COMPUTERIZED QUALITY CONTROL OF THE TABLET SPLITTING PROCESS

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What was done?

A computer method of gravimetric quality control of the tablet splitting process was designed.

Why was it done?

It was necessary to establish a quality control of this pharmaceutical process.

How was it done?

The procedure consists on a precision scale connected to a computer in which, according to the uniformity of mass assay of the Spanish Pharmacopoeia, the weights of 20 units of a batch of whole tablets destined to be split are automatically recorded in a spreadsheet, carrying out the following formulas:

=AVERAGE

Provides the average weight of the sample of whole tablets.

=MAX and **=MIN**

Select respectively the largest and the smallest of the weights.

=STDEV

Calculates the standard deviation of the sample weights.

With the average weight of the whole tablets, the theoretical weight of the half-tablets is calculated, establishing a maximum and a minimum admissible limits of weight with the following formulas:

=AVERAGE/2

Determines the theoretical average weight of each half-tablet.

=(AVERAGE/2)*(+1.075) and **(AVERAGE/2)*(+0.925)**

=(AVERAGE/2)*(+1.15) and **(AVERAGE/2)*(+0.85)**

Establish upper and lower gravimetric limits:
★ -Only 10% of half-tablets can exceed the first limit of ± 7.5%.
★ -No half-tablet can exceed the second limit of ± 15%. .

All the half-tablets need to be weighted, as the tablet splitting process is carried out tablet-by-tablet and this modus operandi is not reproducible enough. In case of non-compliance with maximum and minimum weight criteria, the half-tablet must be discarded.

Conditional functions were established such that the spreadsheet itself reflects the half-tablet acceptance/rejection decision. Basic technical computer skills, training in the technique of tablet splitting, appropriate clothing and environmental measures to avoid risks to the operator and the medications are required.

QUALITY CONTROL SPREADSHEET

WHOLE TABLET		
BATCH:	L003	
EXP:	31/05/2022	
No.	WEIGHT (g)	%Var
1	0,413	0,78%
2	0,408	-0,44%
3	0,415	1,27%
4	0,414	1,02%
5	0,415	1,27%
6	0,404	-1,42%
7	0,408	-0,44%
8	0,408	-0,44%
9	0,401	-2,15%
10	0,407	-0,68%

HALF TABLET				
BATCH:	1012018			
EXP:	10/01/2019			
No.	WEIGHT (g)	%Var	+/- 15%*	+/- 7,5%*
1	0,201	-1,90%	0	0
2	0,214	4,44%	0	0
3	0,194	-5,32%	0	0
4	0,22	7,37%	0	0
5	0,193	-5,81%	0	0
6	0,22	7,37%	0	0
7	0,209	2,00%	0	0
8	0,197	-3,86%	0	0
9	0,191	-6,78%	0	0
10	0,219	6,88%	0	0

SUMMARIES

SUMMARY WHOLE-TABLETS	
TOTAL WEIGHT (g)	8,1960
AVERAGE WEIGH (g)	0,4098
MAXIMUM WEIGHT (g)	0,4200
MINIMUM WEIGHT (g)	0,4010
STANDARD DEVIATION	0,0052

SUMMARY HALF-TABLETS				
AVERAGE WEIGH (theoretical)	0,2049		AVERAGE WEIGH (real)	0,2050
UPPER LIMIT (15%)	0,2356		% VARIATION	0,06%
LOWER LIMIT (15%)	0,1742		MAXIMUM WEIGHT (g)	0,2200
UPPER LIMIT (7.5%)	0,2203		MINIMUM WEIGHT (g)	0,1790
LOWER LIMIT (7.5%)	0,1895		STANDARD DEVIATION	0,0099

QUALITY CONTROL REPORT

Quality Control: Uniformity of Mass Assay (Spanish Pharmacopeia)

No half-tablet should exceed the limit of ± 15% of the average weight and only a maximum of 10% of half-tablets could exceed the ± 7.5% of the average weight. Half-tablets that exceed the limit of 15% must be discarded.

No. of half-tablets that exceed the +/- 15% limit:	0
No. of half-tablets that exceed the +/- 7.5% limit:	3
No. of half-tablets discarded:	0
Meets quality control:	YES

Pharmacist signature:
FAR1605

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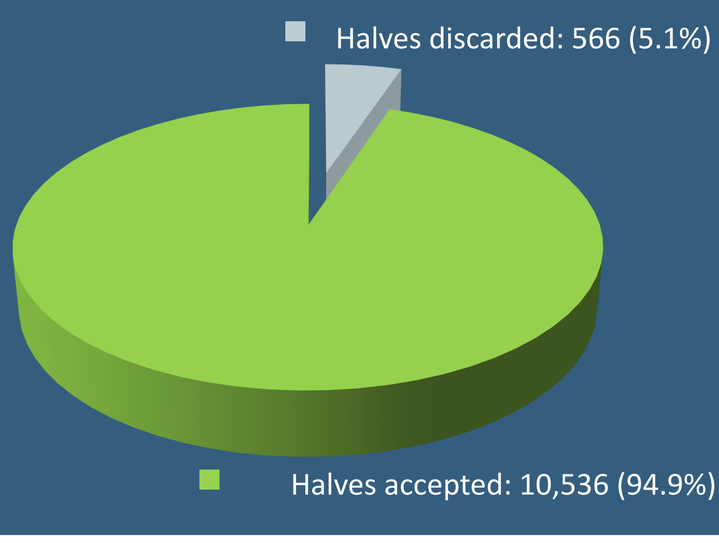
What has been achieved?

Since 2015, two different medicinal products were subjected to the tablet splitting technique. A total of 10,536 halves of suitable tablets were obtained, which permitted safe dosing at lower doses than commercialized, and also generated a financial asset of 101,724 Euros. 566 halves were discarded. The splitting efficiency was of 94.9%.



What next?

This quality control procedure is applicable to all divisible solid oral dosage forms. The standardization of the technique and the quality controls will allow to extend it to other medicinal products with dosing and economic purposes.

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