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Author(s)	Furuyama, Ayako
Citation	Fukushima Journal of Medical Science. 59(2): 117-119
Issue Date	2013
URL	http://ir.fmu.ac.jp/dspace/handle/123456789/380
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DOI	10.5387/fms.59.117
Text Version	publisher

This document is downloaded at: 2024-04-17T15:27:02Z

[FUKUSHIMA RADIATION SYMPOSIUM 2013]

TESTING FOR RADIOACTIVE MATERIALS IN BREAST MILK

AYAKO FURUYAMA

Children & Families Support Division, Social Health and Welfare Department, Fukushima Prefectural Government

(Received October 30, 2013, accepted November 4, 2013)

Abstract : Following the accident at Tokyo Electric Power's Dai'ichi Reactor, Fukushima Prefecture has conducted tests to detect the presence of radioactive materials in the breast milk of mothers applying for such tests. Of 467 mothers who applied for testing between June 2012 and March 2013, it was found that ^{134}Cs and ^{137}Cs were absent from all cases. The passage of time since the accident has seen a decrease in the number of mothers applying for the tests. Nonetheless, the prefectural government has decided to continue to conduct the testing as a means of allaying the anxiety of breast-feeding mothers in the future.

Keywords : breast milk, testing for radioactive substances

INTRODUCTION

Ever since the accident at Tokyo Electric Power's Dai'ichi Reactor, which followed in the wake of the Great East Japan Earthquake and tsunami, the residents of Fukushima Prefecture have continued to experience anxiety about the effects of radioactive substances on their health. This is particularly the case with mothers with young children. In view of these concerns, the prefectural government established the Fukushima Infant Consultation Center in June 2012, whose activities have included conducting tests for radioactive substances in the breast milk of mothers wishing to apply. The results presented in this report are of tests for radioactive substances in breast milk which were conducted between June 2012 and March 2013.

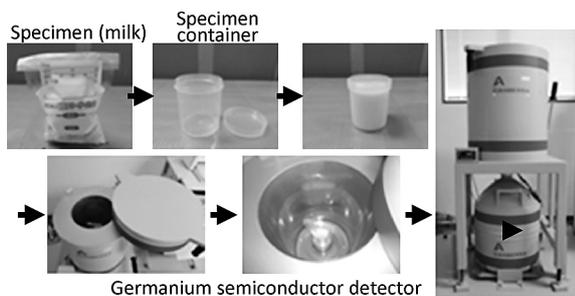


Fig. 1. Procedure of milk monitoring.

PARTICIPANTS AND METHOD

As a first step, mothers wishing to take the test applied by telephone to the Fukushima Infant

受付番号: [REDACTED] 平成25年[REDACTED]月[REDACTED]日

MIST 一般財団法人材料科学技術振興財団
分析評価部
〒157-0067 東京都世田谷区喜多見1-18-6
TEL 03-3749-2525 FAX 03-3749-4567
URL <http://www.mst.or.jp/>

測定結果報告書

MST-[REDACTED]-[REDACTED]

- 1) 委託件名 : 母子の健康支援事業における母乳検査業務委託
- 2) 測定方法 : グルマニウム半導体検出器によるガンマ線スペクトロメリー
- 3) 検体番号 : [REDACTED]
- 4) 測定条件 : 測定実施日 : 平成25年[REDACTED]月[REDACTED]日
測定時間 : 28,800(秒)
供試料量 : 0.098(kg)
- 5) 測定結果 :

分析項目	放射能濃度 (Dq/kg)	検出限界濃度 (Bq/kg)
放射性セシウム	検出せず	---
放射性セシウム134	検出せず	<2
放射性セシウム137	検出せず	<2

(備考)
※1) 測定装置: セイコー・イメージアンドジー製 GEM20-70
※2) 放射能濃度は測定実施日における値となります。

- 6) 検体写真 :

承認 担当

本測定に関する情報につきましては守秘義務を厳守致します。

Fig. 2. An example of test results.

Consultation Center, which was set up at the Fukushima Association of Midwifery, entrusted with the implementation of the tests. A testing kit was then sent to the applicant's home, where she inserted 120 cc of breast milk into a sealed bag. She then forwarded this bag to the test center.

The tests were conducted by the Foundation for Promotion of Material Science and Technology of Japan (head office : Setagaya, Tokyo).

The specimen itself was marked solely with the application number ; the personal information of the applicant was made known only to the center where the application was processed. Care was taken to ensure that the name of the applicant remained unknown to the delivery service and other concerns involved.

The test center communicated the results by electronic mail to the Fukushima Prefectural Government's Children and Families Support Division. The Fukushima Association of Midwifery then informed the applicant of the results by mail.

The test measures levels of ^{134}Cs , ^{137}Cs , and ^{40}K present in a test sample of 100 cc. Test method was in accordance with the method implemented by the research team funded by a research project grant from the Ministry of Health, Labor and Welfare in May and June of 2011. The detection limit was 2 Bq, and measurement duration was approximately three hours.

RESULTS

Tests were conducted for 467 applicants over a 10-month period spanning June 2012 to March 2013. Tests on all specimens failed to detect the presence of both ^{134}Cs and ^{137}Cs . ^{40}K was detected in 92 specimens ($2.37\text{E}+0.1 - 5.63\text{E}+0.1$ Bq/kg).

Almost all of the 559 applications for the test came in the first two months after it was initiated, the rest dropping off to a figure of between 20 and 30 per month thereafter.

The tests were conducted using four germanium detectors. Measurement durations were 12,260-28,464 seconds (3.4-4.5 hours) on model no. Gc4020 (CANBERRA Industries), 21,600-42,200 seconds (6.0-11.7 hours) on model no. GEM20-70 (Seiko Instruments Inc.)

Durations of measurement varied as a result not only of the tendency of breast milk to decrease in density with the passage of time after birth but also of the considerable variations among individuals.

Also, it was frequently necessary to prolong the measurement duration because of the relatively

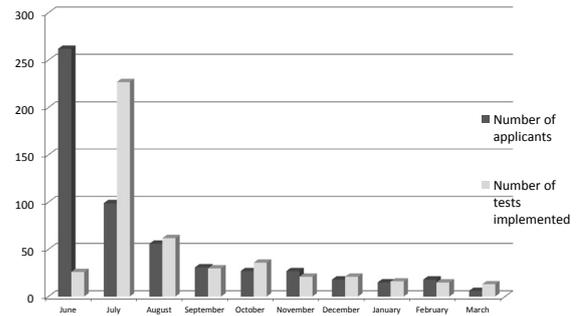


Fig. 3. Tests implemented during FY 2012 (per month).

Testing device(model#)	Test duration (Sec)
GC4020 (CANBERRA Industries)	12, 260~28, 464
GEM20-70① (Seiko Industries)	25, 200~43, 200
GEM20-70② (Seiko Industries)	21, 600~36, 000
GEM20-70⑤ (Seiko Industries)	25, 200~28, 800

Weight of sample 0.56~0.95kg

Fig. 4. Test results.

small amount of the specimen (100 cc) in comparison with water, foodstuffs and the like.

DISCUSSION

Applicants for the test were largely resident in the northern area of the prefecture (e.g., Fukushima City, Date City, etc.) and in the central area, including, Koriyama City. A particularly high proportion of applications came from mothers resident in areas where air radiation levels were high.

Applications requesting breast milk screening were received immediately after the accident at the nuclear reactor. In results of tests on 108 individuals conducted by the Ministry of Health, Labor and Welfare research project, traces of radioactive cesium were detected in seven cases. Nonetheless, Fukushima Prefectural Government deemed tests to be unnecessary in these cases on the following grounds : Firstly, values were sufficiently low when compared with the provisional regulation values for radioactivity in food to conclude that there was no risk of adverse effects on the health of nursing infants. Secondly, the Pediatric Society and the Society of Obstetrics and Gynecology stated their belief that the advantages of breastfeeding infants outweighed any disadvantages. However, in view

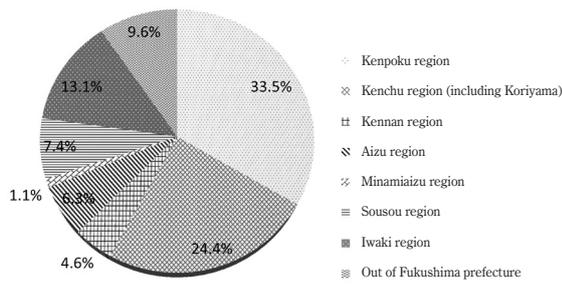


Fig. 5. Percentage of test applicants by region.

of the fact that mothers continued to voice their concerns about breastfeeding and that the prefecture was in receipt of a government grant to fund the screening of breast milk, it was decided to conduct testing after June 2012. Despite numerous applica-

tions upon the initiation of testing and shortly thereafter, the number of individuals requesting tests gradually declined until by 2013 it had reached a mere one to five individuals per month.

While it is possible to see this decline in the number of applications as a sign that anxieties regarding the breastfeeding of infants are less marked than before, it is by no means the case that concerns about the adverse effects of radioactive substances on children's health have disappeared. We thus intend to conduct ongoing tests to detect the presence of radioactive substances in breast milk in the future and to disseminate the results of such testing as a means of allaying the anxieties of mothers bringing up their children in Fukushima Prefecture.