

SAMPLE	Gallic acid conc., mg/L
Pear juice	514
Pear juice, sweetened	567
K1	551
K2	516
K1E	563
K2E	523
K1 KSF	563
K2 KSF	538

List of abbreviations:

K1 – wine yeast (Uvaferm BDX)

K2 – wine yeast (Cross Evolution)

E – enzyme

Table 2. Analyses of pear wines at the end of fermentation

SAMPLE	K1	K2	K1E	K2E
Total Dry Extract (g/L)	78,4	78,4	77,6	77,5
Etanol (vol %)	11,59	11,53	11,58	11,55
Free SO ₂ (mg/L)	6,4	20,48	7,04	8,96
Total SO ₂ (mg/L)	32,00	99,20	41,6	53,12
Volatile Acids (g/L)	0,53	0,65	0,57	0,58
Total Acids (g/L)	5,74	6,15	5,89	6,41
pH	3,69	3,68	3,67	3,67
Residual Sugar (g/L)	51,77	51,20	53,18	53,10
Total Sugar (g/L)	52,44	51,43	54,67	53,26

CONCLUSIONS

The results of the study showed that selected yeasts Uvaferm BDX and Cross Evolution could successfully ferment pear juice. The higher specific fermentation rate was achieved using Uvaferm BDX. In samples produced with the addition of the pectolytic enzyme Lallzym OE, a higher specific fermentation rate, as well as a higher total polyphenols content, were observed compared to other pear wine samples. The stimulated MLF led to the decrease of malic acid concentration, which resulted in improved sensory properties of pear wine.