

Examination of Vitamin C and Total Phenolic Content in Raw Quince and its Products

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INTRODUCTION

Quince (*Cydonia oblonga* Mill.) belonging to family Rosaceae, originates from Caucasian area. Quince has many positive biological activities (antimicrobial, antioxidant, antiallergic and wound healing activity). It is used in traditional medicine to cure cough, sore throat, canker sores, diarrhea, high fever, dysentery and gum problems. The antimicrobial and antioxidant activity of quince has been correlated with the phenolic compounds. Namely, the fruit peel extract has shown a significant effect on reducing the growth of bacteria, and chlorogenic acid, as the main component, has been identified as the main compound responsible for these activities. Also, relatively high vitamin C content contributes greatly to numerous beneficial health effects.

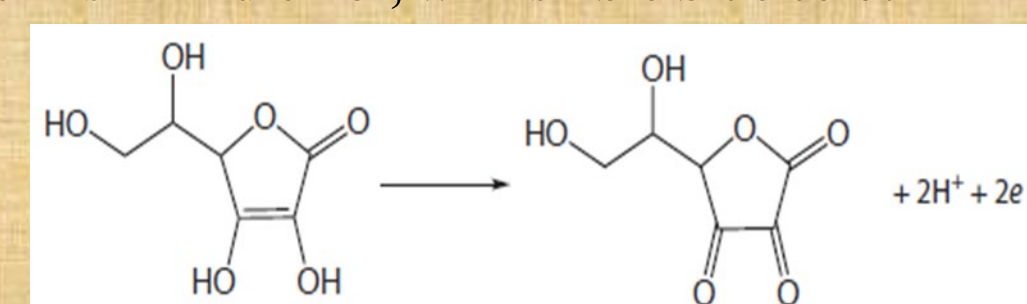
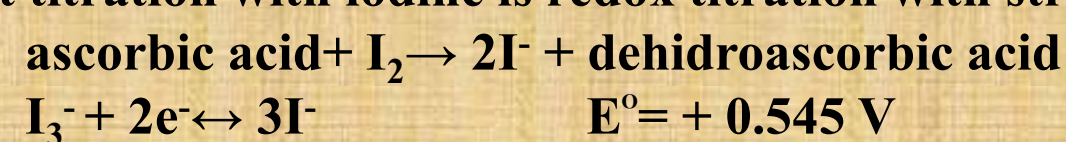
The main objective of this study is the examination the ascorbic acid and total phenols content in raw quince fruit, fruit juice, compote and jam in order to get the information of their potential use as a source of biological active compounds.



MATERIALS AND METHODS

Vitamin C is determined by direct titration with iodine in prepared samples (water extracts of raw quince fruit, jam, compote and quince juice).

Direct titration with iodine is redox titration with starch as an indicator, with stable blue colour at the end point



Iodine solution was standardised using direct method of separate probes, with ascorbic acid as a primary standard. Concentration of iodine solution was determined using following equation:

$$c_{\text{iodine}} (\text{mol/L}) = \frac{m_{\text{vitamine C}} (\text{mg})}{M_{\text{vitamine C}}} / V_{\text{iodine}} (\text{mL})$$

The same samples are used for the colorimetric determination of total phenolic content with Folin-Ciocalteu reagent.



RESULTS

Standardisation of iodine solution

m vitamin C (mg)	V iodine (mL)	c iodine (mol/L)
14.2	17.65	0.00457
16.3	20.30	0.00456
		$\bar{c} = 0.0046$

Recovery

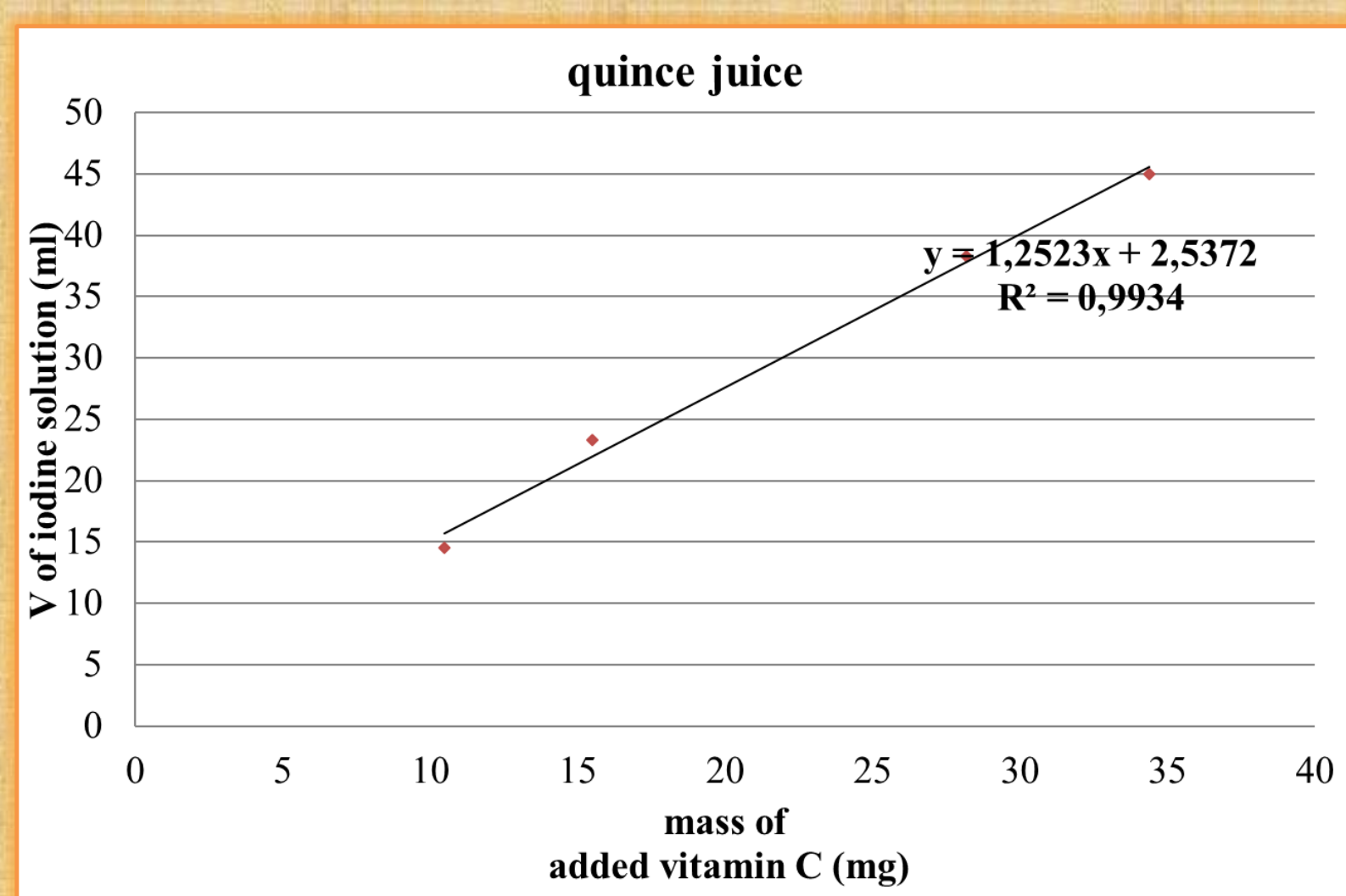
Recovery values by adding ascorbic acid for raw quince, compote and jam

	Added vitamin C(mg)	Determined vitamin C(mg)	Recovery (R)%
Raw quince	12.5	12.42	99.34
	14.2	14.39	101.32
Compote	15	15.34	102.25
	12.8	12.69	99.11
Jam	14.7	15.4	104.8
	16.8	17.01	101.26

Recovery values by adding ascorbic acid for quince juice

Quince juice			
Added vitamin C (mg)	Determined vitamin C (mg)	R%	V iodine (mL)
10.5	9.64	91.86	14.5
15.5	16.72	107.86	23.3
28.2	28.77	102.03	38.3
34.4	34.16	99.3	45

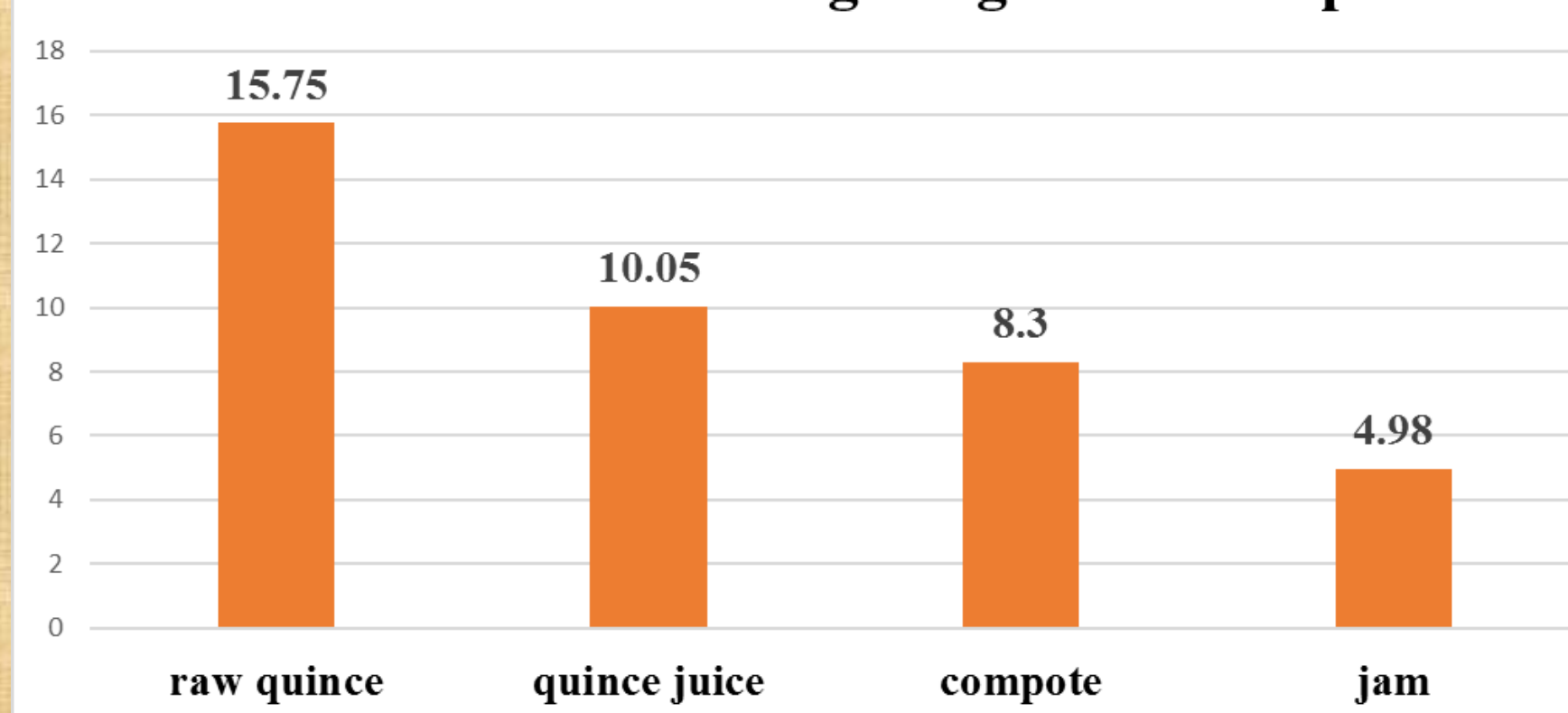
Testing the linearity of the method - to determine the end point of the titration, because the color change at the end point for quince juice was unstable



Determination of vitamin C content using direct titration with iodine

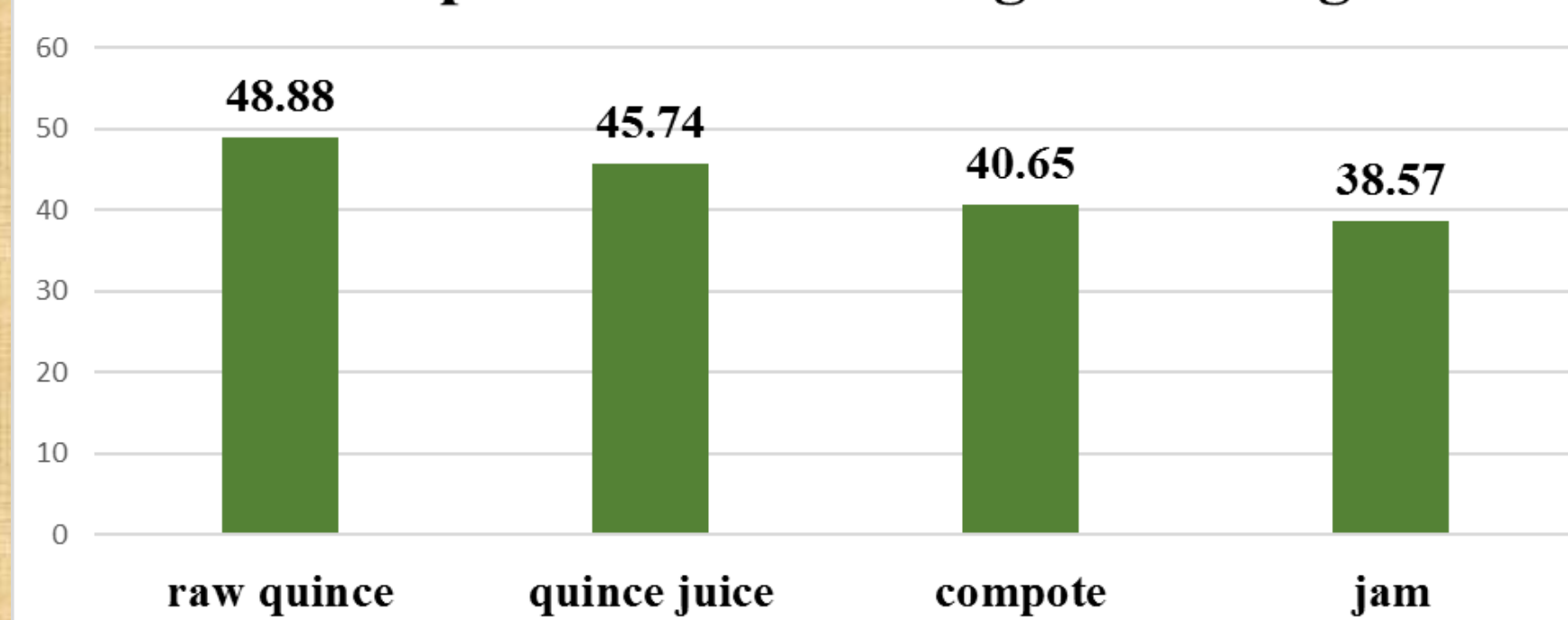
Raw quince		Quince juice		Compote		Jam	
V _{iodine} (mL)	Vitamine C (mg)	V _{iodine} (mL)	Vitamine C (mg)	V _{iodine} (mL)	Vitamine C (mg)	V _{iodine} (mL)	Vitamine C (mg)
2.8		2.4		2.0		1.05	
2.9		2.5		2.1		1	
2.7		2.6		2.1		1.05	
$\bar{V} = 2.8$	15.75	$\bar{V} = 2.5$	10.05	$\bar{V} = 2.07$	8.30	$\bar{V} = 1.033$	4.98
S.D. 0.01		S.D. 0.01		S.D. 0.0033		S.D. 0.0008	

Vitamine C content mg/100g of the sample



Determination of total phenolic content

Total phenolic content mg GAE/100g



CONCLUSIONS

Content of vitamin C in raw quince fruit is highest and decreases with the duration of thermic processing of quince products. Total phenolic content in unpeeled quince fruit is relatively high (due to the higher and more complex phenolic compounds) while processing does not greatly decrease their concentration.

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