

# Determination of grape juice sugars content by HPLC

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## 1. Introduction

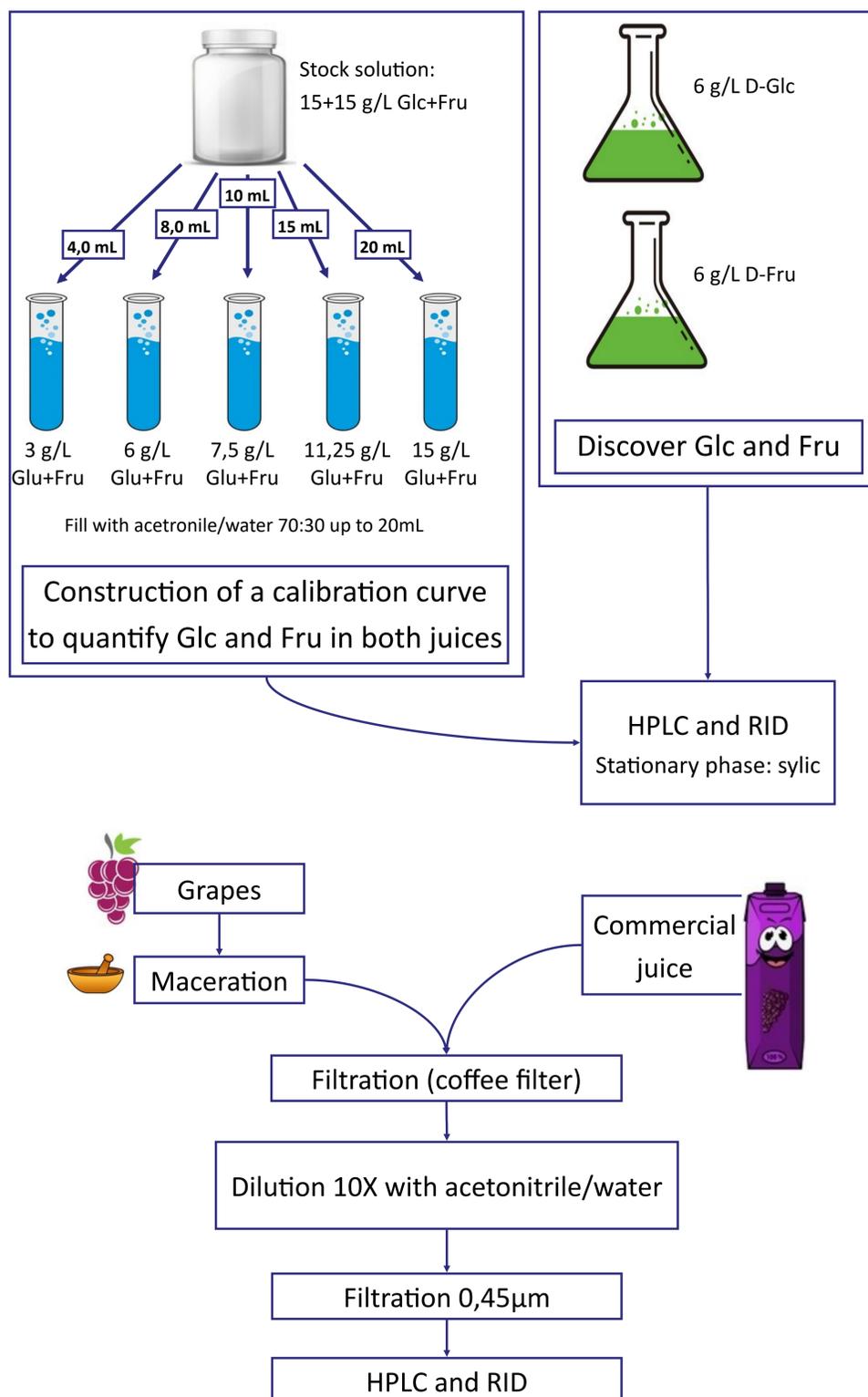
Fruit juices differ from each other, especially natural and commercial juices [1]. The natural must have an inferior amount of sugars, and the non-addition is beneficial to health.

HPLC is a technique for separating compounds in a solution, and relate peak area with concentration [2,3]. The correct quantification of free-sugars may allow a more precise nutritional formulation.

## 2. Objectives

Natural and commercial grape juices will be submitted to HPLC and refractive index detector, in order to quantify D-glucose and D-fructose, to examine the amount of added sugar. This quantity is given by the difference between total sugar content and free sugars.

## 3. Methods



## 4. Results and Discussion

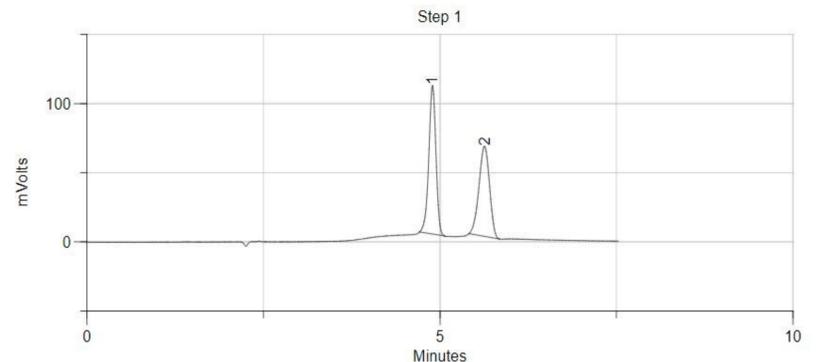
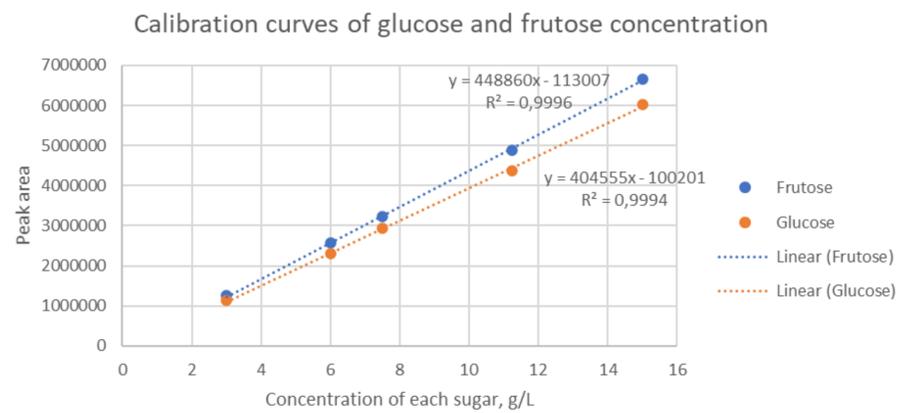


Figure 1—Retention times of D-fructose (4,88 min) and D-glucose (5,65 min), in HPLC.

Glucose's retention time is higher than the fructose one because glucose has a higher affinity to the stationary phase (sylic).



Sample	Data	D-fructose	D-glucose
Grapes' extract	Diluted concentration (g/L)	11,1640	10,4130
	Concentration (g/L)	<b>111,640</b>	<b>104,130</b>
Commercial grape juice	Diluted concentration (g/L)	4,47752	4,61351
	Concentration (g/L)	<b>44,7752</b>	<b>46,1351</b>

Table 1—Peak area and free sugars' concentration in each sample.

Grapes' extract has more free sugars than the commercial one: 215,77 > 90,91 g/L.

## 5. Conclusion

Grapes' free sugars are 215,77 g/L, and according to literature, this amount is correct.

DECLARAÇÃO NUTRICIONAL / NUTRITION DECLARATION / DÉCLARATION NUTRITIONNELLE	POR / PER / POUR 100ml	POR PORÇÃO / PER PORTION PAR PORTION (200ml)	%RVR*
ENERGIA / ENERGY / ÉNERGIE	201kJ / 47kcal	402kJ / 95kcal	5
LÍPIDOS / FAT / MATIÈRES GRASSES	0,10g	0,2g	<1
DOS QUAIS SATURADOS / OF WHICH SATURATED / DONT ACIDES GRAS SATURÉS	0g	0g	0
HIDRATOS DE CARBONO / CARBOHYDRATE / GLUCIDES	11g	23g	9
DOS QUAIS AÇÚCARES / OF WHICH SUGARS / DONT SUCRES	11g	23g	25
PROTEÍNAS / PROTEINS / PROTÉINES	0,2g	0,4g	<1
SAL / SALT / SEL	0g	0g	0

Figure 2—Package information

According to the package [Figure 2], commercial juice has 11g/100mL of sugars, or 110g/L of sugars. In HPLC, only 90,19g/L were identified. So, it's possible to say that 19,09g/L is added sugar, probably added in order to make the juice taste more pleasant. With this technic, it's possible to verify if the fruit juice has more sugars than the natural ones.

## 6. References

- [1] Buglass, A.J., *Chemical Composition of Beverages and Drinks*. In "HandBook of Food Chemistry", P.C.K. Cheung & B.M. Mehta (Eds.), Ch. 10, Springer-Verlag, Berlin Heidelberg, 2015.
- [2] Peris-Tortajada, M., *HPLC Determination of Carbohydrates in Foods*, In: "Food Analysis by HPLC", L.M.L. Nollet, F. Toldra (Eds.), Ch. 7, pp. 233-252, CRC Press/Taylor & Francis Group, Boca Raton, FL, 2013.
- [3] Armoogum, V., & Boodhoo, K. (2020). Full optimization and validation of an HPLC method for the quantitative analysis of total sugars in a soft drink. *Bulletin of the Chemical Society of Ethiopia*, 34(2), 419–426. <https://doi.org/10.4314/bcse.v34i2.17>