

# Lab Report

## VALUES FOR THE FAT-SOLUBLE ACTIVATORS

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In order to add to our knowledge about the fat-soluble activators, vitamins A, D and K<sub>2</sub>, the Weston A. Price Foundation submitted thirty samples of animal fats or fatty animal foods for analysis. Eurofins analyzed the samples for vitamins A and K<sub>2</sub> (MK-4) and Heartland Assays analyzed the samples for vitamin D.

In addition to butter and egg yolks from several sources, plus various meat and bird fats, we tested four brands of cod liver oil: Green Pasture, Nutrapro, Rosita and Vassberg.

In many ways, the results confirmed our general knowledge about the food sources of these activators, but there were some surprises.

### VITAMIN A

Eurofins reported the results to us as micrograms per gram as well as International Units (IU) per gram. We tested for retinol only. Here we report the values in IU per gram as well as the amounts per average serving (in grams), which is probably a more useful value for planning nutrient-dense diets. See Table 1.

It is clear that liver is our best source of vitamin A, with pastured chicken livers a clear winner. Conventional chicken livers contained one-third the value of pastured livers. But liver (including foie gras) and cod liver oil head the list, followed by butter.

Values for butter ranged from 288 to 486 grams per fifteen-gram serving (one tablespoon). Irish butter (Kerrygold brand) headed the list followed by grass-fed from a small farm in New Zealand. Surprisingly, conventional Food Lion butter

TABLE 1: VITAMIN A FOOD	Vit A IU/g	Serving Size (g)	IU/ Serving
Chicken livers, pastured	444	30	13,320
Cod liver oil, V	2610	5	13,050
Cod liver oil, NP	1130	5	5650
Chicken livers, conventional	154	30	4620
Foie gras	57.4	30	1722
Cod liver oil, GP	280	5	1400
Cod liver oil, R	244	5	1220
Butter, Irish	32.4	15	486
Butter, raw grass-fed	29.6	15	444
Butter, New Zealand	27.5	15	413
Butter, Food Lion	24.4	15	366
Ghee	19.3	15	290
Butter, organic	19.2	15	288
Egg yolks, pastured	17.9	15	269
Egg yolks, Vital Farms	17.4	15	261
Egg yolks, conventional	17	15	255
Egg yolks, organic	14.8	15	222
Bear fat, JC	14.3	15	215
Bear fat, BP	4.99	15	75
Butter oil	23.7	2.5	59
Lard, Armour	3.41	15	51
Tallow, white	3.28	15	49
Tallow, yellow	3.08	15	46
Goose fat	2.56	15	38
Lamb fat	2.02	15	30
Caviar	1.01	30	30
Duck fat, d'Artagnan	1.86	15	28
Lard, pastured	1.48	15	22
Emu oil, Walkabout	2.46	2.5	6
Duck fat, Epic	0	15	0

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was not far behind with a value of 366 IU per tablespoon. The vitamin A no doubt came from vitamin A in the feed, and not from green grass. The lowest value for butter was organic butter at 288. Nevertheless, the range in values for butter is less than one order of magnitude, so it is clear that butter, any butter, is a good source of vitamin A.

After butter come egg yolks, with values ranging from 222 to 269 IU per average yolk. Pastured yolks had the highest value, organic yolks the lowest. Still, the range of values is

small, and we can be assured of getting vitamin A from any egg yolk.

Lard, tallow, lamb fat and poultry fats are not good sources of vitamin A.

#### VITAMIN D

Results for vitamin D are shown in Table 2. All brands of cod liver oil provide vitamin D in high amounts. Other good sources are caviar, conventional lard and foie gras.

Surprisingly, there was far more vitamin D in conventional lard than in pastured lard. Likewise with the egg yolks, the highest amount was in conventional yolks. These values no doubt reflect vitamin D in the feed. It would be interesting to test pastured and conventional egg yolks, and

TABLE 2: VITAMIN D FOOD	Vit D IU/g	Serving Size (g)	IU/ Serving
Cod liver oil, V	122.5	5	613
Cod liver oil, NP	112.5	5	563
Caviar	11.6	30	348
Cod liver oil, R	56.38	5	282
Cod liver oil, GP	43.7	5	219
Lard, Armour	9.64	15	145
Foie gras	3.55	30	107
Egg yolks, conventional	4.16	15	62
Egg yolks, organic	3.63	15	55
Egg yolks, pastured	3.38	15	51
Egg yolks, Vital Farms	2.22	15	33
Duck fat, D'artagnan	2.08	15	31
Chicken livers, pastured	1	30	30
Duck fat, Epic	1.13	15	17
Lard, pastured	1.59	15	9
Emu oil, Walkabout	3.44	2.5	9
Goose fat	0.47	15	7
Tallow, yellow	0.36	15	5
Ghee	0.22	15	3
Tallow, white	0.19	15	3
Butter, Irish	0.11	15	2
Butter, Food Lion	0.11	15	2
Lamb fat	0.11	15	2
Butter, New Zealand	0.04	15	1
Butter, organic	0.09	15	1
Butter oil	0.22	2.5	1
Chicken livers, conventional	0	30	0
Butter, raw grass-fed	trace	15	0
Bear fat, JC	0	15	0
Bear fat, BP	0	15	0

TABLE 3: VITAMIN K, FOOD	Vit K ng/g	Serving Size (g)	ng/ Serving
Goose fat	879	15	13,185
Duck fat, D'artagnan	860	15	12,900
Emu oil, Walkabout	3870	2.5	9675
Duck fat, Epic	509	15	7635
Egg yolks, Vital Farms	484	15	7260
Egg yolks, organic	483	15	7245
Butter, Irish	286	15	4290
Foie Gras	140	30	4200
Egg yolks, conventional	255	15	3825
Butter, Food Lion	239	15	3585
Butter, organic	234	15	3510
Chicken livers, pastured	109	30	3270
Lamb fat	204	15	3060
Butter, New Zealand	198	15	2970
Ghee	192	15	2880
Chicken livers, conventional	88	30	2650
Tallow, yellow	142	15	2130
Butter, raw grass-fed	174	15	2010
Egg yolks, pastured	109	15	1635
Tallow, white	65	15	975
Lard, Armour	50	15	750
Lard, pastured	42	15	630
Caviar	20	30	600
Cod Liver Oil, GP	90	5	450
Bear fat, JC	20	15	300
Bear fat, BP	20	15	300
Cod Liver Oil, NP	40	5	200
Cod Liver Oil, R	40	5	200
Butter oil	70	2.5	175
Cod Liver Oil, V	30	5	150

pastured and conventional lard for vitamin D activity using the Rat Assay Test at the University of Wisconsin. This test uses live rats to determine whether a particular source of vitamin D has true vitamin D activity in supporting healthy, strong bones. These tests are very expensive, but according to vitamin D expert Hector Deluca, laboratory analyses are of little value in determining the vitamin D activity of a food.

Egg yolks and duck fat are also good sources of vitamin D, but butter and other animal fats tested low.

## VITAMIN K<sub>2</sub>

All foods tested contained vitamin K<sub>2</sub>, even cod liver oil, but the clear winners are bird fats—goose fat, emu oil and duck fat. Egg yolks, butter and chicken livers are also good sources, as are lamb fat and yellow beef tallow.

Several of the foods tested scored much lower than results we obtained several years ago from Vita K Laboratories in the Netherlands.<sup>1</sup> (This lab has since closed.) For example, butter oil tested three to eleven times higher in vitamin K<sub>2</sub> at Vita K Laboratories. Also, we obtained surprisingly low levels on bear fat, reputed to be extremely rich in vitamin K<sub>2</sub>. Australian emu oil tested three times lower than reported by the manufacturer (see page 34). Obviously, more testing is needed.

## COD LIVER OIL

An interesting discovery was lower levels of vitamin D in the two brands of cod liver oil that we know are not heat treated—Green Pasture and Rosita. We believe that Vassburg cod liver oil is extracted at a rendering plant in Alaska; in other words, it is a heat extraction. On its website, the manufacturer assures its customers that vitamins A and D in the product are naturally occurring.

As for Nutrapro, the ratio of vitamin A to vitamin D is almost

exactly ten to one, a sure sign that these are synthetic vitamins added after molecular distillation processing. WAPF will be withdrawing its recommendation for this brand.

## FOIE GRAS AND EGG YOLKS

A surprising finding was the high levels of all three activators in *foie gras* (fatted liver of duck or goose). No wonder epicures value this food! For the rest of us, the food with the best balance of A, D and K<sub>2</sub> is egg yolks, both pastured and conventional. This makes egg yolks a perfect weaning food for baby, and eggs (with an emphasis on the yolks) a wonderful food at all stages of life.

## VITAMIN TESTING

Vitamin testing is not an exact science, and levels in various foods can vary according to the time of year, the amount added to feed and even the particular sample. And some technicians are more skilled at extracting all the vitamins from a sample than others. We hope to do more testing in the future to answer the questions raised in this round. ☺☺

## REFERENCES

1. <https://www.westonaprice.org/cod-liver-oil/#gsc.tab=0>

## A WORD ABOUT OUR BEAR

One sample of bear fat was provided by chapter leader Vicki Plotner. Vicki reports: This bear was one month from the mini hibernation time, shot October 8th, 2022, in North Carolina's Nantahala National Forest, a region once populated by the Cherokee Indians.

Norman Layne, the hunter, told us the story of the hunt right afterwards. The bear gets run up into a tree by bear hunting dogs who stay at the bottom of the tree, barking. The hunter runs up to the tree and he has to, *has to*, shoot the bear either straight between the eyes or in the eye. If you don't, the bear will remain alive (for how long depends on your shot), fall out of the tree and be pissed like nothing seen, kill the dogs and kill the hunter. It's usually not possible to run fast enough.

For Norman's hunt, he got to the tree, was required to wait for the dogs' owners to arrive so they could be ready to shoot the bear if he fell to the ground alive and angry. The dogs are very expensive to replace. The bear was sixty feet up in the tree, standing on a branch and holding onto the trunk. Norman shot the bear directly in the eye. The bear fell off his feet and lay like a rag doll stuck on the branch, sixty feet up in the air. The bear started jerking as the blood ran from his body, which thankfully shook him off the branch, and he fell to the ground. The tree was at the top of a steep hill with a stronger than forty-five-degree rise most of the way. When the bear hit the ground, it immediately began tumbling down, down, down the steep hill and came to a stop at the feet of the two other hunters, who were ready and aimed for battle if necessary. Norman and the owner of the dogs slid down the hill like children on a slide to get there more quickly. They chopped down a small tree and hog-tied the bear to the trunk and the men carried him out the three miles, needing to change men every twenty minutes due to the weight. Nearly halfway out of the woods, they had to radio the other hunters to come assist, due to the bear's weight. It took twelve strong hunters in total to carry out the bear. This bear fat was well earned!