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Berkeley Low Background Facility
Lawrence Berkeley National Lab
1 Cyclotron Road, MS 072R150
Berkeley, CA 94720

Naturespirit Kelp Samples - 2015

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A.R. Smith[a], E.B. Norman[a], K.J. Thomas[ab]

[a] Nuclear Science Division, Lawrence Berkeley National Laboratory, Berkeley, CA 94720
[b] Department of Nuclear Engineering, University of California, Berkeley, CA 94720

All six of the samples collected by NATURESPIRIT in the summer of 2015 have been counted for at least overnight runs with the MERLIN HPGe n-type detector system at the LBNL Low Background Facility, where 16384-ch were acquired, covering the gamma-ray energy range from about 15 KeV to 3600 KeV.

The samples provided by James Jungwirth of Naturespirit Herbs LLC included the following descriptions on the six samples.

Seaweed samples from Del Norte County, CA. (2015 harvest):

1. Kombu (Laminaria setchellii), harvested 8.4.2015.
2. Sea Fern (Cystoceira osmundacea), harvested 6.21.2015
3. Iridia (Iridea cordata), harvested 8.4.2015
4. Wakame (Alaria marginata), harvested 8.4.2015
5. Bladderwrack Powder (Fucus gardneri), harvested 6.20-21.2015
6. Bull Kelp Fronds (Nereocystis luetkeana), harvested 6.19.2015

Summaries of analyses of these samples are provided below. It is important to note that none of the six samples showed any evidence for the presence of ^{134}Cs (which would likely have been sourced from the Fukushima accident in 2011), while all samples contained detectable amounts of ^{137}Cs (leftover from cold war nuclear weapons testing and is present all over the surface of the earth). The presence of ^{134}Cs was not detected in any of the samples, and a one sigma upper limit for these samples excludes the possible activity for this radioisotope to less than < 0.05 Bq/kg (far below the natural radioactivities presented by the uranium, thorium, and potassium content of the kelp).

The results below are presented in both concentration (ppm or %) for the U and Th chains, and potassium as well as in activity per unit mass (Bq/kg). The uranium and thorium chains are reported as equilibrium values for both early and late portions of the decay chains. Uncertainties are statistical only and an overall systematic uncertainty of 5% is not factored into that value.

NAT2015-1, Dried Kombu, small pieces

Detector:	MERLIN(BKY)	U(early):	0.6(1)	ppm	7(1)	Bq/kg ^{238}U
Sample:	S6MB annulus	U(late):	0.14(1)	ppm	1.7(1)	Bq/kg ^{238}U
Weight:	225 grams	Th(early):	0.10(4)	ppm	0.41(16)	Bq/kg ^{232}Th
Data file:	32775S	Th(late):	0.04(1)	ppm	0.16(4)	Bq/kg ^{232}Th
Count time:	82200 sec	K:	4.09(2)	%	1260(10)	Bq/kg ^{40}K
		^{137}Cs:			0.35(4)	Bq/kg ^{137}Cs

NAT2015-2, Dried Sea Fern, small pieces

Detector:	MERLIN(BKY)	U(early):	0.6(1)	ppm	7(1)	Bq/kg ^{238}U
Sample:	S6MB annulus	U(late):	0.08(1)	ppm	1.0(1)	Bq/kg ^{238}U
Weight:	235 grams	Th(early):	0.20(6)	ppm	0.81(24)	Bq/kg ^{232}Th
Data file:	32779S	Th(late);	0.08(4)	ppm	0.33(16)	Bq/kg ^{232}Th
Count time:	82201 sec	K:	11.31(3)	%	3500(10)	Bq/kg ^{40}K
		^{137}Cs:			0.47(5)	Bq/kg ^{137}Cs

NAT2015-3, Dried Iridea, small pieces

Detector:	MERLIN(BKY)	U(early):	0.13(4)	ppm	1.6(5)	Bq/kg ^{238}U
Sample:	S6MB annulus	U(late):	0.30(5)	ppm	3.7(6)	Bq/kg ^{238}U
Weight:	236 grams	Th(early):	0.04(2)	ppm	0.16(8)	Bq/kg ^{232}Th
Data file:	32782S	Th(late):	0.07(2)	ppm	0.19(8)	Bq/kg ^{232}Th
Count time:	84600 sec	K:	1.26(1)	%	390(3)	Bq/kg ^{40}K
		^{137}Cs:			0.14(2)	Bq/kg ^{137}Cs

NAT2015-4, Dried Wakame, small pieces

Detector:	MERLIN(BKY)	U(early):	0.64(8)	ppm	7.9(10)	Bq/kg ^{238}U
Sample:	S6MB annulus	U(late):	0.19(1)	ppm	2.3(1)	Bq/kg ^{238}U
Weight:	236 grams	Th(early):	0.28(4)	ppm	1.1(2)	Bq/kg ^{232}Th
Data file:	32791S	Th(late):	0.05(2)	ppm	0.20(8)	Bq/kg ^{232}Th
Count time:	81600 sec	K:	5.03(2)	%	1560(10)	Bq/kg ^{40}K
		^{137}Cs:			0.22(4)	Bq/kg ^{137}Cs

NAT2015-5, Bladderwrack Powder

Detector:	MERLIN(BKY)	U(early):	1.3(1)	ppm	16(1)	Bq/kg ^{238}U
Sample:	685@3/4	U(late):	0.04(1)	ppm	0.5(1)	Bq/kg ^{238}U
Weight:	171 grams	Th(early):	0.15(5)	ppm	0.6(2)	Bq/kg ^{232}Th
Data file:	32771S	Th(late):	0.04(1)	ppm	0.16(1)	Bq/kg ^{232}Th
Count time:	87600 sec	K:	3.33(2)	%	1030(10)	Bq/kg ^{40}K
		^{137}Cs:			0.28(4)	Bq/kg ^{137}Cs

NAT2015-6, Dried Kelp, small pieces

Detector:	MERLIN(BKY)	U(early):	0.22(8)	ppm	2.7(10)	Bq/kg ^{238}U
Sample:	S6MB annulus	U(late):	0.06(1)	ppm	0.7(1)	Bq/kg ^{238}U
Weight:	223 grams	Th(early):	0.09(4)	ppm	0.37(16)	Bq/kg ^{232}Th
Data file:	32766S	Th(late):	0.23(2)	ppm	0.93(8)	Bq/kg ^{232}Th
Count time:	160801 sec	K:	13.57(2)	%	4200(10)	Bq/kg ^{40}K
		^{137}Cs:			0.27(4)	Bq/kg ^{137}Cs

This summary of results is presented here without additional comment. Additional comment may be added following discussion with Eric Norman (EBNorman@lbl.gov).