

Feasibility of Immunochromatography Technique for Measuring Cadmium Concentration in Rice Grain

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Background

- ♠ Concerning about crop safety has been increased recently because of human health aspect.
- ♠ Bioaccumulated heavy metals in crops can cause detrimental effect not only on crop growth but human health.
- ♠ Measuring heavy metal concentration in crops is labor and time intensive.

Objectives

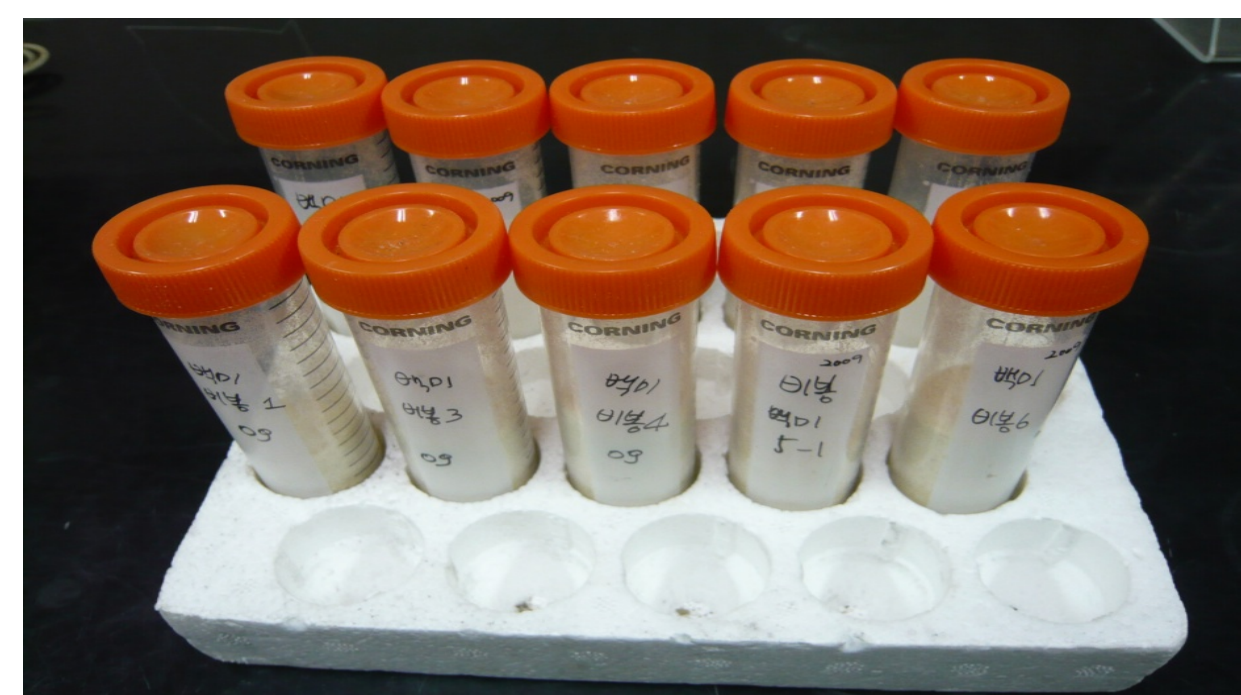
Evaluating immunoassay method for measuring heavy metal concentration in rice grain as rapid measurement technique

Material

❖ Samples

Collect soil and rice grain from Cd contaminated agricultural field near at the metal mine

Rice grain : 10 samples



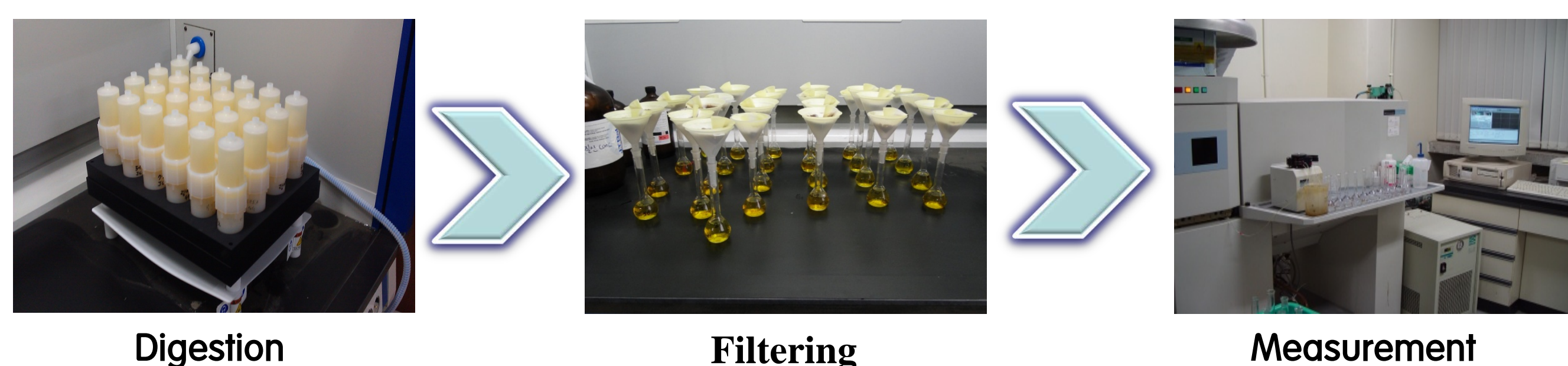
❖ Rapid Immunoassay Kit for Cd

Provided from National Institution for Environmental Science (NIES) in Japan.

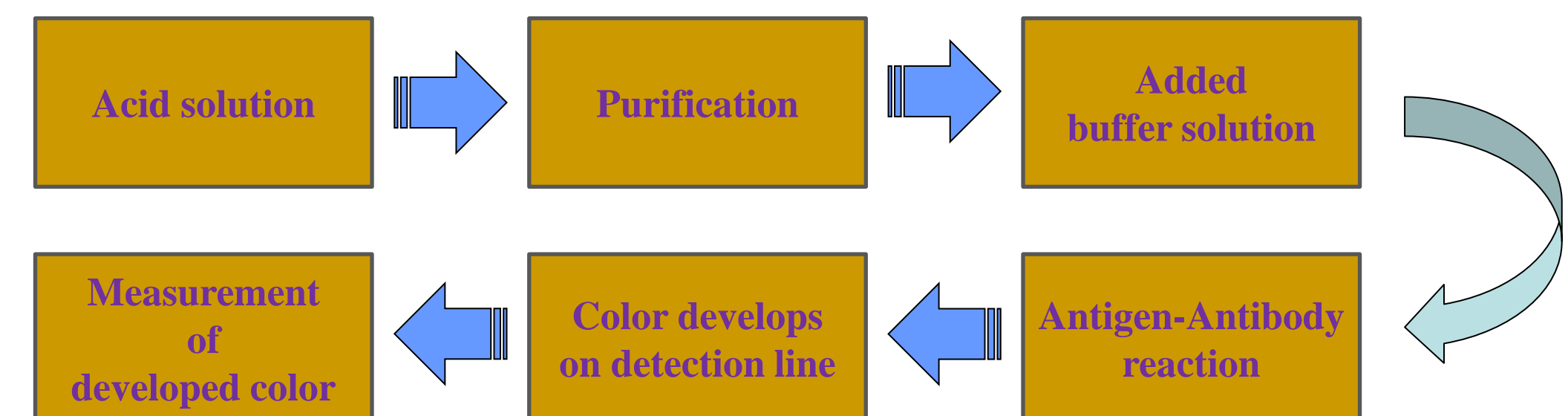


Method

❖ Acid Digestion (H₂O₂-H₂SO₄)

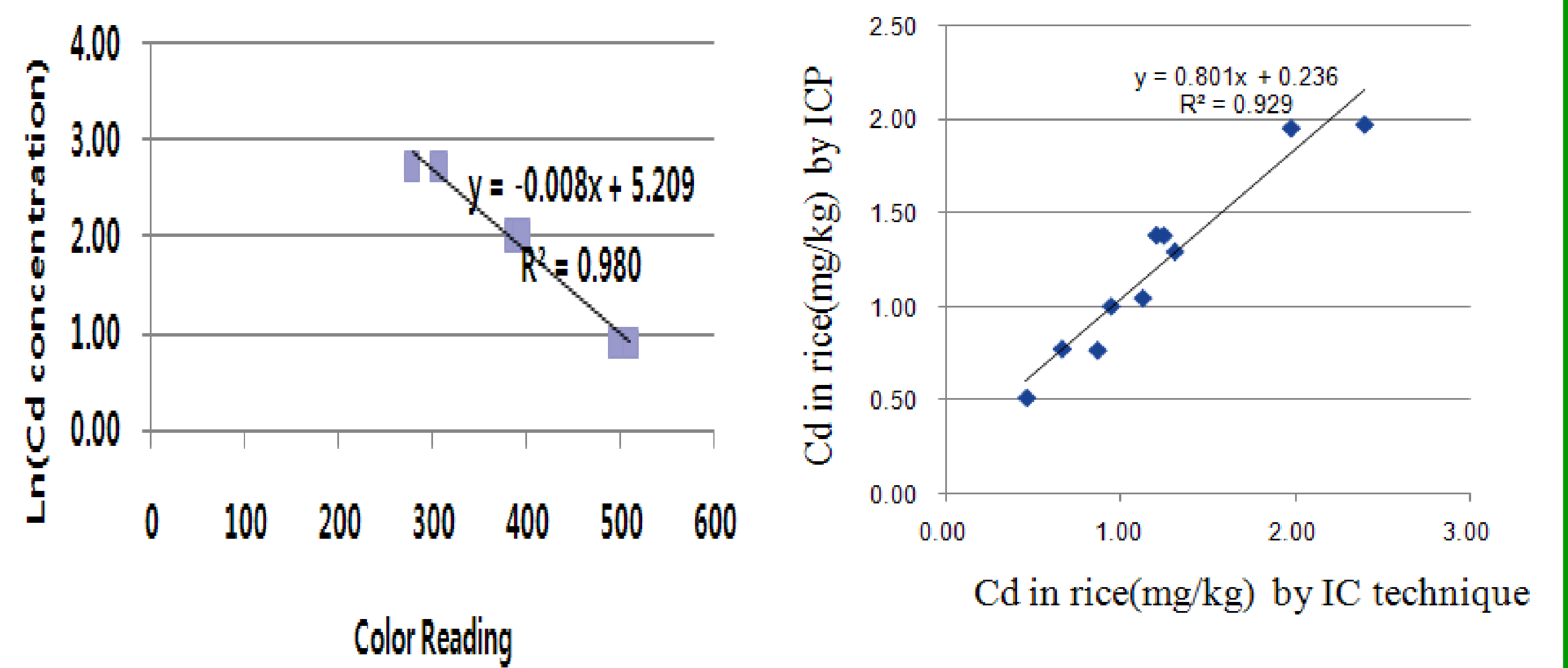


❖ Cd Immunoassay Analysis Method



Results

❖ Calibration curve and Cd concentration in rice grain measured with immunochromatography method



❖ Comparison of Cd concentration in rice grain with IC and ICP-OES method.

No.	Rice grain (mg kg ⁻¹)	
	(IC)	(ICP)
1	2.39	1.97
2	0.86	0.77
3	1.12	1.04
4	0.66	0.78
5	1.97	1.95
6	1.30	1.30
7	1.24	1.38
8	0.94	1.00
9	0.46	0.52
10	1.20	1.38

Conclusion

- 1 Concentration of Cd in rice grain measured with immunochromatography (0.46~2.39 mg kg⁻¹) and ICP (0.52~1.97 mg kg⁻¹) was exceed the threshold of criteria (0.2 mg kg⁻¹).
- 2 Highly positive correlation (R²=0.929) was observed between immunochromatography and ICP-OES technique for measuring Cd concentration in rice grain
- 3 Developed rapid measurement technique with immunochromatography can be adapted for measuring heavy metal concentration in crop. Furthermore, it can be applied for protecting crop safety.