Table 1 continued

	Color After Frying					
	L		a		b	
p.s.	**small**	**large**	**small**	**large**	**small**	**large**
c	68,54	67,51	2,89	3,21	34,53	34,56
c5	69,11	63,11	4,61	7,41	36,62	38,22
c10	66,73	70,63	4,99	2,45	38,8	37,12
c15	71,08	66,18	2,28	4,36	35,7	37,12
s5	61,92	60,25	6,65	10,75	39,87	39,95
s10	63.00	60,01	5,43	9,20	37,91	38,16
s15	60,39	62,66	9,48	7,99	39,86	37,99
g3	61,10	60,6	6,04	5,83	35,98	35,69
g6	63,56	61,33	5,15	6,87	35,5	34,96
g9	70,94	66,51	4,38	4,53	36,95	37,67
LSD	**1,69**	**1,69**	**1,26**	**1,26**	**3,08**	**3,08**

p.s: particle size, c: control, c5: 5%corn flour, c10: 10% corn flour, c15: 15% corn flour, s5: 5% soy flour, s10: 10% soy flour, s15: 15% soy flour, g3: 3% gluten, g6: 6% gluten, g9: 9% gluten, LSD: Least Significant Difference

Effect of soybean flour, corn flour and gluten on quality characteristics of dried bread crumb were evaluated. Moisture, protein, color, water binding capacity, oil absorption, and compressive force of dried bread crumbs were determined. Addition of gluten increased water binding capacity especially for 6% and 9% levels. On the other hand, both corn and soy flour addition decreased water binding capacity in each particle size in comparison with control sample. Gluten added breading absorbed less oil than corn and soy flour added breadings. 15% soy flour addition considerably increased compressive force while gluten addition reasonably decreased the compressive force as compared with control sample ($p<0.0001$).

PRELIMINARY RESULTS FOR CONTENT OF NATURAL AND ARTIFICIAL RADIONUCLIDES IN SOME MARINE OBJECTS FROM BLACK SEA COAST

I.YORDANOVA, D.STANEVA, TS. BINEVA, E. PETROVA-PAVLOVA *
Institute of Soil Science " N. Poushkarov",
Laboratory of Radioecology and Radioisotopic Research,
7, Shousse Bankya Str, 1080 Sofia, Bulgaria
*Institute of Fishing Resources, 9000 Varna, 4 Primorski, Blvd.
E-mail: ivanka.yordanova@gmail.bg

The studies related to radioactive pollution and behavior of natural and man-made radionuclides in Black-sea water basin are rather limited and give no complete picture of the radioecological status of the region. There is lack of systematic data concerning their physical and chemical peculiarities as well as their concentration levels in bottom sediments, algae, mussel, fish, sea snails and other Black sea marine organisms.
That is why results from preliminary research of natural and artificial radionuclides in mussels, rapa whelk, algae, fish and so from the Bulgarian Black sea coastline are presented in this paper. The technogenic ceasium-137 together with the natural uranium-238, bismuth-214 and potassium-40 are determined. The isotopes of uranium are determined by both gamma-spectrometry and alpha-spectrometry after radiochemical procedure for purification and concentration.

Table 1
Results of gamma-specrtometry analyses of samples from Black sea (2004-2005) [Bq/kg]

Sampling place	**Sample type**	**Cs-137**	**U-238**	**Bi-214**	**Ac-228**	**K-40**
1. Varna – fishing beach (2004)	*Mytilus galloprovincialis*	3 ± 2	7 ± 4	17 ± 4	15 ± 5	98 ± 10
2. Varna – fishing beach, (2004)	*Mytilus gallop.*- shells	< 1	4 ± 3	2 ± 1	< 2	< 50
3. Galata – 6 miles to the east (2004)	*Mytilus galloprovincialis*	2±0,5	5 ± 2	3 ± 1	4 ± 2	30 ± 5
4. Kaliakra (2004)	*Mytilus galloprovincialis*	2±0,5	6 ± 4	7 ± 2	3 ± 2	< 50
5. Galata – 6 miles to the east (2004)	*Anadara inaequivalvis*	< 1	6 ± 3	< 1	4 ± 2	< 50
6. Galata – 6 miles to the east (2004)	*Rapana venosa*	10±2	5 ± 3	< 1	< 2	70 ± 5
7. Varna – fishing beach (2005)	*Chlorophyta*	2±0,5	6 ± 2	3 ± 1	3 ± 1	210 ± 10

Table 1 continued

Sampling place	Sample type	Cs-137	U-238	Bi-214	Ac-228	K-40
8. Varna – beach coast (2005)	*Algae*	2±0,5	7 ± 2	8 ± 2	7 ± 2	270 ± 10
9. Arkutino (2005)	*Brown Algae*	2±0,5	< 5	3 ± 2	7 ± 3	30 ± 3
10. Arkutino (2005)	*Chlorophyta*	<1	< 5	3 ± 2	< 2	20 ± 2
11. Sinemoretz (2005)	*Chlorophyta*	< 1	< 5	< 1	< 2	40 ± 4
12. Arapja (2005)	*Chlorophyta*	< 1	< 5	< 1	4 ± 1	100 ± 10

Table 2
Results of gamma-specrtometry analyses of samples from Black sea (2006) [Bq/kg]

Sampling place	Sample type	Cs-137	U-238	Bi-214
Galata	*Rapana venosa*	< 1	< 3	1 ± 0,5
Galata	*Rapana venosa* (shells)	4 ± 2	4 ± 2	3 ± 1
.Galata	*Mytilus galloprovincialis*	2 ± 1	7 ± 3	5 ± 2
.Galata	*Mytilus galloprovincialis* (shells)	0,3 ± 0,2	4 ± 1	1 ± 0,5
Galata	*Anadara inaequivalvis*	1,2 ± 0,5	7 ± 3	5 ± 1
Galata	*Anadara inaequivalvis* (shells)	0,4 ± 0,2	5 ± 1	2,5 ± 0.5

Sampling place	Sample type	Ac-228	K-40
Galata	*Rapana venosa*	< 2	50 ± 5
Galata	*Rapana venosa* (shells)	3 ± 2	73 ± 7
.Galata	*Mytilus galloprovincialis*	4 ± 2	160 ± 30
.Galata	*Mytilus galloprovincialis* shells)	1,2 ± 0,5	30 ± 6
Galata	*Anadara inaequivalvis*	3 ± 2	40 ± 5
Galata	*Anadara inaequivalvis* (shells)	2,3 ± 0,5	20 ± 2

Table 3
Results of alpha-specrtometry analyses of samples from Black sea (2004) [Bq/kg]

Sampling place	Sample type	U-234	U-235
Galata – 6 miles to the east	*Mytilus galloprovincialis*	6 ± 1	0,4 ± 0,1
Kaliakra	*Mytilus galloprovincialis*	7 ± 1	0,5 ± 0,1
Varna – fishing beach	*Chlorophyta*	7 ± 1	0,4 ± 0,1
Galata	*Rapana venosa*	1 ± 0,2	< 0,1

Sampling place	Sample type	U-238
Galata – 6 miles to the east	*Mytilus galloprovincialis*	4 ± 1
Kaliakra	*Mytilus galloprovincialis*	5 ± 1
Varna – fishing beach	*Chlorophyta*	5 ± 1
Galata	*Rapana venosa*	1,4 ± 0,2

DISTRIBUTION OF ^{3}H IN OBJECTS FROM BR "SREBARNA" AND SURFACE WATERS FROM NORTH AND SOUTH BULGARIA

Zlatev, At., I. Yordanova, D.Staneva
Institute of Soil Science "N. Poushkarov", Bulgaria,
1080 Sofia, 7 Shose Bankja str.

ABSTRACT

By reason of the big radiation-hygienic significance of tritium for the individual its specific activity is determined in soils, plants (agricultural and aquatic) and water from BR"Srebarna" and surface waters from North and South Bulgaria. The determined levels of specific activity are low, due to global cycling tritium, and show the lack of local tritium contamination.

INTRODUCTION

The tritium in the environment is produced by the interaction of cosmic rays with nucleus of chemical elements in the atmosphere, the nuclear bomb test, the operation of nuclear reactors and nuclear fuel reprocessing plants. Tritium is one of the more important radionuclides for doze assessment, characterizing and determining the radiation situation in the regions around nuclear fuel cycle