Electronic Supplementary Material (ESI) for Analyst.

CRISPR/Cas12a-Powered Gold/Nickel Foam Surface-Enhanced Raman Spectroscopy Biosensor for Nucleic Acid specific Detection in foods

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1. Table S1. Sequences used in this study.

Name	Sequence (5'-3')
crRNA	UAAUUUCUACUCUUGUAGAUCCCUAGGCUCUGGCCGUUGC
ssDNA-ROX reporter	/ Thiol-CCCCCCCC-ROX
Reporter-FQ	FAM-CCCCCCCC-BHQ1
RT-F	GTCTTCTTTCTTCCAGGGCTC
RT-R	GTGTCCCCAATTTAGACTCCTAC
HAV-cDNA	TGCTTGTAAATATTAATTCCTGCAGGTTCAGGGTTCTTAAATCTGTT TCTCTATAAGAACACTCATTTTTCACGCTTTCTGTCTTCTTTCTTCCA GGGCTCTCCCCTTGCCCTAGGCTCTGGCCGTTGCGCCCGGCGGGGTC AACTCCATGATTAGCATGGAGCTGTAGGAGTCTAAATTGGGGACAC AGATGTTTGGAACGTCACCTTGCAGTGTTAA

2. Compared the CRISPR-SERS biosensor with RT-PCR for target DNA detection.

Here, HAV-cDNA was spiked to bottle water to make different concentration samples. HAV-cDNAstandard was quantified by DeNovx (DS-11 Spectrophotometer). Real-time PCR was

carried out using a SGExcel Univesal SYBR qPCR Mix（Sangon Biotech (Shanghai) Co., Ltd）. The PCR system consisted of 10 μL of mix (1×), 0.4 μL of forward and reverse primers (200 nmol/L), 2 μL of template, and 7.2 μL of RNase-free H2O. The amplification step was performed through a fluorescent quantitative PCR detection system (Biogener Q3200, Hangzhou Biogener Technology Co., Ltd., Hangzhou, China).

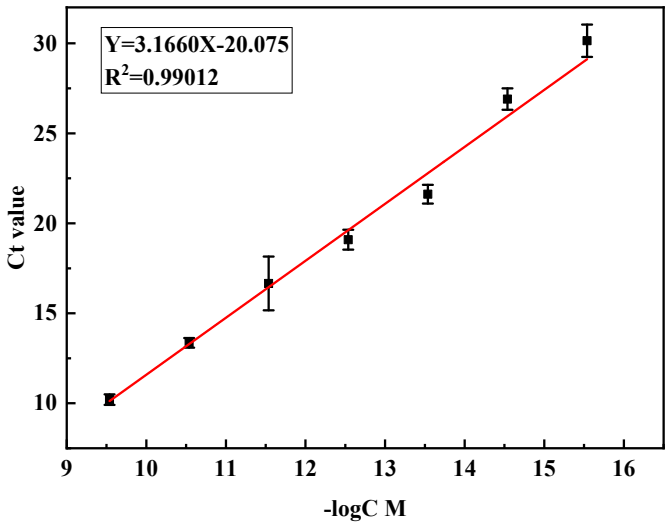

Fig. S1. The linear regression of Ct value the logarithmic concentration of HAV-cDNA.

Error bars represent standard deviation (n = 3)

Table S2 A summary of current CRISPR/Cas12a-based SERS detection methods

No.	SERS substrates	Signal reporter	Time	The test material	Amplification	Sensitivity	Ref.
1	AAO-AgNPs	6′-Carboxy-X-rhodamine(ROX)(1503cm^{-1})	2h	Salmonella Typhimurium	Free	110 CFU/mL	[1]
2	AuNPs	4-ATP(1590cm−1)	59min	Hepatitis Bvirus(HBV)	Free	pM	[2]
3	SiO2@Au	5,5′-Dithiobis-(2-nitrobenzoicacid) (DTNB)(1332cm−1)	1h	HIV-1 dsDNA	Free	fM	[3]
4	AgNPs	4-Aminothiophenol(4-ATP) (1074cm−1)	30-40min	Severeacuterespiratory syndrome coronavirus2 (SARS-CoV-2)	Free	fM	[4]
5	AuNPs@Ni Foam(AuNFs)	ROX(1503cm^{-1})	30min	HAV-cDNA	Free	fM	This work

Table S3 Comparison with the SERS-based nucleic acid detection method

No.	SERS substrates	The test material	method	Amplification	LOD	Ref.
1	Au NP@Si	Circulating tumor DNA (ctDNA)	cycled enzymatic DNA amplification	Yes	7.9fM	[5]
2	Au@4-MBA@Ag NPs	microRNA-21	LFA	Free	84fM	[6]
3	AuNPs(DNA hyperbranched nanostructures)	bacterial 16 S rDNA	RCA	Yes	15fM	[7]
4	paper-based SERS substrate composed of AgNWs	Bacterial DNA	PCR	Yes	3.12 pg/mL	[8]
5	AuNPs@Ni Foam(AuNFs)	HAV-cDNA	CRISPR	Free	8.23fM	This work

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