

# BIO-SAPONINS™

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THE NATURAL SURFACE ACTIVE AGENT

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## Bio-Saponins™

INCI Name: Saponins  
CAS No: 11006-75-0, 8047-15-2  
EINECS No: 232-462-6

### I. Saponins: An Overview

Saponins are naturally-occurring, high molecular-weight glycosides, consisting of a sugar moiety linked to a triterpene or steroid aglycone. They are used extensively in the food industry for both humans and animals. They have also been used as pesticides or to stun fish for easy catching and as ammonia absorbing urease inhibitors to reduce ammonia formation in the poultry business. Many have hemolytic properties.

Older definitions are based on surface activity since many saponins have foaming properties when mixed with water. The name saponin is derived from the Latin word *sapo*, which means soap.

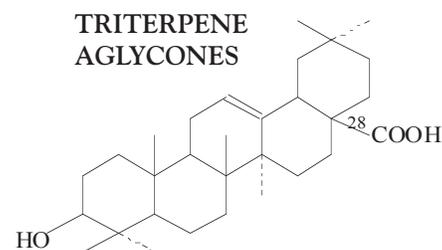
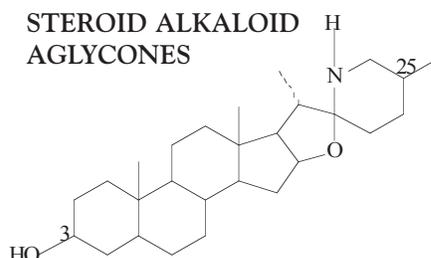
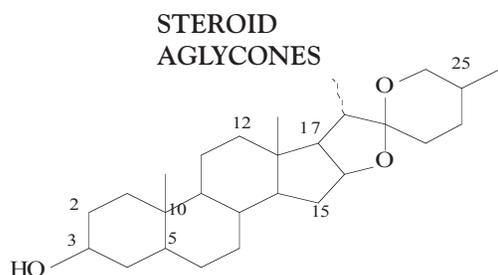
Saponins are widely distributed in the plant kingdom. Many saponin-producing plants have soap as a part of their name:

SOAP <sub>wort</sub>	<i>Saponaria officinalis</i>
SOAP <sub>root</sub>	<i>Chloragalum pomeridianum</i>
SOAP <sub>bark</sub>	<i>Saponaria officinalis</i>
SOAP <sub>nut</sub>	<i>Sapindus mukerossi</i>

The non-saccharide portion (Aglycone) of the saponin molecule is called the **GENIN** or **SAPOGENIN**. Saponins are divided into three main classes depending on the type of Sapogenin present:

**TRITERPENE GLYCOSIDES**  
**STEROID GLYCOSIDES**  
**STEROID ALKALOID GLYCOSIDES**

There are over 360 Sapogenins and 750 Triterpene Glycosides in the Triterpene Glycoside class alone!



Aglycones are normally hydroxylated at the C-3 ring position, the position necessary for the Saponin to attach to one or more sugar chains. When the Aglycone is “hitched” to one, it becomes **MONODESMOSIDIC**. If attached to two, it is **BIDESMOSIDIC**. Bidesmosidic are usually attached through an ether linkage at C-3 and an ester linkage at C-28. If more than two, it is **POLYDESMOSIDIC**.

The most common Monosaccharide linkages are D-Glucose, D-Galactose, D-Glucuronic Acid, D-Galacturonic Acid, L-Rhamnose, L-Arabinose, D-Xylose and D-Fructose.

Some of the better-known Botanicals containing Saponins are:

<i>Panax ginseng</i>	2-3 %
<i>Hedera helix</i>	5 %
<i>Aesculus hippocastanum</i>	3 %
<i>Glycyrrhiza glabra</i>	8-12 %
<i>Primula spp.</i>	5-10 %
<i>Saponaria officinalis</i>	2-5 %
<i>Saponaria alba</i>	20 %
<i>Smilax officinalis</i>	1.8-2.4 %
<i>Polygala spp</i>	8-10 %

## Applications

Saponins are high-foaming agents and are therefore excellent to use whenever natural surface-active compounds are required, including soaps, shampoos, creams, lotions and shaving products. They are also ideal for natural toothpastes.

## II. Bio-Saponins™: The Next Generation

Bio-Saponins™, exclusively developed by Bio-Botanica®, is a concentrated proprietary blend of saponins prepared from various plants known to contain saponins.

### Testing

#### Het-Cam Evaluation

Bio-Saponins™ blend was evaluated for Ocular Irritancy Potential with the Hen's Egg Test, utilizing the ChorioAllantoic Membrane (**HET-CAM**). Under the conditions of the test, the results indicated that the product at 10% showed practically no ocular irritation potential. (A copy of the test results are available upon written request.)

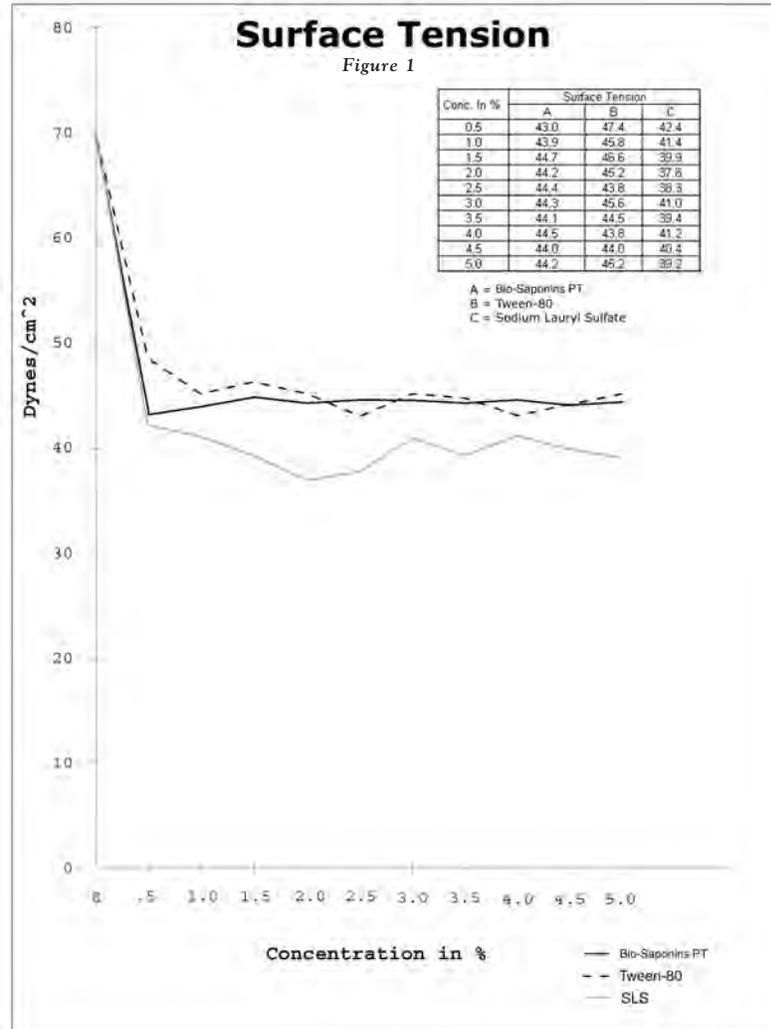


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## Physical Parameters

### Surface Tension

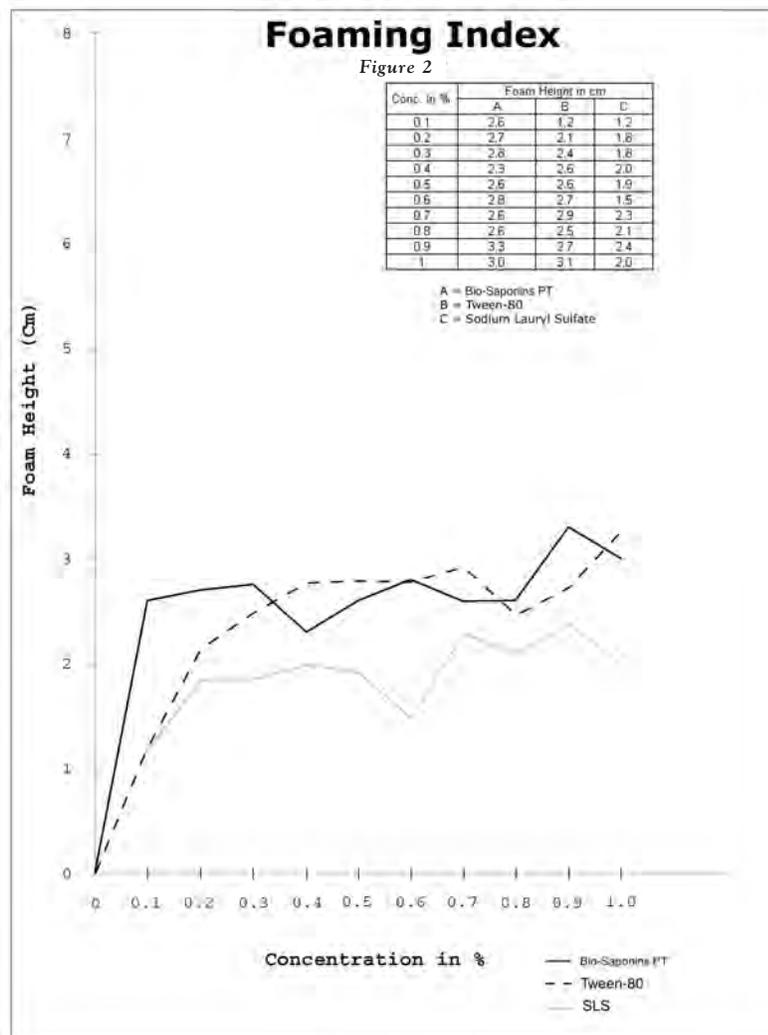
Bio-Saponins™ blend was compared to Tween-80 and Sodium-Lauryl-Sulfate (SLS) on an equivalent dry weight basis. The Surface Tension was measured using a Laboratory Surface Tensiometer. The results follow (See Figure 1). The Surface Tension Reduction Capability of Bio-Saponins™ was similar to Tween-80 and only slightly less than SLS.



## Foaming Index

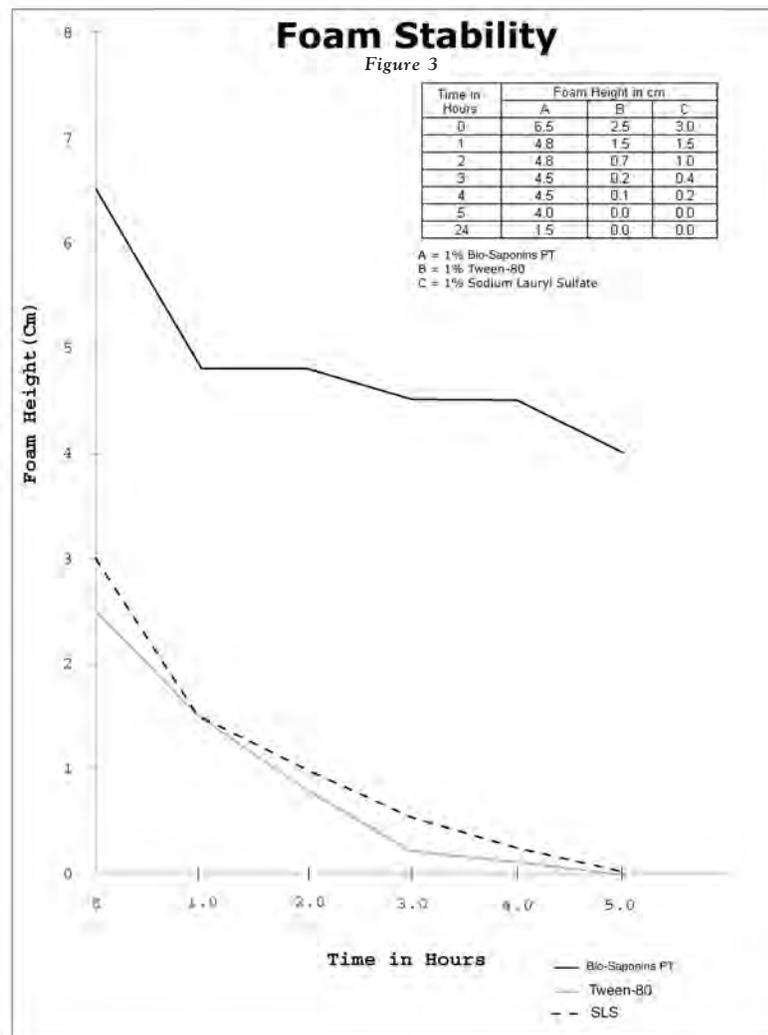
The Foaming Index is the highest degree of dilution of an aqueous decoction of a material, which produces persistent foam under the conditions specified.

The Foaming Index was determined from an aqueous solution of Bio-Saponins™, Tween-80 and SLS. The solutions were prepared on an equivalent solids basis. The results are shown in Figure 2. Bio-Saponins™ blend was better than the other two at low concentrations (0.1%).



## Foam Stability

Foam Stability was determined on 1% solutions of the three test materials. The solutions were vigorously shaken to establish "good foam"; then the foam height was determined as a function of time. The results are shown in Figure 3. Bio-Saponins™ blend had better foam stability than Tween-80 or SLS.



## Natural Foaming Toothpaste

<u>INCI NAME (SUPPLIER)</u>	<u>%LEVEL</u>
1. Deionized Water	37.43
2. Sodium Monoflurora-Phosphate (Ozark)	0.76
3. Glycerin (Bruchem)	12.50
4. CMC 824 HZR (Calgum)	0.20
5. Viscarin GP209 (FMC Corp.)	2.00
6. Calcium Carbonate Heavy (Whittaker, Clark & Daniels)	40.00
7. Calcium Carbonate Light (Whittaker, Clark & Daniels)	3.00
8. <b>Bio-Saponins™ (Bio-Botanica®, Inc.)</b>	<b>2.00</b>
9. Sodium Bicarbonate (Universal Preserv-A-Chem)	0.01
10. Sodium Saccharin (Universal Preserv-A-Chem)	0.26
11. Peppermint Flavor (Virginia Dare)	1.73
12. Spearmint Flavor (Virginia Dare)	0.01
13. Illicium Verum (Anise) Oil (Virginia Dare)	0.07
14. Menthol (Universal Preserv-A-Chem)	0.03

### PROCEDURE

- A. Dissolve item 2 in item 1.
- B. Combine items 4 & 5 then “wet” with item 3.
- C. Combine step A and step B with mixing.
- D. Heat batch to 75°C.
- E. Add items 6-8 with mixing.
- F. Remove heat and let batch cool with mixing @50°C. Add items 9 & 10.
- G. Premix items 11-14, and then add to batch, mixing well.

### SPECIFICATIONS

<b>APPEARANCE:</b>	Non-flowing uniform toothpaste
<b>COLOR:</b>	Light tan to tan
<b>pH:</b>	5.00-6.00
<b>SPECIFIC GRAVITY:</b>	0.9000-1.2000

NOTE: The suggested uses of botanicals are presented here solely for their educational value. We cannot anticipate all conditions under which this information and our products, or the product of other manufacturers in combination with our products, may be used. We accept no responsibility for results obtained by the application of this information or the safety and suitability of our products, either alone or in combination with other products. Users are advised to make their own tests to determine safety and suitability of each such product or product combinations for their own purposes. Unless otherwise agreed in writing, we sell the products without warranty, and buyers and users assume all responsibility and liability for loss or damage arising from the handling and use of our products, whether used alone or in combination with other products.



BIO-BOTANICA, INC.

**For further information, samples and price quotes please  
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