



## OPEN ACCESS

## APPROVED BY

Xin Zhao,  
McGill University, Canada

## \*CORRESPONDENCE

Shayan Sharif  
✉ shayan@uoguelph.ca

RECEIVED 03 July 2023

ACCEPTED 21 September 2023

PUBLISHED 09 October 2023

## CITATION

Alizadeh M, Shojadoost B, Astill J, Taha-Abdelaziz K, Karimi SH, Bavananthasivam J, Kulkarni RR and Sharif S (2023) Corrigendum: Effects of *in ovo* inoculation of multi-strain lactobacilli on cytokine gene expression and antibody-mediated immune responses in chickens. *Front. Vet. Sci.* 10:1252518. doi: 10.3389/fvets.2023.1252518

## COPYRIGHT

© 2023 Alizadeh, Shojadoost, Astill, Taha-Abdelaziz, Karimi, Bavananthasivam, Kulkarni and Sharif. This is an open-access article distributed under the terms of the [Creative Commons Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

# Corrigendum: Effects of *in ovo* inoculation of multi-strain lactobacilli on cytokine gene expression and antibody-mediated immune responses in chickens

Mohammadali Alizadeh<sup>1</sup>, Bahram Shojadoost<sup>1</sup>, Jake Astill<sup>1</sup>, Khaled Taha-Abdelaziz<sup>1,2</sup>, Seyed Hossein Karimi<sup>1</sup>, Jegarubee Bavananthasivam<sup>3</sup>, Raveendra R. Kulkarni<sup>4</sup> and Shayan Sharif<sup>1\*</sup>

<sup>1</sup>Department of Pathobiology, Ontario Veterinary College, University of Guelph, Guelph, ON, Canada,

<sup>2</sup>Department of Pathology, Faculty of Veterinary Medicine, Beni-Suef University, Beni Suef, Egypt,

<sup>3</sup>Department of Pathology and Molecular Medicine, McMaster Immunology Research Centre, M. G. DeGroot Institute for Infectious Disease Research, McMaster University, Hamilton, ON, Canada,

<sup>4</sup>Department of Population Health and Pathobiology, College of Veterinary Medicine, North Carolina State University, Raleigh, NC, United States

## KEYWORDS

**lactobacilli, *in ovo*, chickens, cytokines, antibody**

## A corrigendum on

**Effects of *in ovo* inoculation of multi-strain lactobacilli on cytokine gene expression and antibody-mediated immune responses in chickens**

by Alizadeh, M., Shojadoost, B., Astill, J., Taha-Abdelaziz, K., Karimi, S. H., Bavananthasivam, J., Kulkarni, R. R., and Sharif, S. (2020). *Front. Vet. Sci.* 7:105. doi: 10.3389/fvets.2020.00105

In the published article, there was an error in [Table 1](#) as published. The primer sequences were mixed up during copying and pasting. The corrected [Table 1](#) and its caption appear below.

The authors apologize for this error and state that this does not change the scientific conclusions of the article in any way. The original article has been updated.

## Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

TABLE 1 Primer sequences used for real-time quantitative PCR<sup>a</sup>.

Gene <sup>b</sup>	Primer sequence <sup>c</sup> (5'-3')	Annealing temperature	GeneBank accession number
IFN- $\alpha$	F: ATCCTGCTGCTCACGCTCCTTCT	64	AB021154
	R: GGTGTTGCTGGTGCCAGGATG		
IFN- $\beta$	F: GCCTCCAGCTCCTTCAGAATACG	64	AY974089
	R: CTGGATCTGGTTGAGGAGGCTGT		
IFN- $\gamma$	F: ACACTGACAAGTCAAAGCCGCACA	60	X99774
	R: AGTCGTTTCATCGGGAGCTTGCC		
IL-2	F: TGCAGTGTACCTGGGAGAAGTGGT	60	NM_204153.2
	R: ACTTCCGGTGTGATTTAGACCCGT		
IL-6	F: CGTGTGCGAGAACAGCATGGAGA	60	NM_204628.1
	R: TCAGGCATTTCTCCTCGTCGAAGC		
IL-8	F: CCAAGCACACCTCTCTCCA	64	AJ009800
	R: GCAAGGTAGGACGCTGGTAA		
IL-12p40	F: CCAAGACCTGGAGCACACCGAAG	60	AY262752.1
	R: CGATCCCTGGCCTGCACAGAGA		
IL-13	F: ACTTGTCCAAGCTGAAGCTGTC	60	AJ621250.1
	R: TCTTGCAGTCGGTCATGTTGTC		
$\beta$ -Actin	F: CAACACAGTGTCTGCTGGTGGTA	58	X00182
	R: ATCGTACTCCTGCTTGCTGATCC		

<sup>a</sup>The listed oligonucleotides were used to analyze gene expression via real-time quantitative PCR.

<sup>b</sup>IFN, Interferon; IL, Interleukin.

<sup>c</sup>F, forward; R, reverse.