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SARS-CoV-2 Impact on fCAL and p-Elastase testing in routine laboratories

Dear Customer

Several case studies reported evidence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) viral RNA in faeces [1,2]. Although final proof of active, infectious viral particles is still missing, the faecal-oral transmission by SARS-CoV-2 might be considered as a secondary route of infection.

BÜHLMANN customers have been asking whether it is safe to handle stool samples and extracts, we would like to provide some recommendations based on literature research applicable to the BÜHLMANN stool measuring products.

Generally speaking, faecal samples sent to routine laboratories should be regarded as potentially infectious material for SARS-CoV-2 as well as for other human pathogens, and should therefore be handled with special care and handled according to the recommendations according to your local or national policies.

While this is true for raw stool samples entering the lab, the extracted stool samples in CALEX[®] extraction tubes for calprotectin or p-Elastase measurements may have some advantages.

Solvents and Detergents:

One of the published methods to inactivate SARS-CoV (enveloped RNA viruses) is by treatment with solvents and detergents. Chang et al. [3] as well as Darnell et al. [4] described reduction of active SARS viruses in blood and various spiked PBS and BSA solutions in a timeframe of 2 to over 24 hours depending on the protein content of solutions.

As the BÜHLMANN extraction buffer contains a significant virucide concentration of nonionic detergents that are capable of disrupting the lipid coat of enveloped viruses like the SARS-CoV-2, we are to assume that this extraction buffer feature supports virus inactivation of stool extracts.

Additional prevention steps might further support to mitigate the risk of faecal-oral transmission in the laboratory.

Heat inactivation:

Heat inactivation has shown to be additionally effective. Enveloped viruses are highly susceptible to heating procedures, whereas faecal calprotectin shows a very good heat tolerance. Thus an additional measure may be to heat incoming CALEX[®] Cap extraction devices either for 20 min at 56°C or 10 min at 65°C to reduce the risk of infectious particles. Experiments at BÜHLMANN support the heat tolerance of Calprotectin described in the literature [5]. Please, be aware the p-Elastase shows less heat tolerance.

Fecal extract	Assay	No Treatment	56°C 20 min	65°C 10 min
Sample 1	fCAL turbo	210 µg/g	206 µg/g	210 µg/g
	fPELA turbo	499 µg/g	487 µg/g	30 µg/g
Sample 2	fCAL turbo	1095 µg/g	1237 µg/g	1247 µg/g
	fPELA turbo	397 µg/g	337 µg/g	21 µg/g

Table 1 fecal extract (CALEX[®]) heated and measured for Calprotectin by BÜHLMANN fCAL[®] turbo assay and for pancreatic Elastase by BÜHLMANN fPELA[®] turbo assay.

UV light exposure:

UV light exposure to inactivate SARS-CoV has been described by Darnell et al. ONLY UV-C efficiently inactivate viruses within a treatment of 40 min. UVA was less efficient and required the addition of Psoralen to enhance inactivation. UV light exposure might therefore be an additional option but seems less efficient than heating.

Best regards

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References

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