

GSC
Consultoría de calidad cercana

New approach in the statistic calculation for assigned value in sensory testing of Virgin Olive Oil

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INTRODUCTION

The most widely evaluation system currently used for the organoleptic testing of virgin olive oil (1) lays down on considering the set of panels as if they were a "super panel". This implies that the assigned value is the central one, as "median", but only the interquartile interval is used to estimate the uncertainty, "eliminating" 50% of the data that do not belong to this interval, although most of the excludes data are correct.

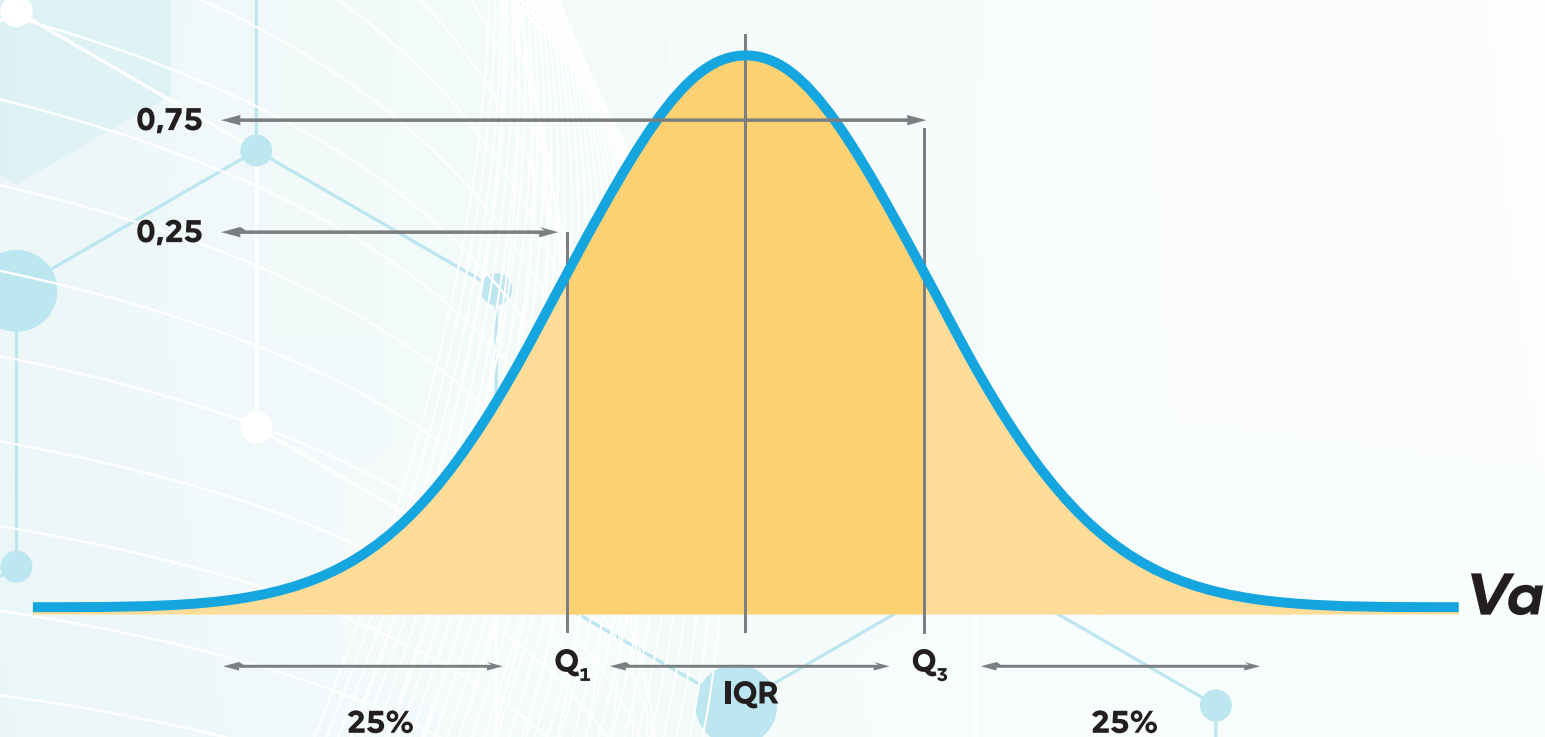
With GSC approach as a new alternative methodology (2) we demonstrate that the median value as assigned value can be replaced, for the "robust" average, as the consensus value, once the outliers are excluded, assuming a normalized model, and using a wider range of participants results.

WORKING HYPOTHESIS

Results for organoleptic testing evaluations, the median results of the panels follow a normal distribution model, allowing for the application of descriptive statistics.

CALCULATION SYSTEM

Tradicional system: Super panel



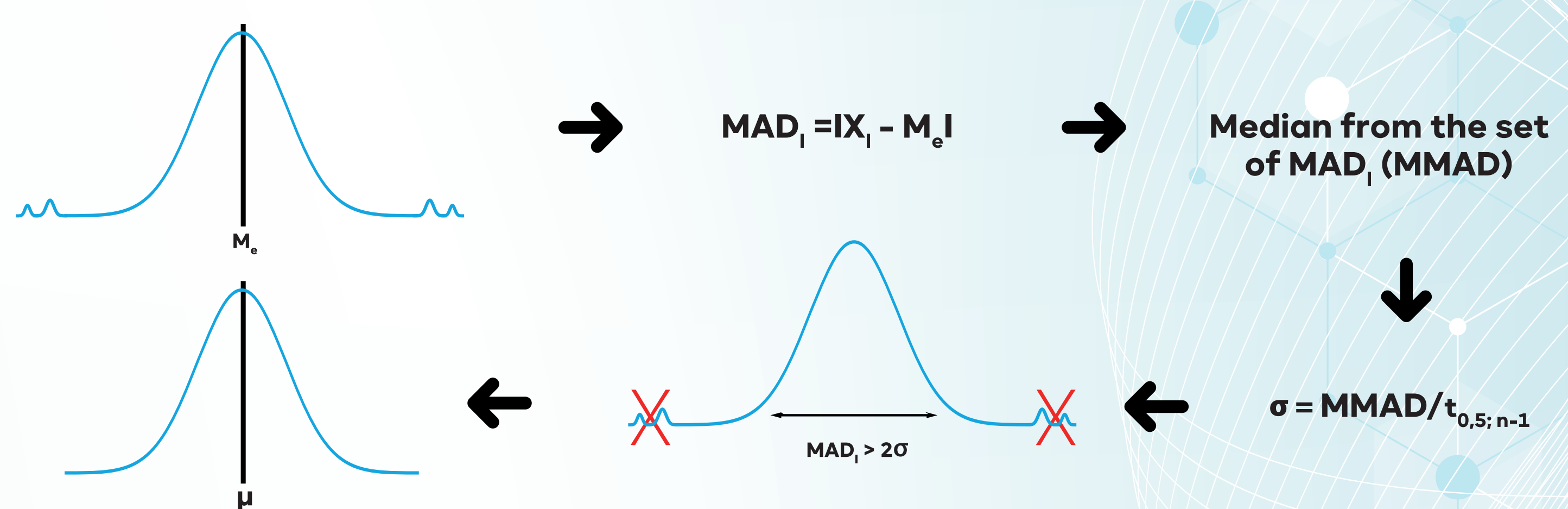
Assigned value = Mean (Me_i)
IQR = $3Q(75\%) - Q1(25\%)$

$$S * u = \frac{1,25 \text{ IQR}}{1,35\sqrt{N}}$$

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IQR = $3Q(75\%) - Q1(25\%)$

Where N is the total number of participants

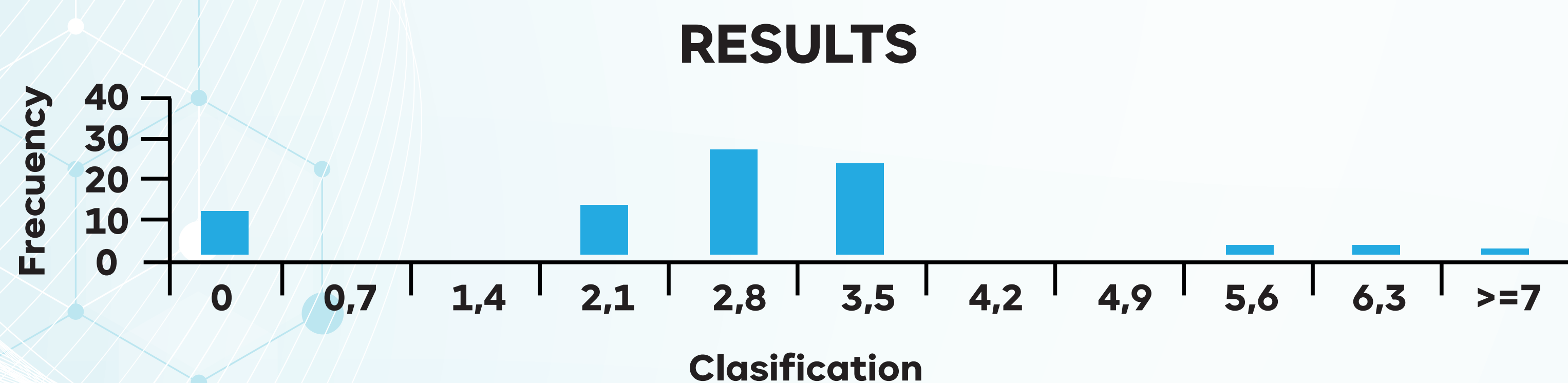
GSC DESCRIPTIVE METHOD: Assigned value: Mean: Me_i



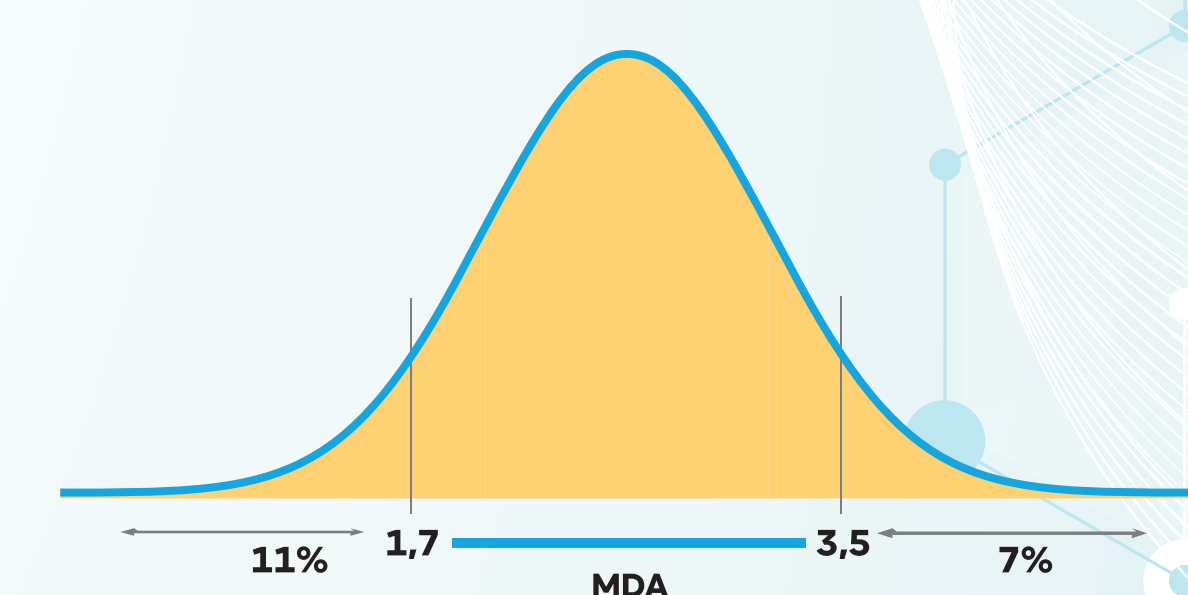
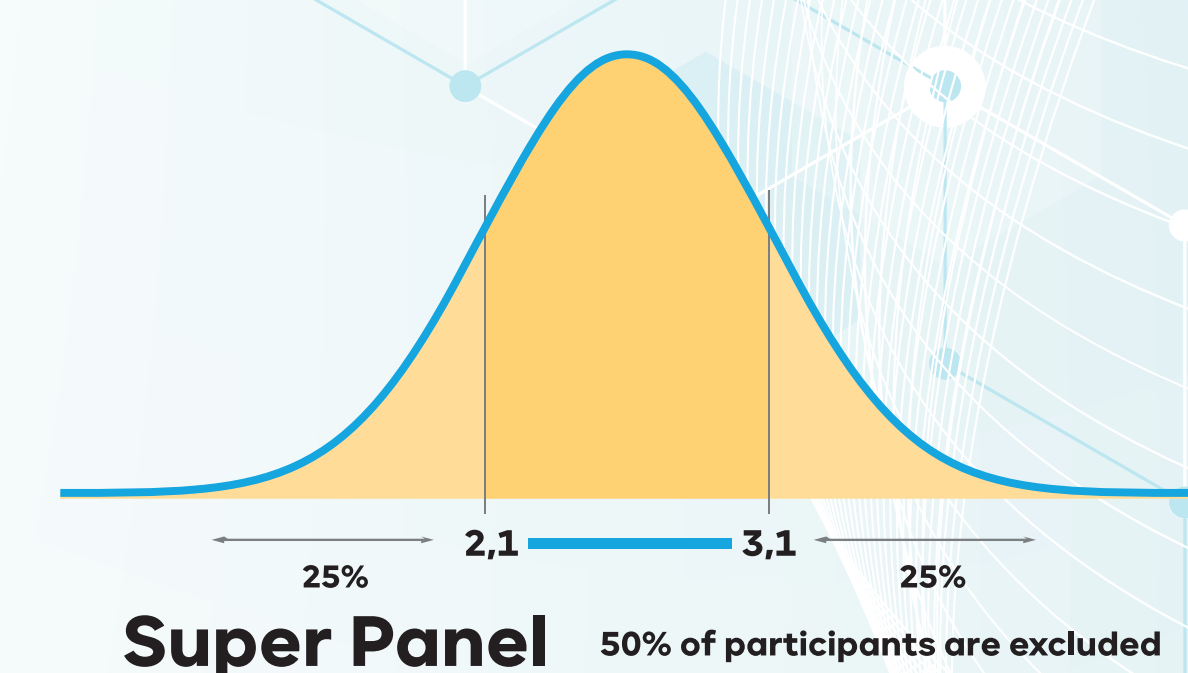
$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}} \quad u = \frac{s}{\sqrt{p}}$$

Where p is number of laboratories after elimination of outliers

EXAMPLE: COMPARISON SUPER PANEL METHOD VS GSC DESCRIPTIVE METHOD (MAD): 100 laboratories histogram results



	Nº accepted laboratories	Assigned value (V_a)	Uncertainty	Dispersion	Range of data use for V_a and U_{va}
Super Panel	50	2,65 (Median)	0,09	1,00 (IQR)	2,10 - 3,10
MDA GSC	81	2,69 (Mean)	0,05	0,47 (s)	1,70 - 3,50



CONCLUSIONS

With GSC approach, the detection and rejection of outliers in the results of such kind of proficiency test allows the use of most of the results of the panels, eliminating only those detected as outliers. This provides more useful and reliable information to the participants.

References

- (1) IOC/ T.20/ Doc. No 15, Sensory analysis of olive oil - method for the organoleptic assessment of virgin olive oil.
- (2) J. Laso Sánchez, A. Peris García-Patrón. "Statistical treatments in proficiency trials: Application of the median for detection of abnormal results". V Ibero-American Virtual Congress. Quality management in laboratories. (IBEROLAB). <https://gscsal.com/blog/tratamientos-estadisticos-en-ensayos-de-aptitud-aplicacion-de-la-mediana-para-deteccion-de-resultados-anomalous/>