

## AlgaLab® Natural SPMs + EPA with Polar Lipids

v2.2 January 7, 2025

Specialized Pro-Resolving Mediators (SPMs) are key regulators in inflammation attenuation and resolution. SPMs are a unique class of bioactive lipid compounds derived primarily from omega-3 fatty acids, including eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), and docosapentaenoic acid (DPA). Unlike traditional anti-inflammatory agents that merely suppress inflammation, SPMs actively orchestrate the resolution phase of inflammation, promoting tissue repair and restoring homeostasis. These molecules—including resolvins, protectins, maresins, and lipoxins—play a critical role in attenuating excessive inflammatory responses while preventing chronic inflammation, which is often implicated in various diseases such as cardiovascular disorders, neurodegenerative conditions, and autoimmune diseases. By enhancing the body's natural ability to resolve inflammation without compromising immune function, SPMs offer promising therapeutic potential in the management of inflammatory diseases and the promotion of long-term health.

### SPMs Included in AlgaLab Natural SPMs Extract

We farm our own *Nannochloropsis sp.* microalgae, and upon harvest we wash and dry to a stable forest green biomass powder. Next, we perform a *simple botanical extraction process* using food grade ethanol to extract the lipid content. This algal extract is naturally rich in SPMs, the Omega-3 eicosapentaenoic acid (EPA) and polar lipids. In fact, 70% polar lipids to include phospholipids and glycolipids clinically demonstrated to dramatically enhance absorption and bioavailability. Imagine that - plant-based, minimally processed, rich in SPMs, plus EPA, plus polar lipids!

AlgaLab Natural SPMs from <i>Nannochloropsis sp.</i>				
	Parent Omega-3	SPM	Units	Average*
1	EPA	12-HEPE	µg/g	136
2	EPA	12-HpEPE	µg/g	10
3	EPA	15-HEPE	µg/g	100
4	EPA	15-HpEPE	µg/g	44
5	EPA	18-HEPE	µg/g	195
6	EPA	5-HEPE	µg/g	112
7	EPA	5-HpEPE	µg/g	26
8	EPA	8-HEPE	µg/g	63
				<b>686 µg/g</b>

\* Average SPM levels of 6 batches of AlgaLab Natural SPM extracts. Analyses by LIPIDOMIX GmbH, Robert-Roessle-Strasse 10, B55 Berlin, 13125. Production Date: 2024

### Eicosapentaenoic Acid (EPA)-Derived Metabolites (HEPE & HpEPE):

- 12-HEPE (12-Hydroxy-Eicosapentaenoic Acid):**
  - Anti-inflammatory lipid mediator derived from EPA, involved in modulating immune responses.
- 12-HpEPE (12-Hydroperoxy-Eicosapentaenoic Acid):**
  - A hydroperoxy intermediate in the biosynthesis of HEPEs, with potential pro-resolving properties.
- 15-HEPE (15-Hydroxy-Eicosapentaenoic Acid):**
  - Anti-inflammatory metabolite that can influence macrophage polarization and immune regulation.
- 15-HpEPE (15-Hydroperoxy-Eicosapentaenoic Acid):**
  - A hydroperoxy precursor to 15-HEPE, involved in inflammation resolution pathways.
- 18-HEPE (18-Hydroxy-Eicosapentaenoic Acid):**
  - A key precursor to Resolvin E-series (e.g., RvE1) with strong anti-inflammatory properties.
- 5-HEPE (5-Hydroxy-Eicosapentaenoic Acid):**
  - Participates in the resolution of inflammation and plays a role in immune cell signaling.
- 5-HpEPE (5-Hydroperoxy-Eicosapentaenoic Acid):**
  - An intermediate in HEPE biosynthesis, leading to various pro-resolving lipid mediators.
- 8-HEPE (8-Hydroxy-Eicosapentaenoic Acid):**
  - Less common EPA-derived metabolite with potential anti-inflammatory effects.



## Most Prominent SPMs

### 18-HEPE (EPA-Derived Precursor):

- **Parent Omega-3:** Eicosapentaenoic Acid (EPA)
- **SPM Pathway:** Precursor for the **Resolvin E-series** (e.g., RvE1, RvE2)
- **Primary Functions:**
  - Reduces **vascular inflammation** and modulates immune responses.
  - Inhibits **neutrophil infiltration** and decreases pro-inflammatory cytokines.
  - Has shown **cardiovascular protective effects**, making it beneficial in heart health and atherosclerosis prevention.
- **Best For:**
  - Cardiovascular inflammation
  - Immune regulation
  - Acute inflammation control

### 15-HEPE (EPA-Derived Precursor):

- **Parent Omega-3:** Eicosapentaenoic Acid (EPA)
- **SPM Pathway:** Precursor for the Resolvin E-series (e.g., RvE1, RvE2) and other bioactive lipid mediators.
- **Primary Functions:**
  - Serves as a direct precursor to SPMs involved in **inflammation resolution**.
  - Help regulate **immune responses** by promoting anti-inflammatory pathways.
  - Reduces **neutrophil recruitment** and limits excessive inflammation.
  - Contributes to **vascular protection** and may have potential benefits for cardiovascular health.
- **Best For:**
  - Inflammation resolution
  - Immune system modulation
  - Cardiovascular health and vascular protection
  - Supporting recovery from acute inflammation

### 12-HEPE (EPA-Derived Precursor):

- **Parent Omega-3:** Eicosapentaenoic Acid (EPA)
- **SPM Pathway:** Potential precursor for anti-inflammatory lipid mediators, though its exact role in SPM biosynthesis is less well defined compared to 18-HEPE or 15-HEPE.
- **Primary Functions:**
  - Modulates **immune cell signaling** and may contribute to inflammation resolution.
  - Potential role in **reducing oxidative stress** and inflammation.
  - May help regulate **vascular function** and **platelet activity**.
  - Less studied than 18-HEPE, but still part of the broader EPA-derived lipid mediator network.
- **Best For:**
  - General immune support
  - Potential inflammation resolution
  - Vascular function modulation
  - Antioxidant and protective effects in tissues

## Closing Summary

Specialized Pro-Resolving Mediators (SPMs) and their precursors play a crucial role in modulating inflammation and maintaining immune balance. Among them, **18-HEPE, 15-HEPE, and 12-HEPE** are **EPA-derived metabolites** that serve as key precursors for the **Resolvin E-series**, contributing to the resolution of inflammation, immune regulation, and cardiovascular protection. **18-HEPE** is particularly important for its role in the biosynthesis of **RvE1 and RvE2**, which help reduce vascular inflammation and immune overactivation. **15-HEPE** also contributes to inflammation resolution and immune homeostasis, while **12-HEPE** is less studied but may play a role in immune signaling and antioxidant defense. Together, these lipid mediators illustrate the intricate balance between **inflammation initiation, regulation, and resolution**, highlighting their potential therapeutic importance in managing inflammatory diseases and promoting overall health.

**Sustainable Nutrition. Superior Performance.**