Electronic Supplementary Material (ESI) for Analytical Methods.

Supplementary Data

For

Nivalenol imprinted quartz crystal microbalance sensor based on sulphur incorporated cobalt ferrite and its application to rice samples

Betül Demir[a], Bahar Bankoğlu Yola[b], Sena Bekerecioğlu[a], İlknur Polat[a], Mehmet Lütfi Yola[a*]

[a]*Department of Nutrition and Dietetics, Faculty of Health Sciences, Hasan Kalyoncu University, Gaziantep, 27000, Turkey*
[b]*Department of Engineering Basic Sciences, Faculty of Engineering and Natural Sciences, Gaziantep Islam Science and Technology University, Gaziantep, 27000, Turkey*
**Correspondence: mlutfi.yola@hku.edu.tr; Tel.: +90-3422118080; Fax: +90-3422118081*

Sensitivity

$$LOQ = 10.0\ S / m$$

$$LOD = 3.3\ S / m$$

S: Standard deviation of the intercept and m: Slope of the regression line

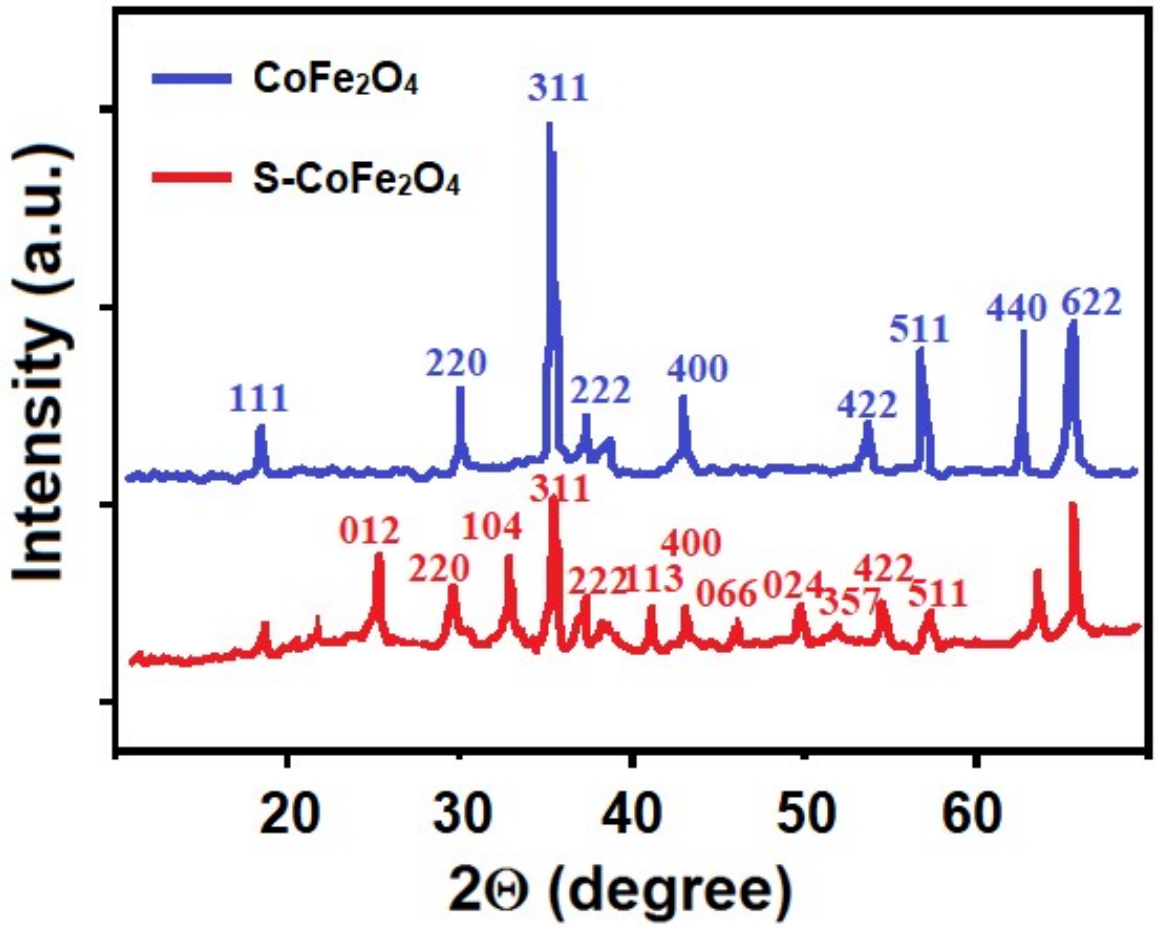

Fig. S1. XRD patterns of $CoFe_2O_4$ and S-$CoFe_2O_4$

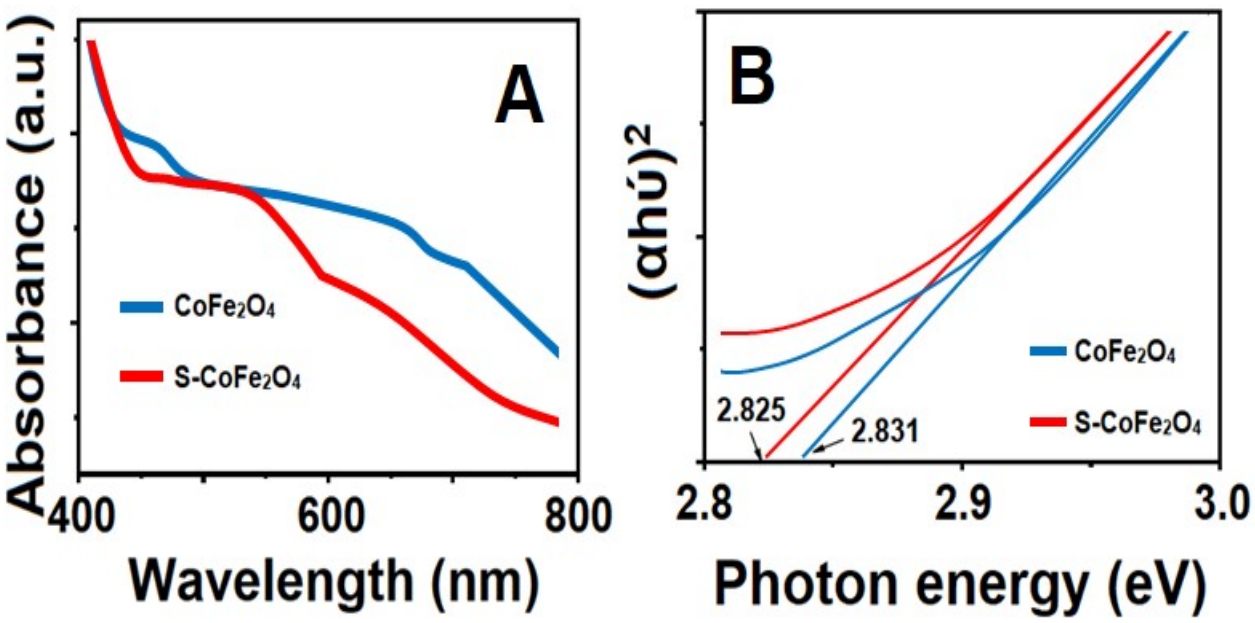

Fig. S2. (A) UV-Vis spectra and (B) the band gap of $CoFe_2O_4$ and S-$CoFe_2O_4$

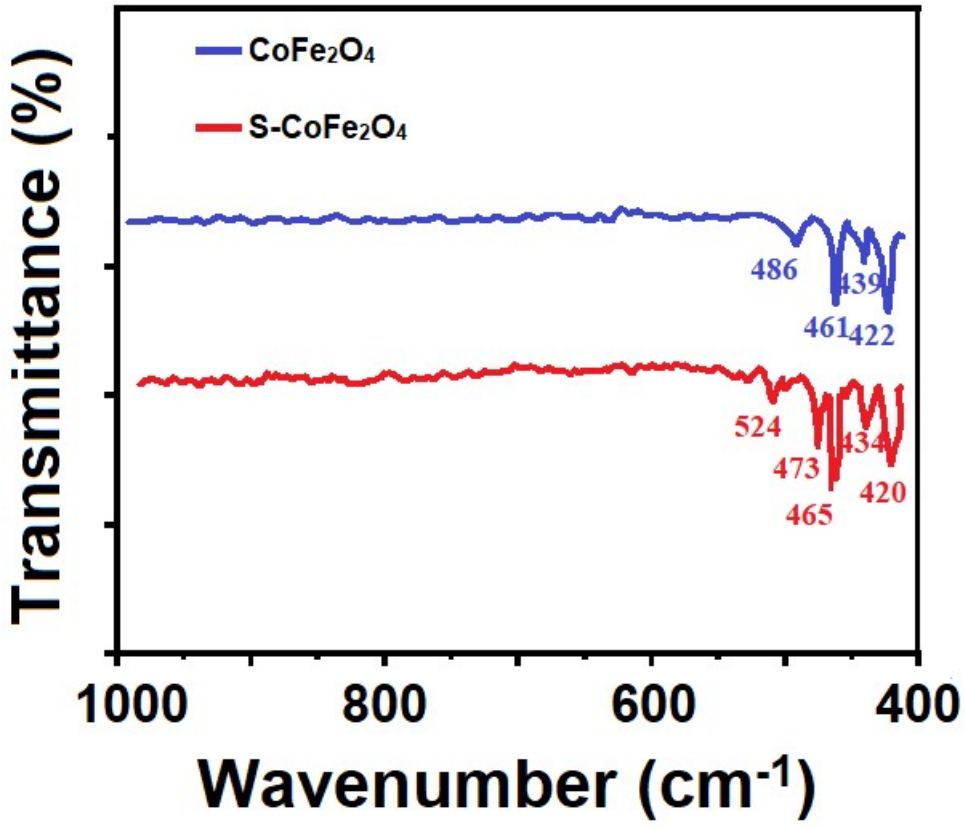

Fig. S3. FTIR spectra of $CoFe_2O_4$ and S-$CoFe_2O_4$

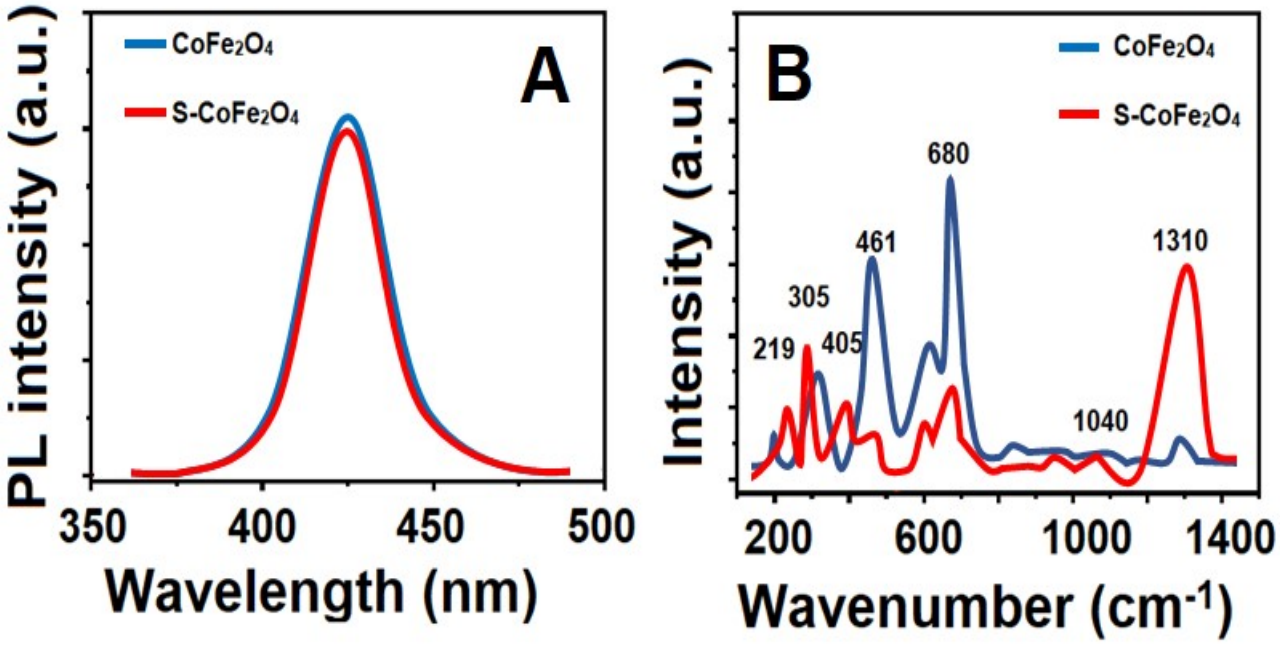

Fig. S4. (A) PL spectra and (B) Raman spectra of $CoFe_2O_4$ and S-$CoFe_2O_4$

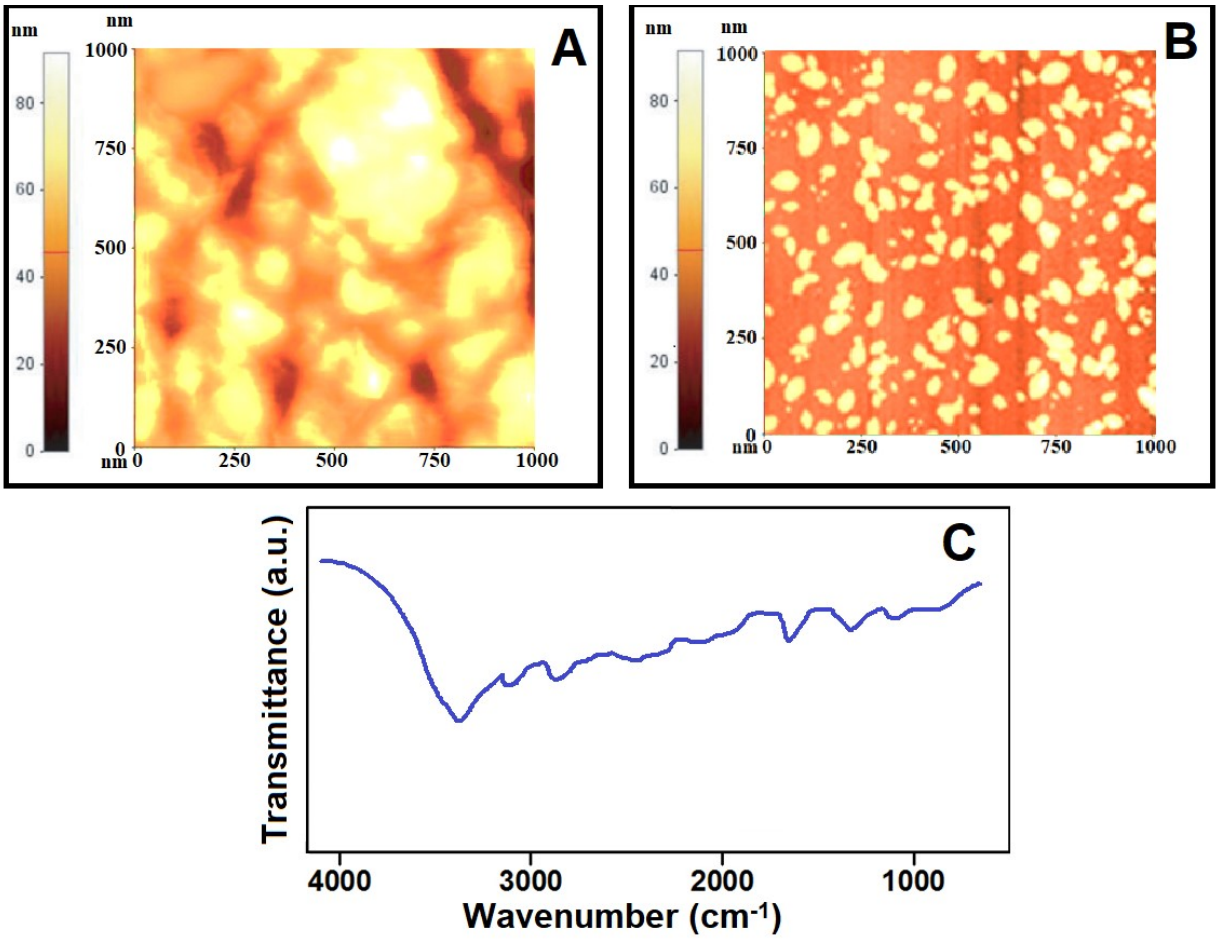

Fig. S5. AFM images of (A) bare QCM chip, (B) NIV imprinted film on S-$CoFe_2O_4$/QCM and (C) FTIR spectrum of NIV imprinted film on S-$CoFe_2O_4$/QCM

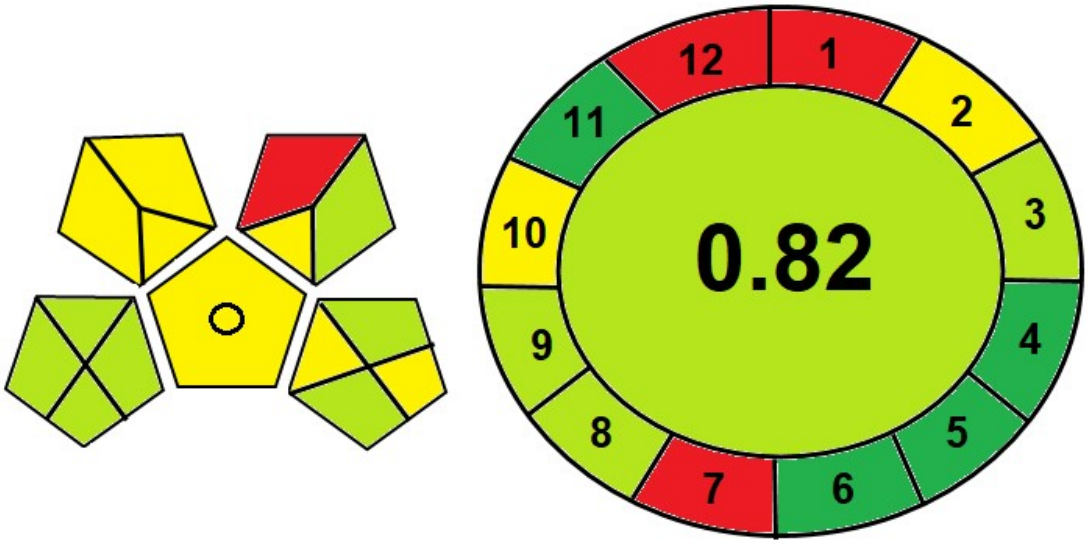

Fig. S6. Method greenness assessment tools pictograms

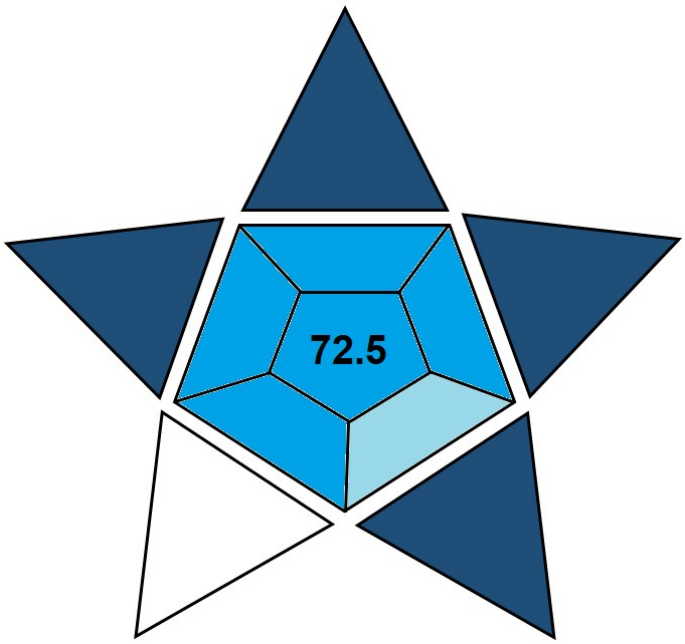

Fig. S7. Practicality assessment of NIV imprinted film on S-$CoFe_2O_4$/QCM using BAGI tools

Table S1. Comparison of the results obtained by MIP/S-$CoFe_2O_4$/QCM and LC-MS/MS methods for NIV detection (n = 6) (Added standard NIV = 4.000 ng L^{-1})

	Found NIV	
Sample	**MIP/S-$CoFe_2O_4$/QCM**	**LC-MS/MS**
Rice grain (ng L^{-1})	4.861 ± 0.006	4.860 ± 0.004
SD	0.015	0.010
RSD	0.30	0.20

$\overline{X}$: Mean ± Standard Error, SD: Standard Deviation, RSD: % Relative Standard Deviation

Table S2. k and k′ values of NIV imprinted QCM chips (MIP/S-$CoFe_2O_4$/QCM and NIP/S-$CoFe_2O_4$/QCM) (n=6)

	MIP		NIP		
	Δm (nM cm^{2-})	**k**	**Δm (nM cm^{2-})**	**k**	**k′**
NIV	10.5 ± 0.01	-	0.20 ± 0.01	-	-
BEA	1.00 ± 0.03	10.50	0.15 ± 0.04	1.33	7.89
DON	0.50 ± 0.02	21.00	0.10 ± 0.07	2.00	10.50
ZEN	0.40 ± 0.05	26.25	0.05 ± 0.02	4.00	6.56
3ADON	0.30 ± 0.06	35.00	0.01 ± 0.03	20.00	1.75

Analyte concentrations: 5.0 ng L^{-1} NIV, 1000.0 ng L^{-1} BEA, 1000.0 ng L^{-1} DON, 1000.0 ng L^{-1} ZEN and 1000.0 ng L^{-1} 3ADON

$k = \Delta m_{NIV}/\Delta m_{\text{interfering chemical}}$ and $k' = k_{MIP}/k_{NIP}$

Table S3. Intra-day and inter-day precision and accuray results of NIV (n=6)

Added standard NIV (ng L^{-1})	**Intra-day**			**Inter-day**		
	Found[a] (ng L^{-1})	**Precision[b] (%)**	**Accuracy[c] (%)**	**Found[a] (ng L^{-1})**	**Precision[b] (%)**	**Accuracy[c] (%)**
2.000	2.001 ± 0.001	0.12	0.05	2.002 ± 0.002	0.25	0.10
4.000	4.001 ± 0.002	0.12	0.03	4.002 ± 0.002	0.12	0.05
6.000	5.999 ± 0.003	0.12	0.02	6.001 ± 0.004	0.16	0.02

[a]Mean ± Standart Error, [b]Precision %: Relative Standart Deviation (RSD), [c]Bias %: [(found – added)/added]×100%