



Magtration® System 12GC: Application data----Microbiology

DNA extraction of *Bordetella pertussis* from respiratory swab using Magtration®-MagaZorb® DNA Common Kit-200

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Introduction

Magtration® System 12GC is a fully automated DNA/RNA isolation system coupled with an extraction kit, Magtration®-MagaZorb® DNA or RNA. To determine the applicability of this instrument in a diagnostic Microbiology laboratory, *Bordetella pertussis* (*B. pertussis*) was selected for the study. The objective of this study was to evaluate the efficiency of extraction as compared with established routine extraction protocol.

Materials and Methods

Swab samples

A total of 76 randomly selected specimens were included in this study. Routine submission for *B. pertussis* consist a nasopharyngeal swab in Regan Lowe transport media. Upon arrival in the laboratory, the swab was removed from the transport media and inserted into a microcentrifuge tube containing 50 µL of 1% Casamino acid. After mixing with vortex for 30 sec, 10 µL was removed and added into 190 µL of saline for DNA extraction.

DNA Isolation and PCR

DNA was extracted with Magtration®-MagaZorb® DNA Common Kit-200 by Magtration® System 12GC. A 200µL sample volume was applied to the instrument and DNA was eluted with 100µL and 5 µL was used for real-time PCR (LightCycler®, Roche Diagnostics) with primers directed to the insertion element (IS481) found in *B. pertussis*. Extraction by Magtration® System 12GC was compared with an established routine extraction protocol by the MagNA Pure LC® (Roche Diagnostics) instrument. To check for the presence of PCR inhibition, extracted DNA was used for PCR with primers directed to human factor V.

Sensitivity and Precision

To compare the sensitivity and precision of the isolation protocols with the two instruments, two low positive samples with crossing points of around 35 were selected for repeat PCR testing up to 15 replicates.

Results

Sensitivity

The results are shown in the following table

		MagNA Pure LC	
		Positive	Negative
Magtration® System 12GC	Pos.	18* ¹	1* ²
	Neg.	3* ³	2

*1: Crossing points of these samples were from 19.04 to 38.47.

*2: Crossing point of this sample was 37.84.

*3: Crossing points of these samples were 38.84, 35.16 and 39.98.

Inhibition effect to PCR

No inhibition was observed for the samples isolated by both MagNA Pure LC® and Magtration® System 12GC using 50 randomly selected swab specimens.

Precision

The results of fifteen replicates of PCR for the 2 low positive samples isolated by both MagNA Pure LC® and Magtration® System 12GC are shown in the following table.

Rep.	Crossing Points	
	MagNA Pure LC®	Magtration® 12GC
1	37.74	-
2	-	-
3	-	-
4	-	-
5	38.45	-
6	37.85	38.15
7	40.64	-
8	-	41.91
9	-	36.56
10	-	36.49
11	43.43	-
12	-	-
13	-	36.76
14	-	41.30
15	-	-

Conclusion

The PCR results using DNA extracted from swab specimens by Magtration® System 12GC with Magtration®-MagaZorb® DNA kit-200 for *B.pertussis* showed comparable results with MagNA Pure LC®. Both isolation protocols showed statistically false negative results for the low positive specimens due to sampling error because of low copy number of target. and low sample volume (5µl) for PCR testing. No inhibition to PCR was observed. The isolated DNA can be directly applied for down stream application such as PCR using Roche LightCycler®. Since Magtration® System 12GC uses reagent-prefilled cartridges, it can minimize hands-on-time and handling error caused by manual reagent dispensing.