



FOOD RESEARCH

ADENINE, SOMETIMES CALLED VITAMIN B-4

Adenine is considered by some health care professionals to be essential for heart health. Published scientific evidence looks to support this [e.g. Yu F, et al. Nicotinamide Adenine Dinucleotide Supplementation to Alleviate Heart Failure: A Mitochondrial Dysfunction Perspective. *Nutrients*. 2025 May 29;17(11):1855; Tannus C, et al. Nicotinamide Riboside Supplementation Restores Myocardial Nicotinamide Adenine Dinucleotide Levels, Improves Survival, and Promotes Protective Environment Post Myocardial Infarction. *Cardiovasc Drugs Ther*. 2024 Dec;38(6):1385-1396; Leu JG, et al. The Cell Protective Effect of Adenine on Hypoxia-Reoxygenation Injury through PPAR Delta Activation. *Life* 2021, 11(12), 1408].

Over the years, adenine has been referred to as vitamin B-4, though it is not officially considered to be an “essential” nutrient.

Additionally, it is known that adenine has a central role in cellular respiration. It is part of adenosine triphosphate which provides the energy that drives and supports most activities in living cells, such as protein synthesis, chemical synthesis, muscle contraction, and nerve impulse propagation. In respiration it also participates as part of the cofactors nicotinamide adenine dinucleotide, flavin adenine dinucleotide, and Coenzyme A (Amjad J, et al. Role of NAD⁺ in regulating cellular and metabolic signaling pathways. *Mol Metab*. 2021 Feb 17;49: 101195).

Do Food Research Supplements Contain Adenine?

Some have wondered if Food Research supplements contain adenine. The fact is that pretty much all of them do!

Two ingredients that are in many Food Research supplements are *Saccharomyces cerevisiae* and organic brown rice, both of which contain adenine.

Published research clearly supports this view. Let's look at *Saccharomyces Cerevisiae*:

Saccharomyces cerevisiae. The adenine content of individual yeast extract powders was examined in relation to the cell mass (dry cell weight, DCW) achieved in culture media formulated with these powders. A general increase in DCW was observed with increasing adenine concentration in the yeast extract. ... A minimum requirement for cell growth is at least as low as 12.5 mg of adenine/g of cells. (VanDousin W, et al. Adenine quantitation in yeast extracts and fermentation media and its relationship to protein expression and cell growth in adenine auxotrophs of *Saccharomyces cerevisiae*. *Biotechnol Prog*. 1997 Jan-Feb;13(1):1-7)

Here is some of why *Saccharomyces Cerevisiae* contains adenine:

Saccharomyces Cerevisiae (baker's or brewer's yeast) contains **adenine** for the same fundamental reason every living cell does: adenine is a core building block of many essential molecules. Here's how it functions in yeast:

1. Nucleic acid synthesis

- Adenine is one of the four nucleotide bases in **DNA (A-T pairing)** and **RNA (A-U pairing)**.
- Without adenine, the yeast could not replicate its genome or transcribe genes.

2. Energy and metabolism

- Adenine is part of **adenosine triphosphate (ATP)**, the cell's main energy currency.
- It is also found in ADP, AMP, and in cofactors like **NAD⁺/NADH** and **FAD** (via adenine-containing adenosine moieties).

3. Signaling and regulation

- Cyclic AMP (cAMP), a derivative of adenine, is a key second messenger in yeast nutrient sensing and stress responses.

4. Biosynthetic context

- Yeast cells synthesize adenine *de novo* through the purine biosynthetic pathway, starting from simple precursors (like amino acids and ribose-5-phosphate).
- Many lab strains have mutations in this pathway (e.g., **ADE2**, **ADE8**), which is why researchers often supplement growth media with adenine to prevent red pigment accumulation or growth defects.

So *Saccharomyces Cerevisiae* doesn't contain adenine for any special “yeast-only” reason—it's a universal requirement of cellular life, critical for genetic information, energy transfer, and metabolic regulation.

It should be added that *Saccharomyces Cerevisiae* has a higher concentration of adenine than wheat germ or organic brown rice.

At Doctors' Research we wondered how much adenine would be in 521 mg of *Saccharomyces Cerevisiae*, which is the minimum amount contained in Food Research's *B Stress Complex*.

There isn't a single fixed number, because the **adenine content varies**. But we can make a **reasonable ball-park estimate** from typical yeast composition.

1. Find nucleic-acid content

Published analyses of dried baker's yeast report roughly:

- **RNA:** 5–10 % of dry weight (yeast is RNA-rich).
- **DNA:** ~0.5 % of dry weight.

Let's take a midrange **total nucleic acid content** $\approx 7\%$ of dry mass.

For 521 mg dry weight:

- Total nucleic acids $\approx 0.07 \times 521 \text{ mg} \approx 36 \text{ mg}$.

2. Fraction of adenine bases

In RNA (adenine, cytosine, guanine, uracil) $\rightarrow \sim 25\%$ adenine by base count.

In DNA (adenine, thymine, cytosine, guanine) $\rightarrow \sim 25\%$ adenine.

So adenine bases $\approx 0.25 \times 36 \text{ mg} \approx \mathbf{9 \text{ mg}}$ (as the free base equivalent).

3. Add other adenine-containing molecules

Yeast also contains ATP, NAD⁺, FAD, etc., but those pools are small compared with the bulk RNA. That might add perhaps another milligram or two of adenine equivalents.

Estimated range

$\approx 8\text{--}12 \text{ mg}$ of adenine (as free base) in 521 mg dried yeast
—roughly $1.5\text{--}2\%$ of the dry weight.

This is only a biochemical back-of-the-envelope figure.

Different growth phases, extraction methods, or definitions (free vs. bound adenine) can shift the result, but it gives you the right order of magnitude.

So, that is what we came up with independently.

Since the *Saccharomyces Cerevisiae* in *B Stress Complex* comes from the Grow Company, we asked it for an ingredient by ingredient analysis. For all of the amounts claimed on the label, Grow estimated that there would be between 4.6 to 15.4 mg of adenine per capsule in *B Stress Complex* (Tical A. Adenine. Calculation Report, September 25, 2025).

However, since Food Research actually puts 10% more Grow nutrients than the *B Stress Complex* label states (for purposes of supporting the "Best Buy" date), then the range actually would appear to be 5.1 to 16.9 mg per capsule.

So, yes, the fact is that *B Stress Complex*, as well as many other Food Research supplements, contain a substantial amount of adenine, also sometimes called vitamin B-4.

Do not let anyone try to convince you otherwise.



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