Description of norovirus analysis (applicable to other enteric viruses as well)

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Cover note: Fill in the cover note that can be downloaded from the internet pages of the University of Helsinki. This cover note or free-form note, containing the same information (the type of the sample, date of the sample taken, which analysis is requested as well ordering and billing information) should be included in the sample delivery.

Assay: Detection of norovirus genome from food

Sample and sending instructions: At least 25 g (preferably 100 g) of food will be taken into a clean container that can be closed tightly. In case of oysters, 10 oysters are needed for one analysis. The virus analysis method is developed especially for risk food, such as fresh produce (vegetables/salad, soft fruit/berries, shellfish/oyster). Food items such as soups are not very suitable for this virus analysis. When an outbreak is suspected, samples should be taken as soon as possible (asap).

The samples should be sent at the temperature at which they are stored, since changing the temperature of the sample may destroy some viruses. Frozen samples can be stored for some weeks before sending to the laboratory. Fresh samples should be sent to the laboratory asap at cold temperature (about 4°C). Please contact the laboratory by email before sending the sample to ensure a safe arrival of the samples.

Method: The analysis comprises three steps. First, viruses are eluted from food and then precipitated by PEG (polyethylene glycol). The second step includes extraction and purification of the viral genome. In the third step viral genome is amplified using reverse transcription-PCR (polymerase chain reaction, separate reactions for genogroup I and II noroviruses). A process control virus is added to each sample to control the performance of the test throughout the processing.

Results: The results are given as virus genomes detected (positive)/not detected (negative) in the amount of food samples analysed. Analyses are usually performed once a week and the results will be informed within 2-5 working days. In rare cases, longer time is required.

Sensitivity of the assay: In theory, 10^-50 viruses per 25 g of food sample can be found using the test. In practice, however, the PCR inhibitors the particular food matrix contains decrease the sensitivity of the test and thus a negative result does not totally exclude the presence of viruses in the samples. The tests are developed to catch all the norovirus genotypes, but the test sensitivity may vary depending on an individual virus genotype.

Other notes: The laboratory uses Good Laboratory Praxis. The laboratory has participated successfully in a ring trial (quality control of shellfish samples) co-ordinated by the EU reference laboratory for viral analyses on shellfish as well as in Nordic and European scientific ring trials (see the references, a separate list). The laboratory participated in the validation of the standard ISO 15216:1, 2017).