



GLUCOSE in TOMATO

RAPID METHOD FOR THE DETERMINATION OF REDUCTIVE SUGARS IN TOMATO

INTRODUCTION

In Italy tomato is one of the most interesting matrix for the alimentary industry since around the 85% of production is destined to industrial transformation.

Tomato composition is conditioned by different factors: cultivar, environmental conditions and ripening period.

Once the ripening is completed, tomato is of a vivid red colour More than the 96% of it can be eaten since only the skin and the seeds (and the wooden part) can not be assimilated.

Normally 100 g of tomato are composed of 93% of water, 2,9% of carbohydrates, 0,2% of fats, 1% of proteins and 1,8% of fibres.

The sugar present is mostly glucose and fructose (reductive sugar) in almost similar proportions and constitute the 40-60% of the dry residual. Saccharose quantity naturally present in tomato is practically negligible.

MATERIALS AND METHODS

The determination of sugar that is present in tomato is usually done using Feeling method, based on the titration method.

CDR innovative test simplifies the official procedure using micro-quantities of sample diluted in water and single use cuvettes pre-filled with the reagent. The glucose present in the sample reacts with a phenolic derivate if the peroxidase enzyme is present. It forms a coloured compound that is detectable at 545 nm.

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Sistema Qualità certificato ISO 9001 ed. 2000



Materials:

- FOODLAB instrument
- Pre-filled single use cuvettes
- Small bottle containing the starter reagent
- 5 μ L micropipette
- Scale
- Container for diluting
- Distilled water

The sample preparation is very simple: dilute 1 gr of sample into 20 mL of distilled water in a container and agitate. With the specific pipette add into the cuvette 5 μ L of diluted sample and 1 drop of starter reagent.

After 3 minutes the instrument prints the results expressed as g/ 100 g of glucose.

Using this value, with mathematical calculation is determined the concentration of fructose and that of reductive sugar.

Reagents	Sample Volume	Wavelength	Analysis mode	Unit of measure	Calibration
2 compounds	5 μ L diluted into distilled water	545 nm	End point	g/100g	available

Linearity	Accuracy	Repeatability	Correl. Coeffic.	Sensitivity	Test duration	Test/hour
10 g/100g Glucose 13 g/100g Fructose 23 g/100g reduc. sugar	+ - 5%	CV < 5%	R ² = 0,99	0,01 g/100g Glucose 0,01 g/100g Fructose 0,02 g/100g reduc. sugar	3 min	70

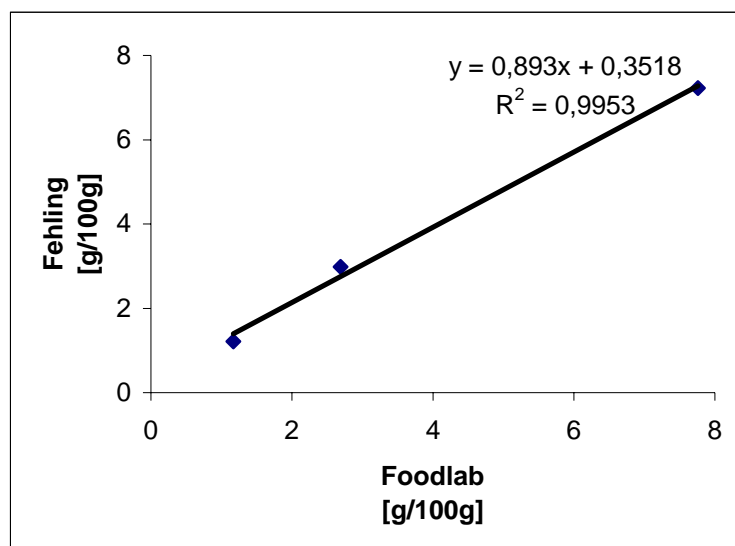


RESULTS AND DISCUSSION

Comparative tests between the standard method (Fehling) and Foodlab method have been done in a SINAL certified laboratory.

The two methods have a good correlation.

GLUCOSE	Foodlab [g/100 g]	Fehling Titration [g/100 g]
Tomato triple concentrated	7,23	7,76
Tomato sauce	2,99	2,69
Tomato pulp	1,22	1,17



For each test once the glucose content has been measured, it is calculated the concentration of fructose and reductive sugar contained in the sample.

FRUCTOSE	Foodlab [g/100 g]	Titolazione Fehling [g/100 g]
Tomato triple concentrated	10,61	8,84
Tomato sauce	3,77	2,90
Tomato pulp	1,27	1,40

REDUCTIVE SUGAR	Foodlab [g/100 g]	Titolazione Fehling [g/100 g]
Tomato triple concentrated	18,45	17,6
Tomato sauce	6,55	6,07
Tomato pulp	2,21	2,87



Repeatability tests have been done in CDR laboratory using 3 different samples of tomato. The results are good.

Tomato triple concentrated [g/100 g]		Tomato sauce [g/100 g]		Tomato pulp [g/100 g]	
Test 1	1,71	Test 1	0,76	Test 1	0,35
Test 2	1,68	Test 2	0,74	Test 2	0,37
Test 3	1,85	Test 3	0,76	Test 3	0,34
Test 4	1,79	Test 4	0,73	Test 4	0,33
Test 5	1,83	Test 5	0,75	Test 5	0,36
mean	1,77	mean	0,75	mean	0,35
SD	0,07	SD	0,01	SD	0,01
CV	4,1%	CV	1,9%	CV	3,8%

CONCLUSIONS

Foodlab method for glucose, fructose and reductive sugar analysis on tomato is very simple, rapid and reliable. It is a very good answer to the need of monitoring tomato quality in all production phases, from the reception to the final packaging phase.