

## IDENTIFICATION OF DIOXIN CONCENTRATION AT SOME AREAS IN VIETNAM

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### Abstract

Our study aims to identify Dioxin concentration at some hot spots and control areas in Vietnam. The study was carried out at Bien Hoa Airport, Danang Airport, Namdong district and Haiphong city. Total of selected samples included 151 ones, in which there are 58 individual blood samples, 34 mixed blood samples, 10 milk samples, 20 mud samples, 17 soil samples and 12 fish samples. Dioxin and its isomer in these samples were analyzed at laboratories of Japan and Vietnam. From the analysis, we have the following conclusions;

- It is found a high Dioxin content (2,3,7,8 – TCDD) in human samples and environmental samples of Danang and Bien Hoa compared to control areas in Hai Phong that exceeded the normal limited levels and the defined detoxicant level of American and some other developed countries.
- It would be appeared new Dioxin exposed subjects from hot spots of Danang Airport on residents around the Airport.
- Dioxin content in human and environmental samples of control areas in Haiphong were very low compared to define detoxicant level.
- In Nam Dong (where Dioxin were sprayed so much during the war) Human and environmental samples were not exceeded the normal limited level.

### Introduction

Vietnamese scientists and some research of foreigners have shown data of Dioxin concentration in environmental samples, and human samples from hot spots such as Bienhoa, Danang, Phucac and other areas in Vietnam. It was found a very high Dioxin content in environmental samples and human samples of above mention areas [1] [2] [4] [5] [6]. Our study aims to identify Dioxin concentration at some hot spots and control areas in Vietnam.

### Materials and methods

The study was carried out at Bien Hoa airport of Dongnai province, Danang Airport of Danang city, Namdong district of Thua Thien Hue province and Catbi Airport of Haiphong city in southern of Vietnam and Haiphong was considered as a control group.

The soils on the surface were taken from 0 to 10 centimeters deep by specialized tools. Each samples contained about 300 grammes; Mud samples were taken from the depth of 30 centimeters by specialized tools. Each samples contained about 300 grammes of mud; Fat, liver, and bowel of snake head (mullet), catfish, and eal were chosen to be fish samples. Each sample contained 60 grammes. All these samples were kept in plastic bag and in deep freezer at – 70°C until being analyzed.

Mixed blood samples were taken from 10 to 20 people, each sample contained a volume of 30 to 60 minilitres blood; Individual blood samples are venae blood without clot, each sample contained a volume of 20 to 30 minilitres of blood; Milk samples were taken from mothers who gave the first birth and were in the six first months. Each samples contained 150 minilitres milk. All these samples were kept in deep freezer - 70°C until being analyzed

All samples were analyzed Dioxin and its isomers at two following laboratories;

- In Japan: (Fukuoka institute of Health and Environmental Science) 39 Mukaizano, Dazaifu, Fukuoka 818 – 035, Japan.
- In Vietnam: Testing centre in Ho Chi Minh City.

## Results and discussion

Total of selected samples included 151 ones, in which there are 58 individual blood samples, 34 mixed blood samples, 10 milk samples, 20 mud samples, 17 soil samples and 12 fish samples.

### 1. Dioxin content and TEQ of PCDD in analyzed samples

Table 1: Dioxin content and it's isomer in individual blood sample of children

No.	Content	2,3,7,8 –TCDD (pg/g lipid)	T.PCDD <sub>S</sub> - TEQ	% T.PCDD <sub>S</sub> – TEQ/Total TEQ
1	Individual blood sample of children in Hai Phong (n=27)			
	Average			
	Minimum	1,5	5,9	41,15
	Maximum	0,5	1,4	27,45
2	Individual blood sample of children in Da Nang (n=30)			
	Average			
	Minimum	10,1	54,9	58,34
	Maximum	2,1	12,4	42,18
		57,7	368,8	94,41

There were only 30 individual blood samples to be analyzed out of 31 ones in Danang because of special one with 352,99 pg/g lipid dioxin. The average of dioxin content in the blood samples of children at some communes around Da nang airport, are 20 times higher than children in Hai phong. The difference between Danang and Haiphong had statistical signification with  $p < 0,0001$ .

Table 2: Dioxin content (2,3,7,8 – TCDD) in blood – mixed and milk samples

No.	Content	n	2,3,7,8 – TCDD (pg/g lipid)		
			Average	Minimum	Maximum
1	Blood – mixed sample of children in Danang	12	13,45	6,65	21,71
2	Blood – mixed sample of adults in Hai Phong	6	1,55	1,07	1,76
3	Blood – mixed sample of adults in Nam Dong - Hue	6	5,17	2,46	8,12
4	Serum – mixed sample of adults in Da Nang	1	22,10		
5	Mother milk sample in Hai phong	5	0,52	0,00 (ND) (n = 3)	1,36
6	Mother milk sample in Nam Dong , Hue	5	1,06	0,00 (ND) (n = 1)	2,87

Dioxin contents in mixed blood of children and adults in Danang were much higher than who were at control areas of Hai phong.

Table 3: *Dioxin content (2,3,7,8 – TCDD) in mud*

No.	Content	n	2,3,7,8 – TCDD (pg/g lipid)		
			Average	Minimum	Maximum
1	Mud sample in Hai Phong	5	1,3	0,00 (ND)	6,5
2	Mud sample at Phan Lang, Da Nang	2	1,25	0,00 (ND)	2,5
3	Mud sample in Thac Gian Lotus Lake - Thanh khe, Danang	1	4823,00		
4	Mud sample in Thac Gian Lotus Lake - Thanh Khe, Danang	1	6675,65		
5	Mud sample at Phan Lang, Thanh Khe, Da Nang	1	1,07		
6	Mud sample in Nam Dong, Hue	4	0,00	0,00	0,00
7	Mud sample in Bien Hung Lake, Bien Hoa, Dong Nai	1	476,72		
8	Mud sample in Lake at Bien Hoa Airport, Dong Nai	1	12,85		

Mud samples in Thac gian Lotus lake, Thanh khe, Da nang and in Bien hung lake near to Bien hoa airport, Dong nai, still contains high content of dioxin (>4000,0 pg/g mud in Da nang and > 400 pg/g mud in Bien hoa)

Table 4 : *Dioxin content (2,3,7,8 – TCDD) in soil*

No.	Area	n	2,3,7,8 – TCDD (pg/g đất)		
			Average	Minimum	Maximum
1	An Hai, Cat Bi - Hai Phong	5	0,00	0,00	0,00
2	Phan Lang Thanh Khe Đa Nang	1	0,00		
3	Đa Nang Airport (inside)	1	8138,00		
4	Bien Hoa Airport (outside of 'Dioxin Basin' area)	1	735,53		
5	Dioxin Basin No.1 – Bien Hoa Airport	1	779,43		
6	Dioxin Basin No.2 – Bien Hoa Airport	1	15724.19		
7	Dioxin Basin No.3– Bien Hoa Airport	1	56.115,88		
8	Nam Đông – Hue	4	0,00		
9	Phan Lang – Thanh Khe Đa Nang	1	0,00	0,00	0,00
10	Đa Nang Airport (inside)	1	11.365,77		
11	An Hai – Hai Phong	3	0,00	0,00	0,00

Dioxin contents in Da nang airport and Bien hoa airport (hot spots) were high, which are 8 or 10 times higher than that of American – defined detoxicant level; some areas still have 50 fold higher.

Dioxin contents in fish of the two lakes around Bien hoa airport were very high (>4.000 pg/g lipid), there still have samples with 7176,43 pg/g lipid. However, Dioxin content in fish samples of the other areas were in normal limited level.

Our research results showed that Dioxin content in human samples and environmental samples of Haiphong control areas were very low and not over the normal limited level of some developed countries such as America, Germany, Japan, Canada, Sweden and WHO [2] [3].

It is found a high Dioxin content in human samples and environmental samples of hot spots in Danang and Bien Hoa that were 5 or 10 higher than exceeded the defined detoxicant level of American (1000 pg/g – TEQ) [4] [5] [6].

#### Comments

- It is urgently to clean up dioxin in the hot spots at Bien hoa and Da nang as well as the lakes near to the airports.
- It is necessary to organize training project on environmental toxicant for the people living in the hot spots to limit and prevent new dioxin exposed cases.
- It is necessary to elucidate mortal rate, cancer, inherited diseases, ect. among population living in the hot spots like Da nang and Bien hoa provinces compared to the control in the North.

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