SETTING CLEANING VALIDATION ACCEPTANCE LIMITS AND DEVELOPING AN HPLC METHOD FOR DETERMINATION OF RISPERIDONE RESIDUES ON MANUFACTURING EQUIPMENT

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BACKGROUND & AIM

Risperidone is a potent atypical antipsychotic; residual carryover therefore requires stringent control.
Cleaning validation protects product quality by preventing cross-contamination between manufacturing campaigns.

STUDY AIM
Establish PDE-based cleaning acceptance limits and validate a sensitive RP-HPLC method for risperidone residues recovered by direct surface swabbing.

CLEANING VALIDATION STRATEGY

A health-based exposure limit was translated into a practical equipment-cleaning control.

PDE	MACO	SURFACE RESIDUE LIMIT
Risk basis	Carryover control	Swab verification

Acceptance limits were established using the Permitted Daily Exposure (PDE) approach to control cross-contamination risk.

SAMPLING

- Textwipe 714A swabs
- Direct sampling of manufacturing-equipment surfaces
- Risperidone certified reference material (CRM)

MATERIALS & METHOD

HPLC system	Shimadzu Nexera XR UPLC
Column	LiChrospher RP Select B · 125 × 4.0 mm · 5 µm
Mobile phase	ACN / 0.25% KH_2PO_4 = 34:66 (v/v) · pH 3.0
Elution	Isocratic · 1.0 mL/min · 35 °C
Detection	235 nm · injection volume 50 µL
Diluent	Methanol / 0.08% H_3PO_4 = 7:3 (v/v)

VALIDATION DESIGN

Selectivity • Accuracy • Linearity
Precision • Quantification limit

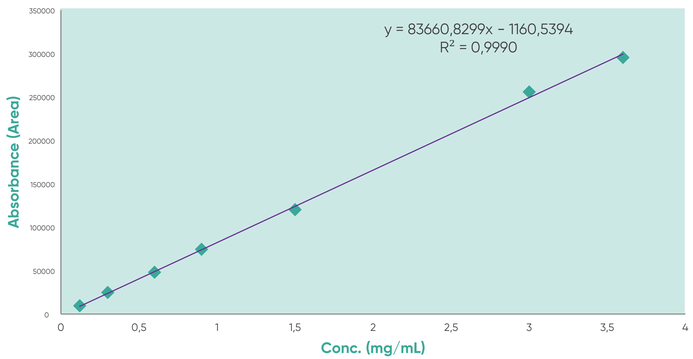
RESULTS & DISCUSSION

The method met the reported sensitivity, linearity and precision criteria for routine residue monitoring.

Parameter	Result	Detail
Linearity	R^2 0.9990	7 concentration levels, range 0.12–3.6 µg/mL
LOQ	0.12 µg/mL	Quantifiable
Precision	RSD < 5%	At LOQ

Reported linear range: 0.12-3.6 µg/mL.

LINEARITY-RISPERIDONE



Seven concentration levels produced a correlation coefficient of 0.9990.

SELECTIVITY

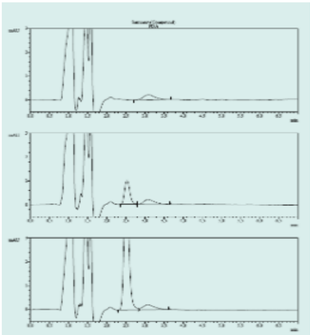


Figure 2. Chromatograms reported as evidence of selectivity.

Three chromatographic traces demonstrate the method's ability to distinguish the risperidone response from matrix and solvent contributions.

CONCLUSION

The validated RP-HPLC method is suitable for monitoring risperidone in equipment-surface swab samples. PDE-based limits were described as realistic and attainable, supporting routine cleaning validation and cross-contamination control.

REFERENCES

ICH Q2(R1) (2005), Validation of Analytical Procedures.; LeBlanc (2000), Validated Cleaning Technologies.; Schotte et al. (1993), Brain Research 631, 191–202.

Disclosure: All authors are affiliated with Replek Farm Ltd.

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