Saffron categories:

The absorbance values measured at 440 nm, 310 nm and 257 nm due to the presence of their secondary metabolite (crocin, safranal and picrocrocin) by using UV-Vis spectrophotometry, which presented in Table 4, were compared with the following values in order to determine the category of each kind of saffron.

The $E_{1cm}^{1\%}$440 nm, $E_{1cm}^{1\%}$310 nm and $E_{1cm}^{1\%}$257 nm were assessed from the absorbance at different wavelength of the fraction containing crocin, safranal and picrocrocin respectively according to the ISO 3632-2 norms using the following equation:

$$E_{1cm}^{1\%} = \frac{D \times 10000}{m \times (100 - H)}$$

D is the absorbance at 257 nm, 310 nm and 440 nm;

m is the mass of the saffron sample, in grams;

H is the moisture and volatile matter content of the sample;

$E_{1cm}^{1\%}$ without unit.

Categories according to ISO/TS 3632-2	$E_{1cm}^{1\%}$ (440 nm) absorption value of crocin	$E_{1cm}^{1\%}$(310 nm) absorption value of safranal	$E_{1cm}^{1\%}$(257nm) absorption value of picrocrocin	Moisture and volatile matter content (%)
I	≥ 190	20-50	≥ 70	< 12
II	≥ 150	20-50	≥ 55	< 12
III	≥ 110	20-50	≥ 40	< 12
IV	≥ 80	20-50	≥ 30	< 12

The table cited below shows a detailed explanation for the analysed saffron sample and their associated category using the UV-Vis spectrophotometer and the ISO/TS 3632-2 standard recommendations, which ranks saffron by taking account the lowest category of the other ones. Considered that picrocrocin is responsible for saffron's bitter taste and by referring to the

absorption value at 257 nm the four samples are considered to have a less pronounced taste, that explain which category belong each saffron sample, despite their high concentration in terms of crocin and safranal.

Saffron Sample	Categories according to ISO/TS 3632-2			
	$E_{1cm}^{1\%}$ (440 nm) absorption value of crocin	$E_{1cm}^{1\%}$(310 nm) absorption value of safranal	$E_{1cm}^{1\%}$(257nm) absorption value of picrocrocin	Results of the category
ST_16	150 ≥ 147 ≥ 110 (Category III)	50 ≥ 33 ≥20 (Category I)	55 ≥ 51 ≥ 40 (Category III)	Category III
ST_70	150 ≥ 124 ≥ 110 (Category III)	50 ≥ 36 ≥20 (Category I)	55 ≥ 46 ≥ 40 (Category III)	Category III
ST_117	190 ≥ 156 ≥ 150 (Category II)	50 ≥ 38 ≥20 (Category I)	70 ≥ 57 ≥ 55 (Category II)	Category II
ST_148	190 ≥ 166 ≥ 150 (Category II)	50 ≥ 35 ≥20 (Category I)	40 ≥ 34 ≥ 30 (Category IV)	Category IV
ST_150	150 ≥ 113 ≥ 110 (Category III)	50 ≥ 30 ≥20 (Category I)	40 ≥ 39 ≥ 30 (Category IV)	Category IV
SI	190 ≥ 157 ≥ 150 (Category II)	50 ≥ 34 ≥20 (Category I)	40 ≥ 34 ≥ 30 (Category IV)	Category IV
SS	190 ≥ 153 ≥ 150 (Category II)	50 ≥ 30 ≥20 (Category I)	40 ≥ 30 ≥ 30 (Category IV)	Category IV