

Development of certified reference materials for organic analysis in KRISS to enhance food safety

Seonghee Ahn*, Byungjoo Kim, Seok-Won Hyung, Kihwan Choi
Korea Research Institute of Standards and Science
*sahn@kriss.re.kr

Introduction

The production of certified reference materials (CRMs) for the accurate determination of organic hazardous materials in food has been challenging due to the stability of hazardous materials and food. It is crucial to identify all conditions necessary for stable CRMs, including the selection of analytes and matrices, sterilization methods, analytical techniques, and storage conditions. Over the past two decades, KRISS has developed CRMs for the analysis of food additives, pesticides, mycotoxins, and antibiotics in various food matrices. In this poster, the list of KRISS CRMs for food safety and proficiency testing (PT) programs by KRISS were introduced. The procedures of preparation for food matrix CRMs were shown with pictures of example CRMs. The certified values of food matrix CRMs are monitored for stability in corresponding storage conditions. The monitored graphs are shown in this poster also.

KRISS CRM for food safety

CRM #	Title	Class	Measurands
108-01-011	Corn Flour for the Analysis of Deoxynivalenol and Other Type B Trichothecenes	Mycotoxin	Deoxynivalenol etc. (4)**
108-01-012	Corn Flour for the Analysis of Zearalenone and its Metabolites	Mycotoxin	Zearalenol etc. (3)
108-02-006	Infant formula for the Analysis of Acrylamide	Acrylamide	Acrylamide
108-03-003	Chicken meat powder for enrofloxacin analysis	Antibiotics	Enrofloxacin
108-03-004	Chicken meat powder for ciprofloxacin analysis	Antibiotics	Ciprofloxacin
108-03-010	Beef powder for the analysis of quinolone antibiotics	Antibiotics	Ciprofloxacin etc. (11)
108-05-013	Kimchi cabbage powder for the analysis of pesticide residues*	Pesticides	Diazinon etc. (8)
108-05-016	Spinach powder for the analysis of pesticide residues**	Pesticides	Atrazine etc. (34)
108-05-018	Strawberry powder for the analysis of pesticide residues	Pesticides	<i>p,p'</i> -DDE etc. (2)
108-06-003	Blended tea beverage for the analysis of food additives***	Food additives	Benzoic acid and methyl paraben
108-10-018	Fermented soybean paste for the analysis of Ochratoxin A	Mycotoxin	Ochratoxin A
108-10-025	Soybean oil for the Analysis of PAHs	PAH	Benzo(a)pyrene etc. (3)
108-10-026	Raw Coffee Bean Flour for the Analysis of Aflatoxins	Mycotoxin	Aflatoxin B1 etc. (3)

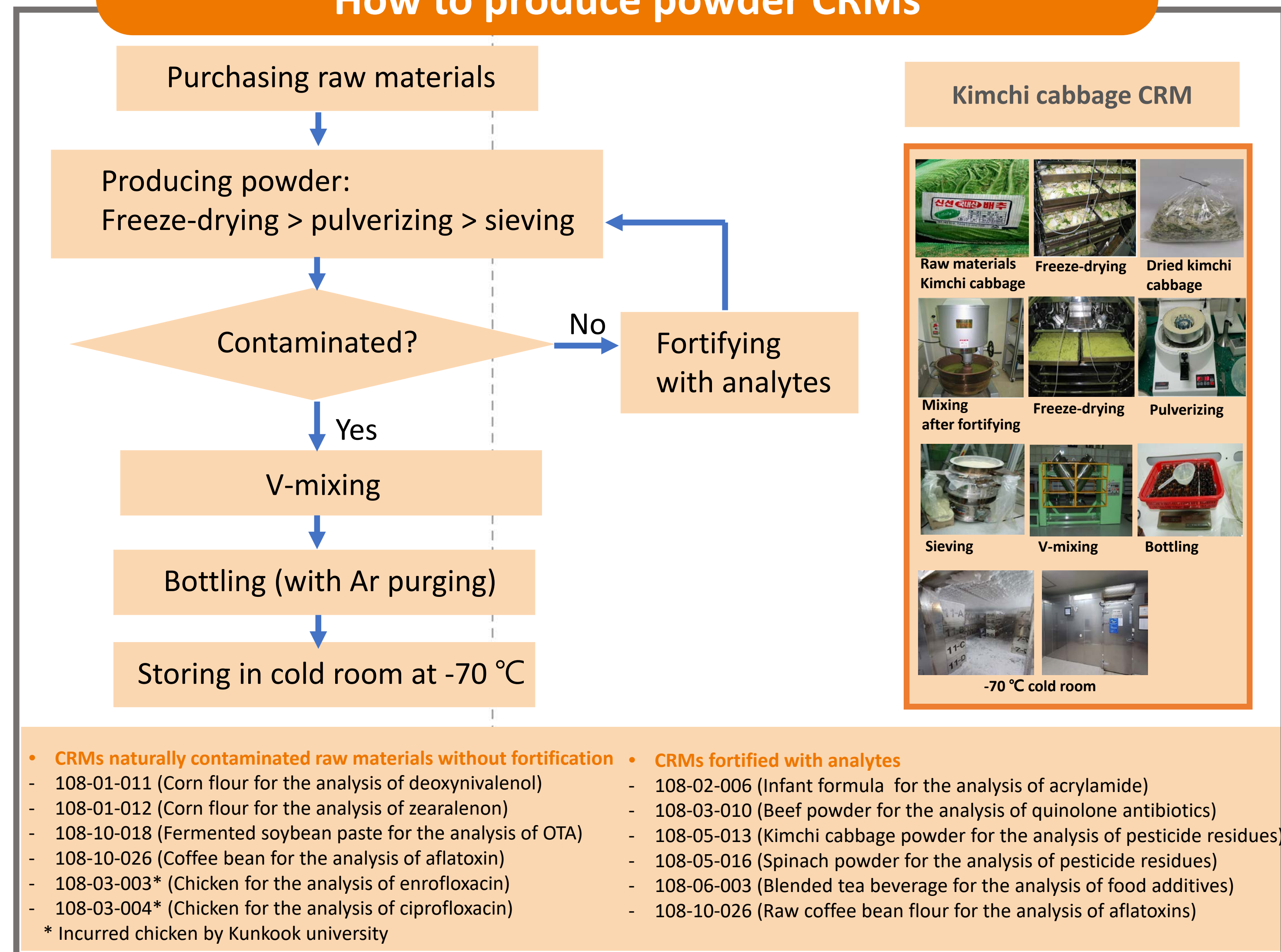
* KRISS CRM 108-05-013 is the fourth batch of kimchi cabbage powder for the analysis of pesticide residues.
** The number of bracket means other measurands in CRMs.
***KRISS CRM 108-06-003 is the third batch of blended tea beverage for the analysis of food additives.

Proficiency test program for food safety by KRISS

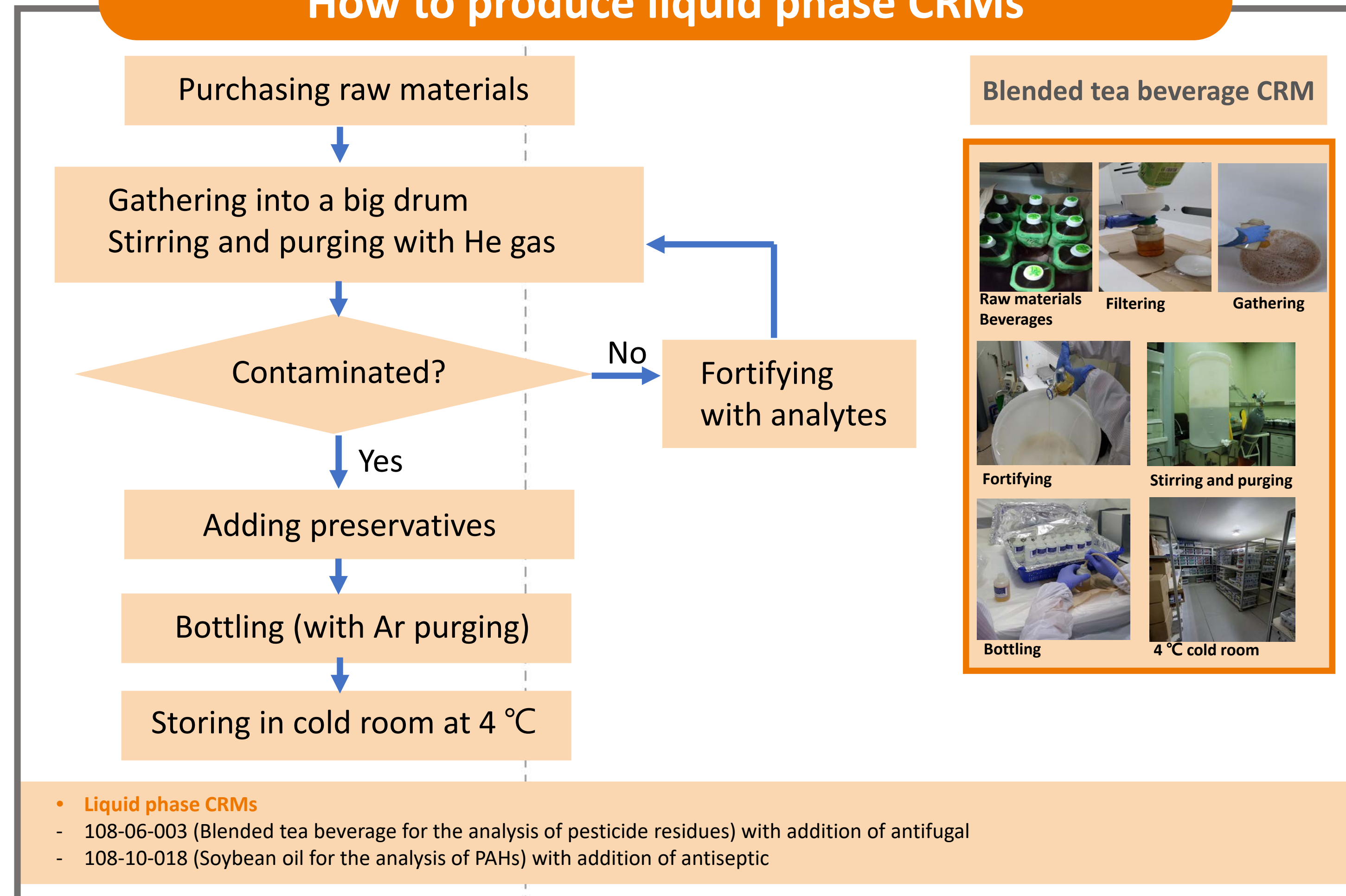
Year	Co-coordinating Institute	Analytes	Matrix
2007 ~ 2013	Ministry of Food and Drug Safety	Food additives	Blended tea beverage
2008 ~ 2024 (cont.)	Ministry of Food and Drug Safety	Pesticides	Kimchi cabbage and Korean ginseng
2009	Korea Laboratory Accreditation Scheme	Pesticides	Kimchi cabbage
2009 ~ 2014	National Agricultural Products Quality Management Service	Pesticides	Kimchi cabbage and Korean ginseng
2014	APMP-APLAC Joint PT Programme*	Pesticides	Kimchi cabbage

*Asia Pacific Metrology Program – Asia Pacific Laboratory Accreditation Cooperation Joint Proficiency Testing Programme

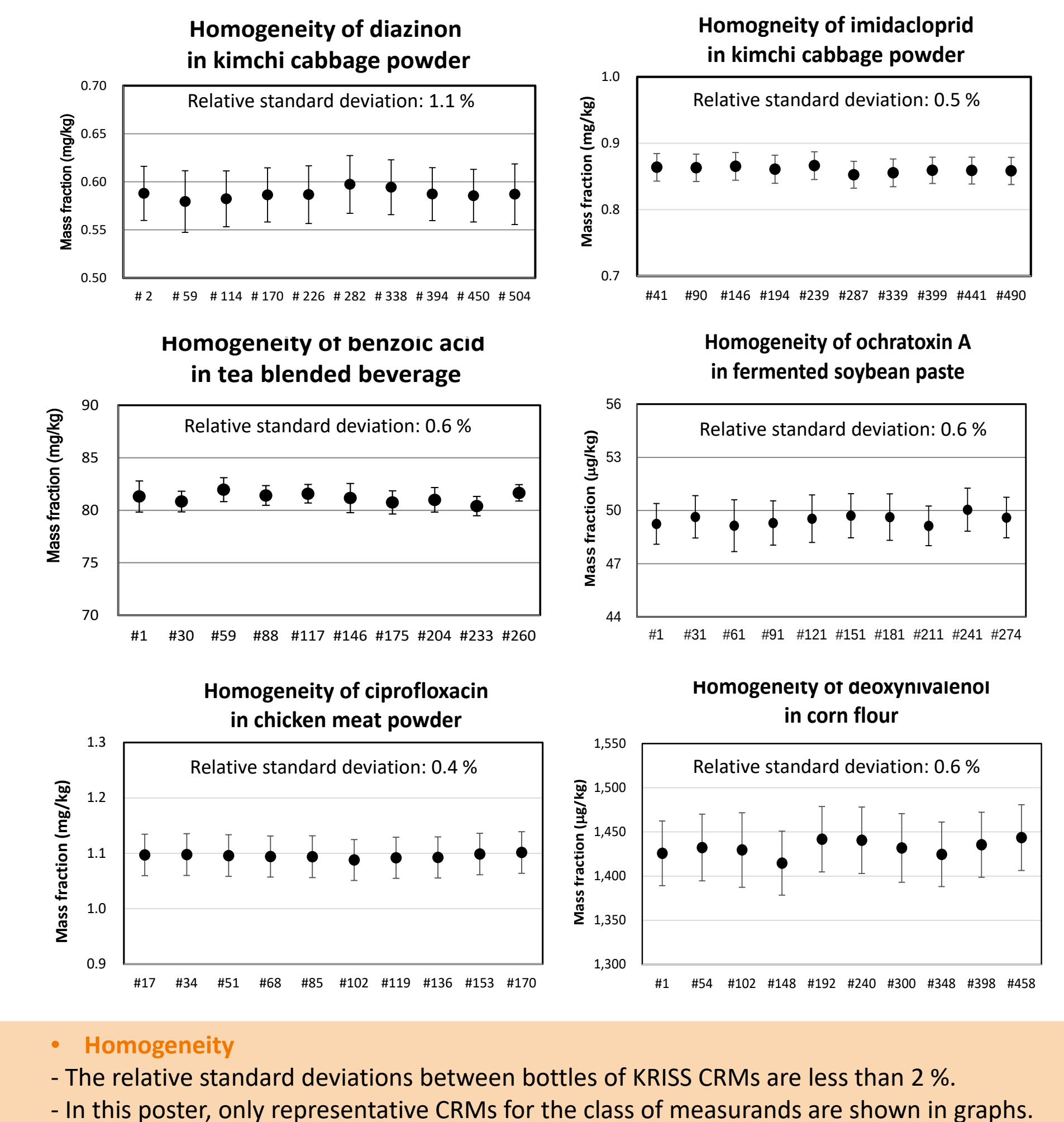
How to produce powder CRMs



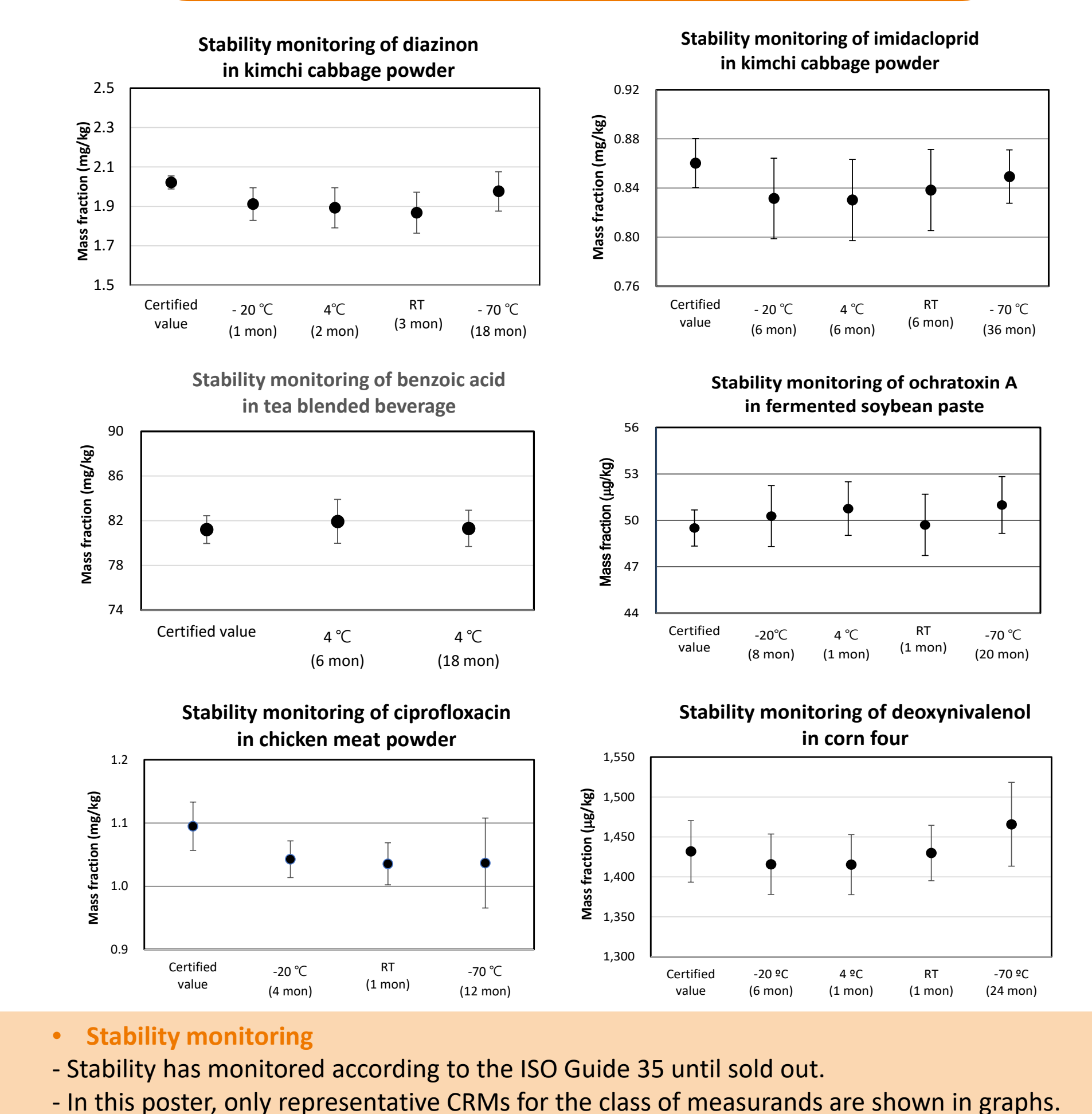
How to produce liquid phase CRMs



Homogeneity



Stability monitoring



References

- [1] Proficiency tests for analysis of pesticide residues in kimchi cabbage and ginseng in South Korea from 2008 to 2020, Accred. Qual. Assur. (2024)
- [2] Effect of irradiation for sterilization on beverage reference materials for the analysis of food additives, Accred. Qual. Assur. (2019)
- [3] Development of a lyophilized soybean paste certified reference material for the analysis of ochratoxin A, J. Food Compos. Anal. (2016)
- [4] Interlaboratory comparison for the determination of pesticide residues in Chinese cabbage, Accred. Qual. Assur. (2011)
- [5] Stability monitoring of acrylamide in potato chip certified reference material, Bull. Kor. Chem. Soc. (2015)