



# ResistAid®

## Proprietary Ingredient From Larch Tree



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Only for Professionals. Not to be distributed as such to Consumers.



## What Is ResistAid®?

ResistAid® is a proprietary natural immune support ingredient manufactured by Lonza. It is produced via a patented water-based extraction process (US 5756098, EP 866808 and other patents) from larch trees that grow in abundance in the United States. ResistAid® ingredient consists of the soluble fiber arabinogalactan and bioactive polyphenolic flavonoids, and thus has antioxidant capacity.



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« ResistAid® brand is a trademark of Lonza. »»

### About Lonza

- Swiss life-science company founded in 1897
- One of the world's leading and most-trusted suppliers to the pharmaceutical, biotech and specialty ingredients markets
- The global leader in the production and support of active pharmaceutical ingredients (API's) based on both chemical as well as biotechnological platforms
- One of the world's leading suppliers of L-Carnitine (Carnipure®) and Vitamin B3 (Niacin and Niacinamide)

## ResistAid® Quality and Safety

### ResistAid® Quality at a Glance

- Water-based extraction process
- Manufactured according to HACCP principles
- GMP audited by American Institute of Baking
- Kosher certified by United Mehadrin
- GMO free
- Monograph in Food Chemicals Codex (FCC)

### ResistAid® Safety at a Glance

- US FDA notified GRAS Status (generally recognized as safe)
- Approved by the US FDA as a direct food additive
- Allergen free<sup>22</sup>
- No reported side effects, no adaptation period required<sup>1,2,3</sup>

## ResistAid® Production Process

ResistAid® ingredient is produced by steam heating larch chips to extract the phenolic and arabinogalactan compounds and evaporating the resulting extract. This water-based extraction method is patented (US 5756098, EP 866808 and other patents) and is unique as it does not require any harsh chemicals to release the compounds from the plant matrix. Therefore, the product remains pure and structurally unaltered after extraction.

Larch arabinogalactan (LAG) consists of galactose and arabinose in a 6:1 ratio. It is a long, densely-branched, non-starch polysaccharide consisting of a galactan backbone and galactose and arabinose side-chains.<sup>2,4</sup>



## ResistAid® Health Benefits

The immune system is a highly complex and interrelated system that has two pathways to address foreign substances. The innate arm of the immune system is non-specific and targets anything that is viewed as foreign to the body whereas the adaptive system targets specific foreign substances. Both immune arms work together to help protect the body against foreign substances.

Clinical study results indicate that larch arabinogalactan has the ability to modulate and support the two arms of the immune system in a positive manner through direct and indirect pathways within the gastrointestinal tract, so that the components of the different arms are optimized and appropriately respond when challenged by a foreign substance. The mechanisms of this effect have been investigated and seem to include not only the indirect effects of lactic acid-producing bacteria and bacterial constituents on immune cells, the production of short chain fatty acids (SCFAs) and binding to SCFA receptors on leucocytes, but also direct effects on components of the immune system.<sup>5,6</sup>

Specifically, the activity of natural killer cells,<sup>7,8,9</sup> cytokines<sup>4,8,9</sup> and macrophages<sup>10,11</sup> may be supported by larch arabinogalactan supplementation.<sup>12</sup> In addition, ResistAid® has antioxidant capacity which can be related to its content of polyphenolic compounds.<sup>13</sup> The polyphenolic flavonoids present in ResistAid® include taxifolin and quercetin, which have been shown to display a wide range of biochemical properties, including antioxidant and chemoprotective effects.<sup>14,15</sup>

Interestingly, several immune “enhancer” herbs contain arabinogalactan, such as *Echinacea purpurea*, *Baptisia tinctoria* or *Thuja occidentalis* and researchers speculate that this is one of the main immune-activating principles in these herbs.<sup>11,16,17</sup>

### Natural Immune Function Support

ResistAid® supports natural immune function by increasing beneficial immune cell populations and/or increasing antibody production based on the immune stressor. ResistAid® has the ability to support and strengthen the appropriate immune response based on the immune stressor.

« ResistAid® ingredient is formulated to deliver triple action immune support year round. »

## ResistAid® Ingredient Found to Reduce the Incidence of Upper Respiratory Infections

In a multi-center, placebo-controlled, double-blind, randomized clinical trial, researchers measured the effect of supplementation with ResistAid® ingredient on naturally acquired common cold episodes and its effect on cold symptoms was compared to placebo. In the study, 199 healthy adults aged 18-70 with a self-reported rate of cold incidences of at least three in the prior six months were divided into two groups, taking either a daily larch arabinogalactan supplement of 4.5 grams or a placebo for 12 weeks. The participants documented each common cold episode in a diary and rated 10 predefined infection symptoms on a four-point rating scale during the infection period, resulting in an infection score. In addition to three prescheduled study visits, each common cold episode was confirmed by medical doctors.

ResistAid® supplementation was associated with a statistically significant reduction [-23%] of the number of cold episodes in comparison with placebo (Figure 1). In addition, the percentage of study days that participants did not suffer from any cold symptoms was significantly higher in the group taking larch arabinogalactan (91.2%) compared to the placebo group (88.5%).<sup>18</sup>

As noted in the study, the susceptibility for common colds is often related to a weak immune status or a lack of strong immune defense. Thus, the common cold was used as a model system to determine the effect of larch arabinogalactan on the human system against invading pathogens.

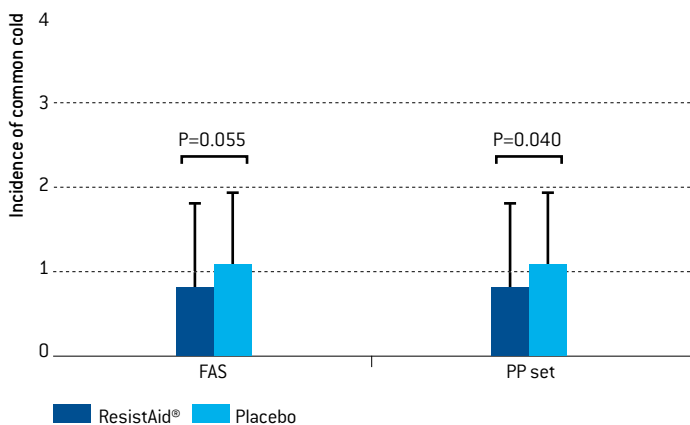


Fig. 1

Incidence of common cold infections following 12 week ResistAid® or placebo supplementation according to the Full Analysis Set (FAS) or the Per Protocol (PP) population. Values are mean ± SD.

## ResistAid® Ingredient Found to Support Adaptive Immune Responses

Research shows that the immune benefits of ResistAid® additionally include the adaptive immune response, a response to specific antigens.<sup>19, 20</sup> The studies were designed to test the hypothesis that ingestion of ResistAid® would selectively enhance the antibody response to a vaccine in healthy adults. Vaccination studies of this type serve as a model to study the effect of dietary supplements on the overall immune function.

In the first vaccination study, 45 healthy adult volunteers were randomized to receive either 4.5 grams of the ResistAid® ingredient or placebo for 72 days.<sup>19</sup> After 30 days of supplementation, all volunteers received the 23-valent pneumococcal vaccine. Immune responses were checked 21 days after the vaccine was given, and then again at the end of the study. The group that received ResistAid® supplements demonstrated a higher IgG antibody response than the placebo group both at 21 days after the vaccine and at the end of the study. The study showed that ResistAid® supplementation may have an immunomodulatory effect, meaning it supports the appropriate response to an antigen without indiscriminately enhancing other arms of the immune system that would not be expected to respond.

A second vaccination study was carried out with the tetanus vaccine.<sup>20</sup> In this study, 75 healthy adult volunteers were randomized to receive either 1.5 or 4.5 grams of the ResistAid® ingredient or placebo for 60 days. After the first 30 days of supplementation, the Tetanus vaccine was administered. Participants were then monitored until the end of the supplementation period. At day 45, or 15 days after the vaccine was given, Tetanus IgG levels in both ResistAid® dosage levels rose significantly. This finding was also true at the end of the study. Results of this study further validated the capability of ResistAid® supplementation to influence a beneficial response from the immune system at a dose of 1.5 grams/day.



## Additionally, as a ResistAid® Customer You Can Expect...

### Regulatory Support

Our regulatory experts collaborate with authorities and organizations globally to work towards a regulatory situation that is in favor of ResistAid® products. We have years of experience with regulatory dossiers and a track record of successful regulatory initiatives.

### Scientific Support

Lonza works in collaboration with universities and research centers around the world to strengthen the scientific backing of the ResistAid® brand. We maintain a database of published literature which is used by our technical experts to provide tailor-made, well-researched answers on technical questions.

### Formulation Support

ResistAid® has a number of technical properties which make it easy to incorporate into dietary supplements in stand-alone form or combined with other ingredients to increase functionality.

#### High Solubility in Water

As ResistAid® has a highly branched structure it is freely soluble, dissolving completely in hot or cold water.

#### Stable to Temperature and Low pH Value

The ResistAid® ingredient is stable at a wide range of temperatures and pH values. In solution it keeps its functionality and neither degrades nor hydrolyzes.

« ResistAid® ingredient  
can be easily used in  
dietary supplements. »

Ask us how ResistAid® can be incorporated into your application.



## ResistAid® Ingredient Offers

- Proprietary, natural immune support from larch trees
- Year round, triple action immune support (direct, indirect and antioxidant capacity)
- Ability to modulate and support appropriate immune response
- Soluble dietary fiber



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## ResistAid® Brochure

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