

# Infant Soy Formula – A Risky Public Experiment

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## STORY AT-A-GLANCE

- › Breast milk is an ideal food for infants. Ideally, breast-feed your child for at least six months or longer. If unable to breast-feed, making your own homemade formula is your healthiest option
- › Most commercial infant formulas are very high in processed sugar and other questionable ingredients. Soy formulas are among the most dangerous
- › Soy formula has been linked to a number of troubling side effects, including uterine fibroids, endometriosis, tumors, disrupted thyroid and reproductive function, inhibited testosterone in boys and autoimmune diseases

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The food you feed your baby during his or her first years has an enormous impact on their development and long-term health. I strongly encourage all mothers to do everything possible to exclusively breast-feed for least six months or longer for this reason, as breast-feeding has tremendous benefits for both mother and child.

It may even be a good idea to begin planning for successful breast-feeding before your baby is even born. If it turns out you can't breast-feed, then you can't, but it's good to have an optimal goal.

La Leche League<sup>1</sup> is a great resource whether you want to prepare beforehand or find you're having trouble breast-feeding once your baby is born. Also find out whether your hospital of choice offers breast-feeding classes and lactation consultants. If it doesn't,

you may want to select a hospital that offers greater support. If for whatever reason you're unable to breast-feed, or you have adopted your newborn, donated breast milk may be an option.

Like the Weston A. Price Foundation (WAPF), I do not recommend using human milk banks, though, as they require the milk to be pasteurized. An alternative may be to work with a physician or pediatrician who is willing to help you find a safe milk donor, and who will be involved in a screening process to ensure the milk is safe. If neither breast-feeding nor milk donation work out, your next best bet is to make your own infant formula.

## **The Strong Case Against Commercial Infant Formulas**

I recommend avoiding commercial infant formulas as much as possible, including organic brands. For starters, most are far too high in refined sugar for optimal health. Infant formula can contain as much sugar as a can of soda, and this processed fructose has none of the benefits of the natural sugars found in breast milk.

Instead, just like soda, it comes with a long list of adverse metabolic effects, raising your child's risk for obesity, diabetes<sup>2</sup> and related health problems, both in the short and long term.

Most formulas also contain a number of other questionable ingredients<sup>3</sup> — including **genetically modified organisms**<sup>4</sup> (GMOs), synthetic vitamins, inorganic minerals, excessive protein and harmful fats — while lacking vital immune-boosting nutrients found in breast milk.

As noted by WAPF,<sup>5</sup> since 1980, more than 20 infant formula recalls have been issued due to contamination with pathogens, heavy metals, arsenic,<sup>6</sup> perchlorate (an ingredient in rocket fuel), foreign substances such as glass or melamine, inadequate nutrition and more. Compared to breast-fed babies, studies have also shown that bottle-fed babies have:<sup>7</sup>

- A 14 times higher hospitalization rate

- Double the risk of infant death
- Fourfold higher risk of sudden infant death syndrome
- More frequent and more severe upper respiratory infections and gastrointestinal problems
- Higher rates of jaw misalignment and related problems, such as breathing problems, snoring, sleep apnea and speech impediments

## **Nursing Versus Bottle Feeding – Beyond Nutrition**

The video above shows the mechanics of breast-feeding using ultrasound. A vacuum is created when the middle of the baby's tongue comes down, which helps express milk from the breast. Next, the forward part of the baby's tongue pushes the mother's nipple inside, right behind the two front teeth.

This motion explains why ancestral feeding widens the jaw, and pushes both the upper and lower jaws forward. It also pushes the cheekbones in the mid-face forward. Add to that restricted frenula, and the tongue, lips and cheek do not usually allow the baby to breast-feed normally.

The sucking motion on the breast essentially acts like a piston that pushes the baby's mid-face outward. When a child is bottle fed, none of this happens, resulting in a narrow facial structure, poorly defined jaw and jaw misalignment. The anatomically incorrect palate and poorly aligned jaw bone also crowd teeth, resulting in crooked teeth.

## **Soy Formula – The Absolute Worst Formula**

Among your absolute worst, most dangerous breast milk substitutes are soy-based formulas. A study<sup>8</sup> published in Environmental Health Perspectives again raises questions about the safety of soy infant formula.

As noted by the authors, "Early-life exposure to estrogenic compounds affects the development of the reproductive system in rodent models and humans. Soy products,

which contain phytoestrogens such as genistein, are one source of exposure in infants fed soy formula, and they result in high serum concentrations."

The aim of this study was to determine whether girls' exposure to soy during infancy might affect DNA methylation in vaginal cells.

As it turns out, there were specific differences between the cell samples obtained from babies fed soy infant formula and those given cow's milk formula, prompting the researchers to conclude that "Girls fed soy formula have altered DNA methylation in vaginal cell DNA which may be associated with decreased expression of an estrogen-responsive gene."

Soy infant formula accounts for 12% of the U.S. formula market<sup>9</sup> – this despite lacking evidence to support the use of soy in infant feeding regimens. On the upside, that's less than half of what it was in 1998, when soy formula had captured 25% of the market.<sup>10</sup>

Part of the problem is that the burden to prove safety is left to manufacturers. The U.S. Food and Drug Administration does not actually approve infant formulas,<sup>11,12</sup> although commercial infant formula must meet certain nutritional requirements.<sup>13</sup> The agency didn't even publish a rule on manufacturing standards for infant formula until September 2014. As noted by WAPF,<sup>14</sup> "The 'scientific' formula label you see today is a result of years of guesswork."

Of particular concern is the estrogenic activity of soy. [Soy milk](#) and soy formula contain up to 4,500 times more plant estrogens than breast milk or cow's milk, and studies have shown serum estrogen levels are significantly higher in soy-fed babies. If you can't breast-feed for whatever reason, the last thing you ever want to feed your baby is soy formula. It's far better to use the homemade formula discussed below.

## **Soy Formula Linked to Troublesome Long-Term Effects**

As noted in the featured study, soy formula – which provides an estrogen amount equivalent to at least five birth control pills per day<sup>15</sup> – has been linked to a number of troubling side effects, including:

Altered age of menarche in girls

Uterine fibroids, endometriosis and tumors

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Disrupted thyroid function due to altered iodine uptake

Inhibited testosterone in infant boys, which may impede appropriate male development<sup>16</sup>

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Disrupted reproductive function

Autoimmune diseases

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In an article discussing this topic, Pulitzer Prize-winning journalist Deborah Blum writes:<sup>17</sup>

*"The idea that plant hormones – such as genistein, the primary phytoestrogen in soy – can interfere with mammalian development is not new. Biologists have been trying to sort out such effects for more than half a century; one of the first such studies followed the rather startling discovery that sheep grazing on fields dense with a hormone-rich clover could become temporarily sterile as a result of their diet.*

*Heather Patisaul, a biology professor at North Carolina State University who specializes in the study of endocrine disruptors, notes that similar effects can be seen in humans: Young women who consume a diet exceptionally high in soy also occasionally 'shut off their menstrual cycles' and become temporarily infertile.*

*'When we think about endocrine disruptors, we have to remember that they aren't all synthetic compounds ... Soy is both a natural food and a hormonally active one.'*

## **Breast Milk Is a Complete Food**

Breast milk from a healthy mother contains hundreds of substances, some of which cannot be reproduced or imitated, and over 100 different types of fats alone. A woman's

breast milk also alters over time, providing the child with highly personalized nutrition. Colostrum, which comes out after giving birth, is quickly and easily digestible, whereas more mature breast milk contains a long list of vitamins, minerals and higher amounts of fat.

Importantly, while breast milk contains sugars, they bear no resemblance to processed corn-based sugars whatsoever. For example, breast milk contains about 150 different oligosaccharides – complex chains of sugars that are completely unique to human milk. These sugars are indigestible. Their primary purpose is to nourish healthy gut microbes, thereby optimizing the child's gut health and strengthening the immune system.

Breast milk also contains nutrient growth factors<sup>18</sup> and antibodies (immune molecules) that provide the baby with natural immunity to illnesses the mother is immune to. This is why breast-fed babies tend to have far fewer colds than formula fed babies.

Moreover, when a newborn is exposed to a pathogen, he or she will transfer it back to the mother while nursing. The mother will then make antibodies to that particular germ and transfer them back to the baby at the next feeding, thereby speeding up the recovery process and promoting future immunity toward the organism, should it be encountered again.

## **Healthy Options for Mothers Who Cannot Breast-Feed**

If you cannot breast-feed, your best bet is to make your own homemade infant formula using [raw milk](#). In the video above, Sarah Pope discusses the differences between different kinds of milk, such as cow's milk and goat's milk, and why cow's milk is actually preferable. She then demonstrates how to make two different formulas, including a meat-based formula for infants with milk allergy.

Pope, who runs The Healthy Home Economist website, is a member of the WAPF board of directors. If you're unsure of where to obtain organic, raw grass fed milk, visit [RealMilk.com](#). Ideally, you'll want to make fresh formula every day. It can be safely frozen, though, so you could make a larger batch to last a few days.

# Milk-Based Formula Recipe and Instructions

The following raw cow's milk recipe will yield 36 ounces of formula. In her video,<sup>19</sup> Pope also makes a number of substitute suggestions for various circumstances such as allergy to certain ingredients, indigestion or constipation. In the event a baby does better on raw goat milk – a frequent occurrence as the protein is A2 casein – a modification of the ingredients<sup>20</sup> is necessary to adjust for the nutritional differences:

## Procedure

1. Warm 1 7/8 cups of filtered water (to get this amount, measure out 2 cups of water and remove 2 tablespoons) over medium heat
2. Add 2 teaspoons of grass fed beef gelatin and 4 tablespoons of lactose to the water; occasionally stir until dissolved
3. Place 2 cups of raw organic whole cow's milk into a clean glass blender. Add remainder of ingredients to the blender:
  - 1/4 cup of liquid homemade whey (for instructions, see Pope's video)
  - 2 to 3 tablespoons of raw cream
  - 1/4 teaspoon acerola powder
  - 1/4 teaspoon bifidobacterium infantis (a probiotic)
  - 2 teaspoons Frontier Brand nutritional yeast flakes
  - 1/2 teaspoon high-vitamin fermented cod liver oil (see important information about fermented cod liver oil below the meat-based formula recipe). You could substitute the cod liver oil with wild-caught Alaskan Salmon oil or krill oil
  - 1 teaspoon expeller-pressed sunflower oil

- 1 teaspoon extra-virgin olive oil
4. Remove the pot of water from the stove. Add 2 teaspoons of coconut oil and 1/4 teaspoon high-vitamin butter oil to the water to melt. Once melted, add the water mixture to the blender ingredients and blend for about three to five seconds
  5. Pour the blended ingredients into glass jars or glass baby bottles and refrigerate. Before feeding, warm the formula by placing the glass bottle in a pot of hot water. A baby bottle warmer can also be used. Never microwave infant formula, as this will destroy many valuable nutrients and enzymes and pose a burn risk

## A Note on Milk Proteins

The next recipe Pope demonstrates is for a meat-based formula using liver, suitable for babies who cannot tolerate milk. Keep in mind that many symptoms of milk intolerance are caused by A1 casein, a type of **lectin** associated with leaky gut and autoimmune disorders. Casein A2 is the normal protein in milk, present in sheep, goat, water buffalo and some Jersey cow milk. Unfortunately, most cows today are casein A1 producers.

The A1 protein is metabolized in your gut to make beta-casomorphin, which can attach to the beta cell of your pancreas and incite an autoimmune attack. Many who believe they're lactose intolerant are actually just responding to the casein A1 in the milk. So, before jumping to conclusions, you could try using raw milk obtained specifically from A2 producing Jersey cows to see if it makes a difference.

You'd have to talk to your farmer or raw milk provider to find out whether the cows are A1 or A2 producers. Holsteins are A1 producers and should be avoided. Using A2 milk would be a good idea even if your child does not show signs of milk intolerance, as the A1 casein can be a problematic lectin. It can, however, be more difficult to find. That said, if you have a choice, I would suggest opting for A2 raw milk. The other alternative is goat's milk that only has A2 casein.



# Hypoallergenic Meat-Based Formula

For a demonstration, see Pope's video above. Brand recommendations and other shopping tips can be found on WAPF's website, where these recipes are also listed. There you can also find other variations, including a formula using goat's milk, as well as instructions for making homemade whey.<sup>21</sup>

Pope also offers shopping recommendations on her website, noting Radiant Life Company sells many the ingredients necessary for milk-based formula.<sup>22</sup> The following recipe will yield 36 ounces of formula:

## Procedure

1. Chop 2 ounces of organic grass fed beef or chicken liver into small pieces
2. Gently simmer the liver pieces in 3 3/4 cups homemade chicken or beef broth, until thoroughly cooked
3. Pour the liver broth into a clean glass blender. Blend for several seconds to liquefy the liver, then let cool. Once the liver broth has cooled, add the remaining ingredients:
  - 5 tablespoons of lactose (if your child is allergic to lactose, substitute with glucose)
  - 1/4 cup organic homemade liquid whey (if your child has intolerance to whey, you may leave it out)
  - 1/4 teaspoon bifidobacterium infantis (a probiotic)
  - 1/4 teaspoon acerola powder
  - 1 tablespoon coconut oil
  - 2 teaspoons extra-virgin olive oil

- 1 teaspoon expeller-pressed sunflower oil
  - 1/2 teaspoon high-vitamin fermented cod liver oil and 1/4 teaspoon high-vitamin butter oil (please see caveats listed below). You could substitute the cod liver oil and butter oil with wild-caught Alaskan Salmon oil or krill oil instead
4. Blend for a few seconds on low speed, until well-mixed. Pour the blended ingredients into glass jars or glass baby bottles and refrigerate
  5. Before feeding, warm the formula by placing the glass bottle in a pot of hot water. A baby bottle warmer can also be used. Never microwave infant formula, as this will destroy many valuable nutrients and enzymes and pose a burn risk

However, a couple of caveats are in order:

1. Fermented cod liver oil is a recommended ingredient in Pope's recipes, which may be dangerous for babies. Laboratory testing has revealed the product tends to be prone to rancidity, may contain added vegetable oils, and lack vitamin K2 and CoQ10.

The concentration of vitamins A and D can also vary significantly from one batch to another, as cod liver oil is not regulated or standardized.<sup>23</sup> Unless you can verify the purity of the cod liver oil, I'd recommend using wild-caught Alaskan Salmon oil or krill oil instead.

2. The Weston A. Price Foundation's baby formula recipe suggests butter oil is optional, but Dr. Price himself recommended always pairing cod liver oil with butter oil, which contains vitamin K2 (MK-4). I recommend tweaking the recipe by making butter oil a requirement if you're using a certified pure fermented cod liver oil.

## **Nutrition Facts for Homemade Formula**

According to WAPF, their homemade formulas provide the following amounts of critical nutrients per ounce:

<b>Homemade Formulas</b>	<b>Chloride</b>	<b>Choline</b>	<b>Inositol</b>	<b>Iodine</b>	<b>Vitamin K1</b>	<b>Vitamin B5</b>
<b>Raw Cow Milk</b>	12.02mg	4.50mg	1.31mg	3.47mcg	0.23mcg	76.64mcg
<b>Raw Goat Milk</b>	20.00mg	7.17mg	1.31mg	2.66mcg	0.183mcg	222.61mcg
<b>Meat-Based</b>	3.81mg	6.67mg	1.75mg	1.05mcg	0.32mcg	51.11mcg

The following chart shows how the three homemade formulas compare in terms of other nutrients, and how they stack up against breast milk:

	<b>Breast Milk</b>	<b>Cow's Milk Formula</b>	<b>Goat Milk Formula</b>	<b>Liver-Based Formula</b>
<b>Calories</b>	766	856	890	682
<b>Protein</b>	11.3g	18g	18g	15g
<b>Carbohydrates</b>	76g	79g	77g	69g
<b>Total Fat</b>	48g	52g	54g	36g
<b>Saturated Fat</b>	22g	28g	30g	16g
<b>Mono Fat</b>	18g	16g	16g	12g
<b>Poly Fat</b>	5.5g	5.6g	5.7g	5.6g

	Breast Milk	Cow's Milk Formula	Goat Milk Formula	Liver-Based Formula
<b>Omega-3 FA</b>	.58g	1.3g	1.2g	1.0g
<b>Omega-6 FA</b>	4.4g	4.2g	4.4g	4.5g
<b>Cholesterol</b>	153mg	137mg	166mg	227mg
<b>Vitamin A*</b>	946IU	5000IU	5000IU	20,000IU
<b>Thiamin-B1</b>	.15mg	1.05mg	1.1mg	.19mg
<b>Riboflavin-B2</b>	.4mg	1.2mg	1.2mg	1.9mg
<b>Niacin-B3</b>	1.9mg	2.5mg	4.4mg	14.2mg
<b>Vitamin B6</b>	.12mg	.51mg	.60mg	.65mg
<b>Vitamin B12</b>	.5mcg	1.9mcg	2.8mcg	39mcg
<b>Folate</b>	57mcg	236mcg	284mcg	159mcg
<b>Vitamin C</b>	55mg	57mg	59mg	62mg
<b>Vitamin D</b>	480IU	450IU	525IU	460IU
<b>Vitamin E***</b>	9.9mg	6.2mg	4.7mg	4.9mg
<b>Calcium</b>	355mg	532mg	548mg	NA**
<b>Copper</b>	.57mg	.38mg	.58mg	1.9mg
<b>Iron</b>	.33mg	1.4mg	2.2mg	5.4mg
<b>Magnesium</b>	37.4mg	91.3mg	96.1mg	34.5mg

	Breast Milk	Cow's Milk Formula	Goat Milk Formula	Liver-Based Formula
<b>Manganese</b>	.29mg	.034mg	.12mg	.24mg
<b>Phosphorus</b>	151mg	616mg	729mg	344mg
<b>Potassium</b>	560mg	949mg	1228mg	750mg
<b>Selenium</b>	18.8mcg	15.4mcg	18.7mcg	31.1mcg
<b>Sodium</b>	186mg	308mg	320mg	NA**
<b>Zinc</b>	1.9mg	2.8mg	2.7mg	2.5mg

## Never Give Your Baby Soy Formula

There are few instances where I make absolute recommendations, seeing how there are usually exceptions to every rule. But when it comes to soy formula, I believe it's unsuitable for all children. Soy simply has too many negative health effects, both for girls and boys.

Considering we now know endocrine disrupting chemicals found in plastics and any number of household products can wreak havoc on human health, it makes no sense to even consider using soy formula, which contains far higher amounts of estrogenic compounds than plastic containers.

So please, do your best to breast-feed, and if you have to use formula, make your own. While soy formula is one of the worst of the bunch, very few commercial formulas, even organic ones, can compare to breast milk or homemade formula.

Granted, you need to make sure you're getting high-quality ingredients and following an expert recipe. In my view, WAPF has the nutritional qualifications to craft a well-designed recipe. For further guidance, I recommend joining a local WAPF chapter.<sup>24</sup>

## Sources and References

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- <sup>2</sup> [Diabetes Care March 2008; 31\(3\); 470-475](#)
- <sup>3</sup> [Weston A. Price Foundation December 9, 2015](#)
- <sup>4</sup> [Gmoinside.org May 1, 2013 \(Archived\)](#)
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- <sup>6</sup> [Bloomberg February 16, 2012](#)
- <sup>8</sup> [Environmental Health Perspectives March 2017; 125\(3\) \(Archived\)](#)
- <sup>9</sup> [Clinical Pediatrics 2016 Mar;55\(3\):278-85](#)
- <sup>10</sup> [Pediatrics January 1998; 101\(1\)](#)
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- <sup>13</sup> [FDA.gov, CFR - Code of Federal Regulations Title 21](#)
- <sup>15</sup> [The Healthy Home Economist, Why Soy Formula \(Even Organic\) Is so Dangerous for Babies](#)
- <sup>16</sup> [Deep Roots at Home February 15, 2016](#)
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