
Application Bulletin

Of interest to: General analytical laboratories, Food analysis

A 1, 7

Automatic determination of the formol number in fruit and vegetable juices

Summary

The determination of the formol number in fruit and vegetable juices represents a further parameter for the characterisation of these drinks. As this is merely an index (it does not deal with molecular size, nor with the quantity of amino acids), the conditions of this titration can be adapted to practical needs. This concerns mainly the pH value of the endpoint (pH = 8.5, 9.0, 9.2 etc.).

Apparatus and accessories

- Titrino 702 or 716 or 719 or 736 or 751 or 785 or Titroprocessor 726 with Dosino 700 or Dosimat 685
 - Second Dosimat (addition of formaldehyde) 765 or 776
 - Magnetic Swing-out Stirrer 2.728.0040
 - Exchange units 6.3014.223
 - Comb. glass electrode 6.0219.100 with electrode cable 6.2104.020
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Reagents

- Titrant: $c(\text{NaOH}) = 0.1 \text{ mol/L}$
 - Formaldehyde: $w(\text{HCHO}) = 35 \%$, adjusted to pH = 8.5 with NaOH
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Analysis

25.0 mL sample solution are pipetted into a glass beaker and titrated in a first SET titration to pH = 8.5. Then through activation pulse, the second SET titration is automatically started under the following parameters:
Addition of 15 mL formaldehyde (second Dosimat), 60 s waiting time, titration to pH = 8.5.

Calculation

Formol number (FN) = $EP1 * C01$; mL $c(\text{NaOH}) = 0.1 \text{ mol/L}$ per 100 mL sample

EP1 = mL NaOH second SET titration
C01 = 4 (with 25 mL sample size)

Literature

- Schweiz. Lebensmittelbuch, Band II
Kapitel 28, Frucht- und Gemüsesäfte ...
Abschnitt 46, Formolzahl-Bestimmung

Figures

'pa			'pa		
719 S Titrino	OP1/110	719.0020	719 S Titrino	OP1/110	719.0020
date 1999-05-11	time 09:34	26	date 1999-05-11	time 09:34	26
SET pH	Formal1		SET pH	Formal2	
parameters			parameters		
>SET1			>SET1		
EP at pH	8.50		EP at pH	8.50	
dynamics	0.5		dynamics	0.5	
max.rate	10.0 ml/min		max.rate	10.0 ml/min	
min.rate	10 µl/min		min.rate	10 µl/min	
stop crit:	drift		stop crit:	drift	
stop drift	20 µl/min		stop drift	20 µl/min	
>SET2			>SET2		
EP at pH	OFF		EP at pH	OFF	
>titration parameters			>titration parameters		
titr.direction:	auto		titr.direction:	+	
pause 1	0 s		pause 1	60 s	
start V:	OFF		start V:	OFF	
pause 2	0 s		pause 2	0 s	
extr.time	0 s		extr.time	0 s	
meas.input:	1		meas.input:	1	
temperature	25.0 °C		temperature	25.0 °C	
>stop conditions			>stop conditions		
stop V:	abs.		stop V:	abs.	
stop V	99.99 ml		stop V	99.99 ml	
filling rate	max. ml/min		filling rate	max. ml/min	
>statistics			>statistics		
status:	OFF		status:	OFF	
>preselections			>preselections		
conditioning:	OFF		conditioning:	OFF	
req.ident:	OFF		req.ident:	OFF	
req.smpl size:	OFF		req.smpl size:	OFF	
activate pulse:	OFF		activate pulse:	OFF	
=====			=====		

Fig. 1 Parameter settings Titrino

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'cr
719 S Titrino      0P1/110  719.0020
date 1999-05-11   time  08:26   17
meas.input:      1      CAL  *****
cal.date      1999-05-11
                pH      U/mV
buffer 1        7.00      15
buffer 2        4.00      185
cal.temp      22.5 °C
slope(rel)     0.968      pH(as)  7.26
=====

'fr
719 S Titrino      0P1/110  719.0020
date 1999-05-11   time  09:41   27
pHc(init)      3.85      SET pH  Formal1
EP1            31.420 ml      8.51
=====

'fr
719 S Titrino      0P1/110  719.0020
date 1999-05-11   time  09:46   28
pHc(init)      7.04      SET pH  Formal2
EP1            4.842 ml      8.50
FZ            19.368
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Fig. 2 Results Titrino, Formol number in orange juice