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August 15, 2002

Dockets Management Branch (HFA-305)
Food and Drug Administration
5630 Fishers Lane, Room 1061
Rockville, MD 20852

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Food Labeling; Guidelines for Voluntary Nutrition Labeling of Raw Fruits, Vegetables, and Fish; Identification of the 20 Most Frequently Consumed Raw Fruits, Vegetables, and Fish. 67 FR 12918, March 20, 2002.

Dear Sir or Madam:

The Citrus Research Board is a commodity program established under the California Marketing Act, which enables the state's citrus growers to sponsor and support research and to promote quality assurance throughout the industry. Growers voted by referendum to create this marketing order in 1968, and they have reaffirmed their support of the program in continuation referendums conducted every 5 years. In administering the program, the Citrus Research Board has the responsibility of determining the industry's most important needs related to research, including nutrient composition research on citrus fruits.

The Citrus Research Board is submitting the results of its 1998 research on the nutrient content of oranges, grapefruit, Mandarin oranges and lemons. In this study, mid-season fruit were collected from packinghouses in California and analyzed for nutrient content at Covance Laboratories in Madison, WI. The results and further details regarding the sampling and analysis are provided in the enclosed report "Nutrient Values of Oranges, Grapefruit, Mandarins and Lemons."

Sincerely yours,

Citrus Research Board

Ted A. Batkin

Ted A. Batkin
President

01N-0548

RPT 1

CITRUS RESEARCH BOARD

NUTRIENT VALUES OF ORANGES GRAPEFRUIT MANDARINS LEMONS

prepared by

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CITRUS RESEARCH BOARD
NUTRIENT VALUES OF
ORANGES, GRAPEFRUIT, MANDARINS AND LEMONS

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INTRODUCTION AND GENERAL METHODS

Oranges, grapefruit, mandarins, and lemons are among the top 20 fruits for which retailers must post FDA-published nutrition information at the point of sale.

The goal of the present research was to conduct a pilot study, in which California oranges, grapefruit, mandarins, and lemons would be collected mid-season and analyzed for nutrient content. The study results are intended to form the basis for future sampling and testing protocols, to help substantiate health and nutrient claims, and to provide current data for nutrition labeling and regulatory purposes.

Samples were collected from packing houses in California and shipped to Covance Laboratories in Madison, Wisconsin for chemical analysis. Each sampler shipped fruit from one harvest date and growing region, documenting information about the fruit and its chain of custody. The laboratory carefully removed the rind, seeds, and core and analyzed the edible portion for nutrient content. Each sample lot for analysis was comprised of twelve fruit from a single packing house.

Oranges. Two varieties were analyzed in this study. Washington Navel oranges were harvested in February 1998 from Tulare County, CA. Valencias were harvested in August 1998 from Ventura County, CA. Each variety was composited and analyzed separately by the laboratory.

Nationally, navel oranges represent approximately 65% of the fresh use of oranges, with Valencia oranges representing approximately 35% (statistics for crops 1998-99 through 2000-01 in: "Citrus Fruits 2001 Summary," September 2001, Agricultural Statistics Board, NASS, USDA).

Grapefruit. Rio Red grapefruit were harvested in March 1998 from Riverside County, CA.

Mandarins. Delight mandarin oranges were harvested in February 1998 from Tulare County, CA.

Lemons: Lemon samples were harvested in July 1998 from Ventura County, CA.

Results of the laboratory analyses are summarized in the tables on the following pages. Calories and calories from fat have been calculated using the specific energy factors (Atwater factors) appropriate for each fruit type. The energy factors are presented in each table under the column heading "E Factor."

The summary tables are followed by Covance Laboratory reports of the analytical data and methods.

WASHINGTON NAVEL ORANGES AND VALENCIA ORANGES, PER 100G AND PER 154G

Lab No.: 80300406, 80803202

Lab Date: 3/3/98, 8/18/98

Harvest Date: 2/21/98, 8/5/98

Region: Tulare County, Ventura County

Nutrient	Unit	E Fact	Navel/ 100g	Valencia/ 100g	Mean/ 100g	Mean/Svg 1.54	%DV/ Svg	Lbl Value	Lbl %DV
Water	g		85.100	87.900	86.500	133.210			
Ash	g		0.400	0.400	0.400	0.616			
Calories	kcal		52.452	42.338	47.395	72.988		70	
Cal fr Fat	kcal		0.778	0.762	0.770	1.186		0	
Total Fat (GC)	g	8.37	0.093	0.091	0.092	0.142	0.22%	0	0%
Sat Fat	g		0.025	0.021	0.023	0.035	0.18%	0	0%
Poly Fat	g		0.064	0.035	0.050	0.076		0	
Mono Fat	g		0.004	0.035	0.020	0.030		0	
Sodium	mg		0.480	0.880	0.680	1.047	0.04%	0	0%
Potassium	mg		164.000	156.000	160.000	246.400	7.04%	250	7%
Carbo	g	3.60	13.607	10.709	12.158	18.723	6.24%	19	6%
D Fiber Prosky	g		2.000	1.600	1.800	2.772	11.09%	3	12%
D Fiber Lee	g		1.800	1.700	1.750	2.695	10.78%		
Soluble Fiber	g		<1.000	<1.000	<1.000	<1.540			
Insoluble Fiber	g		1.800	1.700	1.750	2.695			
Sugars	g		9.000	8.400	8.700	13.398		13	
Protein	g	3.36	0.800	0.900	0.850	1.309		1	
Vit A	IU		66.700	180.000	123.350	189.959	3.80%		4%
Vit C	mg		64.100	51.500	57.800	89.012	148.35%		150%
Calcium	mg		36.500	33.000	34.750	53.515	5.35%		6%
Iron	mg		0.128	0.145	0.137	0.210	1.17%		2%
Vit E	IU		0.481	0.523	0.502	0.773	2.58%		2%
Thiamin	mg		0.070	0.100	0.085	0.131	8.73%		8%
Riboflavin	mg		0.040	0.030	0.035	0.054	3.17%		4%
Niacin	mg		0.380	0.300	0.340	0.524	2.62%		2%
Vitamin B6	mg		0.066	0.070	0.068	0.105	5.24%		6%
Folate	mcg		35.100	49.400	42.250	65.065	16.27%		15%
Panto Acid	mg		0.180	0.250	0.215	0.331	3.31%		4%
Phosphorus	mg		21.100	20.900	21.000	32.340	3.23%		4%
Magnesium	mg		10.300	11.300	10.800	16.632	4.16%		4%
Zinc	mg		0.142	0.057	0.100	0.153	1.02%		2%
Selenium	mcg		< 0.500	< 0.500	< 0.500	< 0.770	<1.10%		
Copper	mg		0.052	0.036	0.044	0.068	3.39%		4%
Manganese	mg		0.022	0.020	0.021	0.032	1.62%		2%
Chromium	mcg		<5.000	<5.000	<5.000	<7.700	<6.42%		
Molybdenum	mcg		<2.000	<2.000	<2.000	<3.080	<4.11%		
Boron	mg		0.200	0.322	0.261	0.402			

RIO RED GRAPEFRUIT, PER 100G AND PER 154G SERVING

Lab No.: 80302099 Lab Date: 3/11/98
 Harvest Date: 3/6/98 Region: Riverside County

Nutrient	Unit	E Fact	Units/ 100g	Units/Svg 1.54	%DV/ Svg	Lbl Value	Lbl %DV
Water	g		88.100	135.674			
Ash	g		0.500	0.770			
Calories	kcal		41.092	63.281		60	
Cal fr Fat	kcal		0.343	0.528		0	
Total Fat (GC)	g	8.37	0.041	0.063	0.10%	0	0%
Sat Fat	g		0.009	0.014	0.07%	0	0%
Poly Fat	g		0.019	0.029		0	
Mono Fat	g		0.013	0.020		0	
Sodium	mg		2.800	4.312	0.18%	0	0%
Potassium	mg		154.000	237.160	6.78%	240	7%
Carbo	g	3.60	10.759	16.569	5.52%	17	6%
D Fiber Prosky	g		1.100	1.694	6.78%	2	8%
D Fiber Lee	g		1.500	2.310	9.24%		
Soluble Fiber	g		<1.000	<1.540			
Insoluble Fiber	g		1.500	2.310			
Sugars	g		5.300	8.162		8	
Protein	g	3.36	0.600	0.924		1	
Vit A	IU		650.000	1001.000	20.02%		20%
Vit C	mg		30.300	46.662	77.77%		80%
Calcium	mg		23.800	36.652	3.67%		4%
Iron	mg		0.114	0.176	0.98%		0%
Vit E	IU		0.378	0.582	1.94%		2%
Thiamin	mg		0.010	0.015	1.03%		2%
Riboflavin	mg		0.020	0.031	1.81%		2%
Niacin	mg		0.230	0.354	1.77%		2%
Vitamin B6	mg		0.044	0.068	3.39%		4%
Folate	mcg		11.700	18.018	4.50%		4%
Panto Acid	mg		0.230	0.354	3.54%		4%
Phosphorus	mg		16.400	25.256	2.53%		2%
Magnesium	mg		8.690	13.383	3.35%		4%
Zinc	mg		0.164	0.253	1.68%		2%
Selenium	mcg		< 0.500	< 0.770	<1.10%		
Copper	mg		0.034	0.052	2.62%		2%
Manganese	mg		0.023	0.035	1.77%		2%
Chromium	mcg		<5.000	<7.700	<6.42%		
Molybdenum	mcg		<2.000	<3.080	<4.11%		
Boron	mg		0.162	0.249			

DELIGHT MANDARIN ORANGES, PER 100G AND PER 109G SERVING

Lab No.: 80300412 Lab Date: 3/3/98
 Harvest Date: 2/27/98 Region: Tulare County

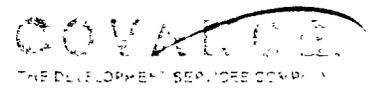
Nutrient	Unit	E Fact	Units/ 100g	Units/Svg 1.09	%DV/ Svg	Lbl Value	Lbl %DV
Water	g		86.900	94.721			
Ash	g		0.400	0.436			
Calories	kcal		45.814	49.937		50	
Cal fr Fat	kcal		0.670	0.730		0	
Total Fat (GC)	g	8.37	0.080	0.087	0.13%	0	0%
Sat Fat	g		0.016	0.017	0.09%	0	0%
Poly Fat	g		0.039	0.043		0	
Mono Fat	g		0.025	0.027		0	
Sodium	mg		0.850	0.927	0.04%	0	0%
Potassium	mg		160.000	174.400	4.98%	170	5%
Carbo	g	3.60	11.420	12.448	4.15%	12	4%
D Fiber Prosky	g		1.400	1.526	6.10%	2	8%
Soluble Fiber	g		<1.000	<1.090			
Insoluble Fiber	g		<1.000	<1.090			
Sugars	g		7.800	8.502		9	
Protein	g	3.36	1.200	1.308		1	
Vit A	IU		783.000	853.470	17.07%		15%
Vit C	mg		28.900	31.501	52.50%		50%
Calcium	mg		31.300	34.117	3.41%		4%
Iron	mg		0.149	0.162	0.90%		0%
Vit E	IU		0.861	0.938	3.13%		4%
Thiamin	mg		0.070	0.076	5.09%		6%
Riboflavin	mg		0.030	0.033	1.92%		2%
Niacin	mg		0.170	0.185	0.93%		
Vitamin B6	mg		0.112	0.122	6.10%		6%
Folate	mcg		21.700	23.653	5.91%		6%
Panto Acid	mg		0.420	0.458	4.58%		4%
Phosphorus	mg		20.600	22.454	2.25%		2%
Magnesium	mg		10.600	11.554	2.89%		2%
Zinc	mg		0.121	0.132	0.88%		
Selenium	mcg		<0.500	<0.545	<0.78%		
Copper	mg		0.062	0.068	3.38%		4%
Manganese	mg		0.053	0.058	2.89%		2%
Chromium	mcg		<5.000	<5.450	<4.54%		
Molybdenum	mcg		<2.000	<2.180	<2.91%		
Boron	mg		0.112	0.122			

LEMONS, PER 100G AND PER 58G SERVING

Lab No.: 80901233 Lab Date: 9/22/98
 Harvest Date: 7/23/98 Region: Ventura County

Nutrient	Unit	E Fact	Units/100g	Units/Svg 0.58	%DV/Svg	Lbl Value	Lbl %DV
Water	g		89.300	51.794			
Ash	g		0.400	0.232			
Calories	kcal		26.237	15.217		15	
Cal fr Fat	kcal		0.109	0.063		0	
Total Fat (GC)	g	8.37	0.013	0.008	0.01%	0	0%
Sat Fat	g		0.003	0.002	0.01%	0	0%
Poly Fat	g		0.006	0.003		0	
Mono Fat	g		0.004	0.002		0	
Sodium	mg		1.630	0.945	0.04%	0	0%
Potassium	mg		151.000	87.580	2.50%	90	3%
Carbo	g	2.48	9.587	5.560	1.85%	6	2%
D Fiber Prosky	g		2.300	1.334	5.34%	1	4%
D Fiber Lee	g		3.200	1.856	7.42%		
Soluble Fiber	g		1.400	0.812			
Insoluble Fiber	g		1.900	1.102			
Sugars	g		3.300	1.914		2	
Protein	g	3.36	0.700	0.406		0	
Vit A	IU						0%
Vit C	mg		41.600	24.128	40.21%		40%
Calcium	mg		24.900	14.442	1.44%		2%
Iron	mg		0.141	0.082	0.45%		0%
Thiamin	mg		0.030	0.017	1.16%		2%
Riboflavin	mg		0.020	0.012	0.68%		
Niacin	mg		0.170	0.099	0.49%		
Vitamin B6	mg		0.050	0.029	1.45%		2%
Folate	mcg		26.200	15.196	3.80%		4%
Panto Acid	mg		0.210	0.122	1.22%		2%
Phosphorus	mg		21.400	12.412	1.24%		2%
Magnesium	mg		8.070	4.681	1.17%		2%
Zinc	mg		0.282	0.164	1.09%		2%
Selenium	mcg		<0.500	<0.290	<0.41%		
Copper	mg		0.053	0.031	1.54%		2%
Manganese	mg		0.021	0.012	0.61%		
Chromium	mcg		<5.000	<2.900	<2.42%		
Molybdenum	mcg		<2.000	<1.160	<1.55%		
Boron	mg		0.150	0.087			

Covance Laboratories Inc.
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Tel: 608/241-4471 Fax: 608/241-7227



REPORT OF ANALYSIS

LESLIE NYQUIST
NUTRITION RESEARCH GROUP
4199 CAMPUS DRIVE, SUITE 550
IRVINE, CA 92715

SAMPLE NUMBER: 80300406
DATE ENTERED: 03/03/98
REPORT PRINTED: 04/02/98

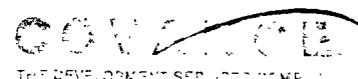
WASHINGTON NAVAL ORANGES: 1 THROUGH 12, (TULARE) LINDSAY, CA
(COMPOSITE OF 12)

SERVING SIZE = 154.0 GM

PROTEIN USRDA = 65 GM

ASSAY	CONTENT/100 GM		PER SERVING		% USRDA/ SERVING
CALORIES (USING TDF)	51.5	CL	79.3	CL	
PROTEIN (N X 6.25)	.8	GM	1.0	GM	
TOTAL CARBOHYDRATE	13.4	GM	20.6	GM	
TOTAL FAT	.3	GM	.5	GM	
SODIUM	.48	MG	.74	MG	
POTASSIUM	164.	MG	253.	MG	
ALPHA CAROTENE BY HPLC	< .02	MG			
BETA CAROTENE BY HPLC	.04	MG	.06	MG	
VITAMIN A FROM CAROTENE	66.7	IU	103.0	IU	2.05
VITAMIN C, TOTAL	64.1	MG	98.7	MG	164.52
THIAMIN HYDROCHLORIDE	.07	MG	.11	MG	7.19
RIBOFLAVIN	.04	MG	.06	MG	3.62
NIACIN	.38	MG	.59	MG	2.93
CALCIUM	36.5	MG	56.2	MG	5.62
IRON	.128	MG	.197	MG	1.10

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SAMPLE NUMBER: 80300406

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WASHINGTON NAVEL ORANGES: 1 THROUGH 12, (TULARE) LINDSAY, CA
(COMPOSITE OF 12)

<u>ASSAY</u>	<u>CONTENT/100 GM</u>		<u>PER SERVING</u>		<u>% USRDA/ SERVING</u>
PYRIDOXINE HYDROCHLORIDE	.066	MG	.102	MG	5.08
FOLIC ACID	.0351	MG	.0541	MG	13.51
PHOSPHORUS	21.1	MG	32.5	MG	3.25
MAGNESIUM	10.3	MG	15.9	MG	3.97
ZINC	.142	MG	.219	MG	1.46
COPPER	.052	MG	.080	MG	4.00
PANTOTHENIC ACID	.18	MG	.28	MG	2.77
MANGANESE	.022	MG	.034	MG	
DIETARY FIBER	2.0	GM	3.1	GM	
SUGAR PROFILE					
FRUCTOSE	2.3	GM	3.5	GM	
GALACTOSE	< .1	GM			
GLUCOSE	2.5	GM	3.9	GM	
SUCROSE	4.2	GM	6.5	GM	
LACTOSE	< .1	GM			
MALTOSE	< .1	GM			
MOISTURE, 70 DEGREE VAC. OVEN	85.1	GM	131.0	GM	
ASH	.4	GM	.6	GM	
BORON	.200	MG	.308	MG	
MOLYBDENUM	< .002	MG			
INSOLUBLE FIBER	1.8	GM	2.8	GM	
DIETARY FIBER					

NONCALCULABLE

SAMPLE NUMBER: 80300406

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WASHINGTON NAVAL ORANGES: 1 THROUGH 12, (TULARE) LINDSAY, CA
(COMPOSITE OF 12)

<u>ASSAY</u>	<u>CONTENT/100 GM</u>		<u>PER SERVING</u>		<u>% USRDA/ SERVING</u>
SOLUBLE FIBER	< 1.0	GM			
ALPHA TOCOPHEROL	.323	MG	.497	MG	
FATTY ACIDS AS TRIGLYCERIDES					
8:0 CAPRYLIC	< .001	GM			
10:0 CAPRIC	< .001	GM			
12:0 LAURIC	< .001	GM			
14:0 MYRISTIC	< .001	GM			
14:1 MYRISTOLEIC	< .001	GM			
15:0 PENTADECANOIC	< .001	GM			
15:1 PENTADECENOIC	< .001	GM			
16:0 PALMITIC	.021	GM	.032	GM	
16:1 PALMITOLEIC	.004	GM	.006	GM	
17:0 HEPTADECANOIC	< .001	GM			
17:1 HEPTADECENOIC	< .001	GM			
18:0 STEARIC	.003	GM	.005	GM	
18:1 OLEIC	< .001	GM			
18:2 LINOLEIC	.041	GM	.063	GM	
GAMMA LINOLENIC	< .001	GM			
18:3 LINOLENIC	.023	GM	.035	GM	
20:0 ARACHIDIC	< .001	GM			
20:1 EICOSENOIC	< .001	GM			
20:2 EICOSADIENOIC	< .001	GM			

SAMPLE NUMBER: 80300406

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WASHINGTON NAVAL ORANGES: 1 THROUGH 12, (TULARE) LINDSAY, CA
(COMPOSITE OF 12)

<u>ASSAY</u>	<u>CONTENT/100 GM</u>	<u>PER SERVING</u>	<u>% USRDA/ SERVING</u>
20:4 ARACHIDONIC	< .001	GM	
20:3 EICOSATRIENOIC	< .001	GM	
22:0 BEHENIC	.001	GM .002 GM	
SUM OF QUANTITATED FATTY ACIDS	< .10	GM AS OLEIC	
SELENIUM	< .0005	MG	

METHOD REFERENCES

CALORIES (USING TDF)

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PROTEIN (N X 6.25)

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SAMPLE NUMBER: 80300406

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WASHINGTON NAVAL ORANGES: 1 THROUGH 12, (TULARE) LINDSAY, CA
(COMPOSITE OF 12)

METHOD REFERENCES (CONTINUED)

ALPHA CAROTENE BY HPLC

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PAGE 6

WASHINGTON NAVAL ORANGES: 1 THROUGH 12, (TULARE) LINDSAY, CA
(COMPOSITE OF 12)

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SAMPLE NUMBER: 80300406

PAGE 7

WASHINGTON NAVAL ORANGES: 1 THROUGH 12, (TULARE) LINDSAY, CA
(COMPOSITE OF 12)

METHOD REFERENCES (CONTINUED)

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REPORT OF ANALYSIS



LESLIE NYQUIST
NUTRITION RESEARCH GROUP
4199 CAMPUS DRIVE, SUITE 550
IRVINE, CA 92715

SAMPLE NUMBER: 80300407
DATE ENTERED: 03/03/98
REPORT PRINTED: 03/16/98

WASHINGTON NAVEL ORANGES: 1 THROUGH 12, (TULARE) LINDSAY, CA
(COMPOSITE OF 12)

SERVING SIZE = 154.0 GM

PROTEIN USRDA = 65 GM

ASSAY	CONTENT/100 GM	PER SERVING	% USRDA/ SERVING
CHROMIUM BY GRAPHITE FURNACE	< .0050 MG		

METHOD REFERENCES

CHROMIUM BY GRAPHITE FURNACE
METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, EPA PUBLICATION NO.
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REPORT OF ANALYSIS

LESLIE NYQUIST
NUTRITION RESEARCH GROUP
4199 CAMPUS DRIVE, SUITE 550
IRVINE, CA 92715

SAMPLE NUMBER: 80803202

DATE ENTERED: 08/18/98

REPORT PRINTED: 09/04/98

VALENCIA ORANGE: 1 THROUGH 12, PITU, CA
(COMPOSITE OF 12)

SERVING SIZE = 154.0 GM

PROTEIN USRDA = 65 GM

ASSAY	CONTENT/100 GM		PER SERVING		% USRDA/ SERVING
CALORIES (USING TDF)	41.4	CL	63.8	CL	
PROTEIN (N X 6.25)	.9	GM	1.0	GM	
TOTAL CARBOHYDRATE	10.6	GM	16.3	GM	
TOTAL FAT	.2	GM	.3	GM	
SODIUM	.88	MG	1.40	MG	
POTASSIUM	156.	MG	240.	MG	
ALPHA CAROTENE BY HPLC	.03	MG	.05	MG	
BETA CAROTENE BY HPLC	.09	MG	.14	MG	
VITAMIN A FROM CAROTENE	180.	IU	277.	IU	5.54
VITAMIN C, TOTAL	51.5	MG	79.3	MG	132.18
THIAMIN HYDROCHLORIDE	.10	MG	.15	MG	10.27
RIBOFLAVIN	.03	MG	.05	MG	2.72
NIACIN	.30	MG	.46	MG	2.31
CALCIUM	33.0	MG	50.8	MG	5.08
IRON	.145	MG	.223	MG	1.24

SAMPLE NUMBER: 80803202

PAGE 2

VALENCIA ORANGE: 1 THROUGH 12, PITU, CA
(COMPOSITE OF 12)

<u>ASSAY</u>	<u>CONTENT/100 GM</u>		<u>PER SERVING</u>		<u>% USRDA/ SERVING</u>
PYRIDOXINE HYDROCHLORIDE	.070	MG	.108	MG	5.39
FOLIC ACID	.0494	MG	.0761	MG	19.02
PHOSPHORUS	20.9	MG	32.2	MG	3.22
MAGNESIUM	11.3	MG	17.4	MG	4.35
ZINC	.057	MG	.088	MG	.59
COPPER	.036	MG	.055	MG	2.77
PANTOTHENIC ACID	.25	MG	.39	MG	3.85
MANGANESE	.020	MG	.031	MG	
DIETARY FIBER	1.6	GM	2.5	GM	
SUGAR PROFILE					
FRUCTOSE	2.0	GM	3.1	GM	
GALACTOSE	< .1	GM			
GLUCOSE	1.9	GM	2.9	GM	
SUCROSE	4.5	GM	6.9	GM	
LACTOSE	< .1	GM			
MALTOSE	< .1	GM			
MOISTURE, 70 DEGREE VAC. OVEN	87.9	GM	135.0	GM	
ASH	.4	GM	.6	GM	
BORON	.322	MG	.496	MG	
MOLYBDENUM	< .002	MG			
INSOLUBLE FIBER	1.7	GM	2.6	GM	

DIETARY FIBER

NONCALCULABLE

SAMPLE NUMBER: 80803202

PAGE 3

VALENCIA ORANGE: 1 THROUGH 12, PITU, CA
(COMPOSITE OF 12)

<u>ASSAY</u>	<u>CONTENT/100 GM</u>		<u>PER SERVING</u>		<u>% USRDA/</u>
					<u>SERVING</u>
SOLUBLE FIBER	< 1.00	GM			
ALPHA TOCOPHEROL	.351	MG	.541	MG	
FATTY ACIDS AS TRIGLYCERIDES					
8:0 CAPRYLIC	.002	GM	.003	GM	
10:0 CAPRIC	< .001	GM			
12:0 LAURIC	< .001	GM			
14:0 MYRISTIC	< .001	GM			
14:1 MYRISTOLEIC	< .001	GM			
15:0 PENTADECANOIC	< .001	GM			
15:1 PENTADECENOIC	< .001	GM			
16:0 PALMITIC	.015	GM	.023	GM	
16:1 PALMITOLEIC	.002	GM	.003	GM	
17:0 HEPTADECANOIC	< .001	GM			
17:1 HEPTADECENOIC	< .001	GM			
18:0 STEARIC	.004	GM	.006	GM	
18:1 OLEIC	.033	GM	.051	GM	
18:2 LINOLEIC	.027	GM	.042	GM	
GAMMA LINOLENIC	< .001	GM			
18:3 LINOLENIC	.008	GM	.012	GM	
20:0 ARACHIDIC	< .001	GM			
20:1 EICOSENOIC	< .001	GM			
20:2 EICOSADIENOIC	< .001	GM			

SAMPLE NUMBER: 80803202

VALENCIA ORANGE: 1 THROUGH 12, PITU, CA
(COMPOSITE OF 12)

<u>ASSAY</u>	<u>CONTENT/100 GM</u>	<u>PER SERVING</u>	<u>% USRDA/ SERVING</u>
20:4 ARACHIDONIC	< .001 GM		
20:3 EICOSATRIENOIC	< .001 GM		
22:0 BEHENIC	< .001 GM		
SUM OF QUANTITATED FATTY ACIDS	.091 GM	.140 GM	
		AS TRIGLYCERIDES	
SELENIUM	< .0005 MG		

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SAMPLE NUMBER: 80803202

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VALENCIA ORANGE: 1 THROUGH 12, PITU, CA
(COMPOSITE OF 12)

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VALENCIA ORANGE: 1 THROUGH 12, PITU, CA
(COMPOSITE OF 12)

METHOD REFERENCES (CONTINUED)

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SAMPLE NUMBER: 80803202

VALENCIA ORANGE: 1 THROUGH 12, PITU, CA
(COMPOSITE OF 12)

METHOD REFERENCES (CONTINUED)

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SELENIUM

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REPORT OF ANALYSIS



LESLIE NYQUIST
NUTRITION RESEARCH GROUP
4199 CAMPUS DRIVE, SUITE 550
IRVINE, CA 92715

SAMPLE NUMBER: 80803203

DATE ENTERED: 08/18/98

REPORT PRINTED: 08/27/98

VALENCIA ORANGE: 1 THROUGH 12, PITU, CA
(COMPOSITE OF 12)

SERVING SIZE = 154.0 GM

PROTEIN USRDA = 65 GM

<u>ASSAY</u>	<u>CONTENT/100 GM</u>	<u>PER SERVING</u>	<u>% USRDA/ SERVING</u>
CHROMIUM BY GRAPHITE FURNACE	< .0050 MG		

METHOD REFERENCES

CHROMIUM BY GRAPHITE FURNACE

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, EPA PUBLICATION NO. 600/4-79-020, METALS 1-19 AND METHOD 218.2, US EPA, CINCINNATI, OH, (1979) (MODIFIED).

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REPORT OF ANALYSIS

LESLIE NYQUIST
NUTRITION RESEARCH GROUP
4199 CAMPUS DRIVE, SUITE 550
IRVINE, CA 92715

SAMPLE NUMBER: 80302099

DATE ENTERED: 03/11/98

REPORT PRINTED: 04/06/98

RIO RED GRAPEFRUIT: 1 THROUGH 12, RIVERSIDE, CA
(COMPOSITE OF 12)

SERVING SIZE = 154.0 GM

PROTEIN USRDA = 65 GM

<u>ASSAY</u>	<u>CONTENT/100 GM</u>		<u>PER SERVING</u>		<u>% USRDA/ SERVING</u>
CALORIES (USING TDF)	42.2	CL	65.0	CL	
PROTEIN (N X 6.25)	.6	GM	.9	GM	
TOTAL CARBOHYDRATE	10.6	GM	16.3	GM	
TOTAL FAT	.2	GM	.3	GM	
SODIUM	2.80	MG	4.31	MG	
POTASSIUM	154.	MG	237.	MG	
ALPHA CAROTENE BY HPLC	< .02	MG			
BETA CAROTENE BY HPLC	.39	MG	.60	MG	
VITAMIN A FROM CAROTENE	650.	IU	1000.	IU	20.02
VITAMIN C, TOTAL	30.3	MG	46.7	MG	77.77
THIAMIN HYDROCHLORIDE	.01	MG	.01	MG	1.03
RIBOFLAVIN	.02	MG	.03	MG	1.81
NIACIN	.23	MG	.35	MG	1.77
CALCIUM	23.8	MG	36.7	MG	3.67
IRON	.114	MG	.176	MG	.98

SAMPLE NUMBER: 80302099

PAGE 2

RIO RED GRAPEFRUIT: 1 THROUGH 12, RIVERSIDE, CA
(COMPOSITE OF 12)

ASSAY	CONTENT/100 GM		PER SERVING		% USRDA/ SERVING
PYRIDOXINE HYDROCHLORIDE	.044	MG	.068	MG	3.39
FOLIC ACID	.0117	MG	.0180	MG	4.50
PHOSPHORUS	16.4	MG	25.3	MG	2.53
MAGNESIUM	8.69	MG	13.40	MG	3.35
ZINC	.164	MG	.253	MG	1.68
COPPER	.034	MG	.052	MG	2.62
PANTOTHENIC ACID	.23	MG	.35	MG	3.54
MANGANESE	.023	MG	.035	MG	
DIETARY FIBER	1.1	GM	1.7	GM	
SUGAR PROFILE					
FRUCTOSE	1.1	GM	1.7	GM	
GALACTOSE	< .1	GM			
GLUCOSE	1.1	GM	1.7	GM	
SUCROSE	3.1	GM	4.8	GM	
LACTOSE	< .1	GM			
MALTOSE	< .1	GM			
MOISTURE, 70 DEGREE VAC. OVEN	88.1	GM	136.0	GM	
ASH	.5	GM	.8	GM	
BORON	.162	MG	.249	MG	
MOLYBDENUM	< .002	MG			
INSOLUBLE FIBER	1.5	GM	2.3	GM	
DIETARY FIBER					

NONCALCULABLE

SAMPLE NUMBER: 80302099

PAGE 3

RIO RED GRAPEFRUIT: 1 THROUGH 12, RIVERSIDE, CA
(COMPOSITE OF 12)

<u>ASSAY</u>	<u>CONTENT/100 GM</u>		<u>PER SERVING</u>	<u>% USRDA/ SERVING</u>
SOLUBLE FIBER	< 1.0	GM		
ALPHA TOCOPHEROL	.254	MG	.391	MG
FATTY ACIDS AS TRIGLYCERIDES				
8:0 CAPRYLIC	< .001	GM		
10:0 CAPRIC	< .001	GM		
12:0 LAURIC	< .001	GM		
14:0 MYRISTIC	< .001	GM		
14:1 MYRISTOLEIC	< .001	GM		
15:0 PENTADECANOIC	< .001	GM		
15:1 PENTADECENOIC	< .001	GM		
16:0 PALMITIC	.007	GM	.011	GM
16:1 PALMITOLEIC	.001	GM	.002	GM
17:0 HEPTADECANOIC	< .001	GM		
17:1 HEPTADECENOIC	< .001	GM		
18:0 STEARIC	.002	GM	.003	GM
18:1 OLEIC	.012	GM	.018	GM
18:2 LINOLEIC	.013	GM	.020	GM
GAMMA LINOLENIC	< .001	GM		
18:3 LINOLENIC	.006	GM	.009	GM
20:0 ARACHIDIC	< .001	GM		
20:1 EICOSENOIC	< .001	GM		
20:2 EICOSADIENOIC	< .001	GM		

SAMPLE NUMBER: 80302099

PAGE 4

RIO RED GRAPEFRUIT: 1 THROUGH 12, RIVERSIDE, CA
(COMPOSITE OF 12)

ASSAY	CONTENT/100 GM	PER SERVING	% USRDA/ SERVING
20:4 ARACHIDONIC	< .001	GM	
20:3 EICOSATRIENOIC	< .001	GM	
22:0 BEHENIC	< .001	GM	
SUM OF QUANTITATED FATTY ACIDS	< .1	GM AS TRIGLYCERIDES	
SELENIUM	< .0005	MG	

METHOD REFERENCES

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PAGE 5

RIO RED GRAPEFRUIT: 1 THROUGH 12, RIVERSIDE, CA
(COMPOSITE OF 12)

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RIO RED GRAPEFRUIT: 1 THROUGH 12, RIVERSIDE, CA
(COMPOSITE OF 12)

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SAMPLE NUMBER: 80302099

PAGE 7

RIO RED GRAPEFRUIT: 1 THROUGH 12, RIVERSIDE, CA
(COMPOSITE OF 12)

METHOD REFERENCES (CONTINUED)

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REPORT OF ANALYSIS



LESLIE NYQUIST
NUTRITION RESEARCH GROUP
4199 CAMPUS DRIVE, SUITE 550
IRVINE, CA 92715

SAMPLE NUMBER: 80302100

DATE ENTERED: 03/11/98

REPORT PRINTED: 03/24/98

RIO RED GRAPEFRUIT: 1 THROUGH 12, RIVERSIDE, CA
(COMPOSITE OF 12)

SERVING SIZE = 154.0 GM

PROTEIN USRDA = 65 GM

<u>ASSAY</u>	<u>CONTENT/100 GM</u>	<u>PER SERVING</u>	<u>% USRDA/ SERVING</u>
CHROMIUM BY GRAPHITE FURNACE	< .0050 MG		

METHOD REFERENCES

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REPORT OF ANALYSIS

LESLIE NYQUIST
NUTRITION RESEARCH GROUP
4199 CAMPUS DRIVE, SUITE 550
IRVINE, CA 92715

SAMPLE NUMBER: 80300412

DATE ENTERED: 03/03/98

REPORT PRINTED: 04/02/98

MANDARIN ORANGES: 1 THROUGH 12, (TULARE) VISALIA, CA
(COMPOSITE OF 12)

SERVING SIZE = 109.0 GM

PROTEIN USRDA = 65 GM

ASSAY	CONTENT/100 GM		PER SERVING		% USRDA/ SERVING
CALORIES (USING TDF)	46.2	CL	50.4	CL	
PROTEIN (N X 6.25)	1.2	GM	1.3	GM	
TOTAL CARBOHYDRATE	11.3	GM	12.3	GM	
TOTAL FAT	.2	GM	.2	GM	
SODIUM	.85	MG	.93	MG	
POTASSIUM	160.	MG	174.	MG	
ALPHA CAROTENE BY HPLC	.04	MG	.04	MG	
BETA CAROTENE BY HPLC	.45	MG	.49	MG	
VITAMIN A FROM CAROTENE	783.	IU	853.	IU	17.07
VITAMIN C, TOTAL	28.9	MG	31.5	MG	52.50
THIAMIN HYDROCHLORIDE	.07	MG	.08	MG	5.09
RIBOFLAVIN	.03	MG	.03	MG	1.92
NIACIN	.17	MG	.19	MG	.93
CALCIUM	31.3	MG	34.1	MG	3.41
IRON	.149	MG	.162	MG	.90

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SAMPLE NUMBER: 80300412

PAGE 2

MANDARIN ORANGES: 1 THROUGH 12, (TULARE) VISALIA, CA
(COMPOSITE OF 12)

<u>ASSAY</u>	<u>CONTENT/100 GM</u>		<u>PER SERVING</u>		<u>% USRDA/ SERVING</u>
PYRIDOXINE HYDROCHLORIDE	.112	MG	.122	MG	6.10
FOLIC ACID	.0217	MG	.0237	MG	5.91
PHOSPHORUS	20.6	MG	22.5	MG	2.25
MAGNESIUM	10.6	MG	11.6	MG	2.89
ZINC	.121	MG	.132	MG	.88
COPPER	.062	MG	.068	MG	3.38
PANTOTHENIC ACID	.42	MG	.46	MG	4.58
MANGANESE	.053	MG	.058	MG	
DIETARY FIBER	1.4	GM	1.5	GM	
SUGAR PROFILE					
FRUCTOSE	1.6	GM	1.7	GM	
GALACTOSE	< .1	GM			
GLUCOSE	1.6	GM	1.7	GM	
SUCROSE	4.6	GM	5.0	GM	
LACTOSE	< .1	GM			
MALTOSE	< .1	GM			
MOISTURE, 70 DEGREE VAC. OVEN	86.9	GM	94.7	GM	
ASH	.4	GM	.4	GM	
BORON	.112	MG	.122	MG	
MOLYBDENUM	< .002	MG			
INSOLUBLE FIBER	< 1.0	GM			
DIETARY FIBER					

NONCALCULABLE

SAMPLE NUMBER: 80300412

PAGE 3

MANDARIN ORANGES: 1 THROUGH 12, (TULARE) VISALIA, CA
(COMPOSITE OF 12)

<u>ASSAY</u>	<u>CONTENT/100 GM</u>		<u>PER SERVING</u>		<u>% USRDA/ SERVING</u>
SOLUBLE FIBER	< 1.0	GM			
ALPHA TOCOPHEROL	.578	MG	.630	MG	
FATTY ACIDS AS TRIGLYCERIDES					
8:0 CAPRYLIC	< .001	GM			
10:0 CAPRIC	< .001	GM			
12:0 LAURIC	< .001	GM			
14:0 MYRISTIC	< .001	GM			
14:1 MYRISTOLEIC	< .001	GM			
15:0 PENTADECANOIC	< .001	GM			
15:1 PENTADECENOIC	< .001	GM			
16:0 PALMITIC	.014	GM	.015	GM	
16:1 PALMITOLEIC	.002	GM	.002	GM	
17:0 HEPTADECANOIC	< .001	GM			
17:1 HEPTADECENOIC	< .001	GM			
18:0 STEARIC	.002	GM	.002	GM	
18:1 OLEIC	.023	GM	.025	GM	
18:2 LINOLEIC	.030	GM	.033	GM	
GAMMA LINOLENIC	< .001	GM			
18:3 LINOLENIC	.009	GM	.010	GM	
20:0 ARACHIDIC	< .001	GM			
20:1 EICOSENOIC	< .001	GM			
20:2 EICOSADIENOIC	< .001	GM			

SAMPLE NUMBER: 80300412

PAGE 4

MANDARIN ORANGES: 1 THROUGH 12, (TULARE) VISALIA, CA
(COMPOSITE OF 12)

<u>ASSAY</u>	<u>CONTENT/100 GM</u>	<u>PER SERVING</u>	<u>% USRDA/ SERVING</u>
20:4 ARACHIDONIC	< .001	GM	
20:3 EICOSATRIENOIC	< .001	GM	
22:0 BEHENIC	< .001	GM	
SUM OF QUANTITATED FATTY ACIDS	< .10	GM AS OLEIC	
SELENIUM	< .0005	MG	

METHOD REFERENCES

CALORIES (USING TDF)

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PROTEIN (N X 6.25)

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TOTAL CARBOHYDRATE

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TOTAL FAT

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SODIUM

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SAMPLE NUMBER: 80300412

PAGE 5

MANDARIN ORANGES: 1 THROUGH 12, (TULARE) VISALIA, CA
(COMPOSITE OF 12)

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ALPHA CAROTENE BY HPLC

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SAMPLE NUMBER: 80300412

PAGE 6

MANDARIN ORANGES: 1 THROUGH 12, (TULARE) VISALIA, CA
(COMPOSITE OF 12)

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ASH

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MOLYBDENUM

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SAMPLE NUMBER: 80300412

PAGE 7

MANDARIN ORANGES: 1 THROUGH 12, (TULARE) VISALIA, CA
(COMPOSITE OF 12)

METHOD REFERENCES (CONTINUED)

DIETARY FIBER

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INDUCTIVELY COUPLED PLASMA-ATOMIC EMISSION SPECTROMETRY ANALYSIS OF BIOLOGICAL MATERIALS AND SOILS FOR MAJOR TRACE AND ULTRA-TRACE ELEMENTS, APPLIED SPECTROSCOPY, VOLUME 32, PAGES 1-29 (1978), (MODIFIED).

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REPORT OF ANALYSIS



LESLIE NYQUIST
NUTRITION RESEARCH GROUP
4199 CAMPUS DRIVE, SUITE 550
IRVINE, CA 92715

SAMPLE NUMBER: 80300413

DATE ENTERED: 03/03/98

REPORT PRINTED: 03/16/98

MANDARIN ORANGES: 1 THROUGH 12, (TULARE) VISALIA, CA
(COMPOSITE OF 12)

SERVING SIZE = 109.0 GM

PROTEIN USRDA = 65 GM

<u>ASSAY</u>	<u>CONTENT/100 GM</u>	<u>PER SERVING</u>	<u>% USRDA/ SERVING</u>
CHROMIUM BY GRAPHITE FURNACE	< .0050 MG		

METHOD REFERENCES

CHROMIUM BY GRAPHITE FURNACE

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, EPA PUBLICATION NO. 600/4-79-020, METALS 1-19 AND METHOD 218.2, US EPA, CINCINNATI, OH, (1979) (MODIFIED).

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REPORT OF ANALYSIS



LESLIE NYQUIST
NUTRITION RESEARCH GROUP
4199 CAMPUS DRIVE, SUITE 550
IRVINE, CA 92715

SAMPLE NUMBER: 80901233

DATE ENTERED: 09/09/98

REPORT PRINTED: 10/08/98

VENTURA LEMONS: 1 THROUGH 12, SANTA PAULA, CA
(COMPOSITE OF 12)

SERVING SIZE = 58.0 GM

PROTEIN USRDA = 65 GM

ASSAY	CONTENT/100 GM		PER SERVING		% USRDA/ SERVING
CALORIES (USING TDF)	32.5	CL	18.9	CL	
PROTEIN (N X 6.25)	.7	GM	.4	GM	
TOTAL CARBOHYDRATE	9.5	GM	5.5	GM	
TOTAL FAT	.1	GM	.1	GM	
SODIUM	1.63	MG	.945	MG	
POTASSIUM	151.	MG	88.	MG	
VITAMIN C	41.6	MG	24.1	MG	40.21
THIAMIN HYDROCHLORIDE	.03	MG	.02	MG	1.16
RIBOFLAVIN	.020	MG	.012	MG	.68
NIACIN	.17	MG	.10	MG	.49
CALCIUM	24.9	MG	14.4	MG	1.44
IRON	.141	MG	.082	MG	.45
PYRIDOXINE HYDROCHLORIDE	.050	MG	.029	MG	1.45
FOLIC ACID	.0262	MG	.0152	MG	3.80
PHOSPHORUS	21.4	MG	12.4	MG	1.24

SAMPLE NUMBER: 80901233

PAGE 2

VENTURA LEMONS: 1 THROUGH 12, SANTA PAULA, CA
(COMPOSITE OF 12)

<u>ASSAY</u>	<u>CONTENT/100 GM</u>		<u>PER SERVING</u>		<u>% USRDA/ SERVING</u>
MAGNESIUM	8.07	MG	4.68	MG	1.17
ZINC	.282	MG	.164	MG	1.09
COPPER	.053	MG	.031	MG	1.54
PANTOTHENIC ACID	.21	MG	.12	MG	1.22
MANGANESE	.021	MG	.012	MG	
DIETARY FIBER	2.3	GM	1.3	GM	
SUGAR PROFILE					
FRUCTOSE	2.3	GM	1.3	GM	
GALACTOSE	< .1	GM			
GLUCOSE	.7	GM	.4	GM	
SUCROSE	.3	GM	.2	GM	
LACTOSE	< .1	GM			
MALTOSE	< .1	GM			
MOISTURE, 70 DEGREE VAC. OVEN	89.3	GM	51.8	GM	
ASH	.4	GM	.2	GM	
BORON	.150	MG	.087	MG	
MOLYBDENUM	< .002	MG			
INSOLUBLE FIBER	1.9	GM	1.1	GM	
DIETARY FIBER	3.2	GM	1.9	GM	
SOLUBLE FIBER	1.4	GM	.81	GM	
FATTY ACIDS AS TRIGLYCERIDES					
8:0 CAPRYLIC	< .001	GM			

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SAMPLE NUMBER: 80901233

VENTURA LEMONS: 1 THROUGH 12, SANTA PAULA, CA
(COMPOSITE OF 12)

<u>ASSAY</u>	<u>CONTENT/100 GM</u>		<u>PER SERVING</u>		<u>% USRDA/ SERVING</u>
10:0 CAPRIC	<	.001 GM			
12:0 LAURIC	<	.001 GM			
14:0 MYRISTIC	<	.001 GM			
14:1 MYRISTOLEIC	<	.001 GM			
15:0 PENTADECANOIC	<	.001 GM			
15:1 PENTADECENOIC	<	.001 GM			
16:0 PALMITIC		.003 GM	.002	GM	
16:1 PALMITOLEIC	<	.001 GM			
17:0 HEPTADECANOIC	<	.001 GM			
17:1 HEPTADECENOIC	<	.001 GM			
18:0 STEARIC	<	.001 GM			
18:1 OLEIC		.004 GM	.002	GM	
18:2 LINOLEIC		.004 GM	.002	GM	
GAMMA LINOLENIC	<	.001 GM			
18:3 LINOLENIC		.002 GM	.001	GM	
20:0 ARACHIDIC	<	.001 GM			
20:1 EICOSENOIC	<	.001 GM			
20:2 EICOSADIENOIC	<	.001 GM			
20:4 ARACHIDONIC	<	.001 GM			
20:3 EICOSATRIENOIC	<	.001 GM			
22:0 BEHENIC	<	.001 GM			
SUM OF QUANTITATED FATTY ACIDS		.013 GM	.008	GM	
			AS TRIGLYCERIDES		

SAMPLE NUMBER: 80901233

PAGE 4

VENTURA LEMONS: 1 THROUGH 12, SANTA PAULA, CA
(COMPOSITE OF 12)

<u>ASSAY</u>	<u>CONTENT/100 GM</u>	<u>PER SERVING</u>	<u>% USRDA/ SERVING</u>
SELENIUM	< .0000005 GM		

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SAMPLE NUMBER: 80901233

PAGE 5

VENTURA LEMONS: 1 THROUGH 12, SANTA PAULA, CA
(COMPOSITE OF 12)

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(COMPOSITE OF 12)

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PAGE 7

SAMPLE NUMBER: 80901233

VENTURA LEMONS: 1 THROUGH 12, SANTA PAULA, CA
(COMPOSITE OF 12)

METHOD REFERENCES (CONTINUED)

SELENIUM

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REPORT OF ANALYSIS



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IRVINE, CA 92715

SAMPLE NUMBER: 80901234

DATE ENTERED: 09/09/98

REPORT PRINTED: 10/02/98

VENTURA LEMONS: 1 THROUGH 12, SANTA PAULA, CA
(COMPOSITE OF 12)

SERVING SIZE = 58.0 GM

PROTEIN USRDA = 65 GM

<u>ASSAY</u>	<u>CONTENT/100 GM</u>	<u>PER SERVING</u>	<u>% USRDA/ SERVING</u>
CHROMIUM BY GRAPHITE FURNACE	< .0050 MG		

METHOD REFERENCES

CHROMIUM BY GRAPHITE FURNACE
METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, EPA PUBLICATION NO.
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