Chemical Characteristics of Natural Mineral Waters from Wellspring in Ban Haubueng Community Forest, Nampong District, Khon Kaen Province

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Abstract

The present study was conducted to evaluate the contamination of heavy metal and some essential minerals status in mineral water from different location in Ban Haubueng Community Forest, Nampong District, Khon Kaen Province. The water samples were collected in 2021 and then analyzed according to standard methods for heavy metal and the essential minerals viz. As, Pb, Cd, Zn, Cu, Hg, Ni, Mn, Zn, Fe, Se, Na, Si and Ca and microbial contamination such as E.coli and for salmonella spp .

The results found that As, Pb, Cd, Zn, Cu, Hg, Ni were not detected in all water samples. And E.coli and salmonella spp were not found in in all water samples. The essential minerals such as Si and Ca were detected in mineral water 7.61-7.64 and 3.0-8.86 ppm, respectively. Therefore, it can be concluded that mineral water has no heavy metal contamination and safe from pathogenic microorganisms, Escherichia coli and salmonella spp. Moreover, there are some mineral elements such as silicon that may be useful for others purpose such as use for agricultural production.

Introduction

Physico-chemical properties and minerals status is an important decisive factor for assessment of water quality for water resources utilization. Therefore, the present study was conducted to evaluate the contamination of heavy metal and some essential minerals status in mineral water from different location in Ban Haubueng Community Forest, Nampong District, Khon Kaen Province

Methodology

Irrigation water and mineral water and rice grown in paddy field irrigated with Mineral Water from wellspring in community forest were collected from Ban Haubueng, Nampong District, Khon Kaen Province. Analyzed water samples according to standard methods for

- ✓ heavy metal and the essential minerals viz. As, Pb, Cd, Zn, Cu, Hg, Ni ,Mn, Zn, Fe, Se, Na, Si and Ca by using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) In-house method based on EPA 3015
- ✓ microbial contamination such as *E.coli* by methods of AFNOR Certificate Number 3 M 01/8-06/01 compared to ISO16649-2 And for *salmonella* spp by ISO 6579:2017

Result

Chemical Characteristics (Mineral Contents) of Natural Mineral Waters (ppm)

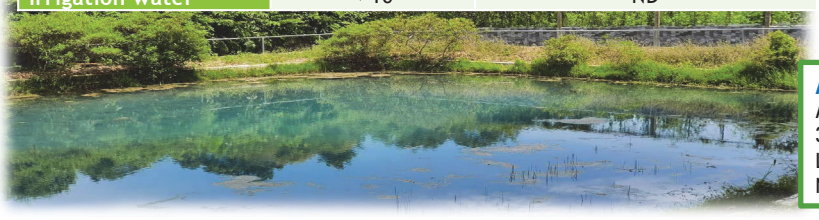
Metal	As	Pb	Cd	Cu	Hg	Ni	Mn
Mineral Water from wellspring	ND	ND	ND	ND	ND	ND	0.01
Mineral Water in paddy field	ND	ND	ND	ND	ND	ND	0.02
Irrigation water	ND	ND		ND	ND	ND	0.02
Rice	ND	ND	ND	1.32	ND	ND	ND

Chemical Characteristics (Metal Content) of Natural Mineral Waters (ppm)

Mineral	Zn	Fe	Se	Na	Si	Ca
Mineral Water from wellspring	ND	ND	ND	1.71	7.61	3.0
Mineral Water in paddy field	ND	0.84	ND	2.75	7.64	8.86
Irrigation water	ND	0.03	ND	15.67	6.36	28.31
Rice	15.34	17.51	ND	37.79	66.35	106.68

Analysis of pathogenic microorganisms (*Escherichia coli* and *Salmonella* spp)

	Pathogenic microorganisms	
	E. coli (CFU/g)	Salmonella spp. (in 25 grams)
Mineral Water from from wellspring	< 10	ND
Tap water in the village	< 10	ND
Irrigation water	< 10	ND



Discussion

The mean concentrations of As, Cd, and Pb in rice and Mineral Water did not exceed the maximum levels (MLs) Silicon sodium and calcium element was mainly found in the component of mineral water.

Conclusion

Mineral water from Natural Mineral Waters from Wellspring in Ban Haubueng Community Forest, Nampong District, Khon Kaen Province has no heavy metals contamination and safe from pathogenic microorganisms, Escherichia coli and *salmonella* spp

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