ACB Tomato Bioferment PF

BACKGROUND & SCIENCE

Shampoo removes build up, sebum and dirt but leaves the hair difficult to comb and style. Conditioners cure most of the problems, but tend to produce build up and attract dirt. Most of the problem is related to the mechanism used to condition hair. Traditional hair conditioners rely on the deposition of molecules, like proteins and sugars. Cationic modification of these molecules increase substantivity and neutralize static charge. In some cases, hydrophobic materials, such as silicone or natural lipids, are used to reduce the drag experienced during combing, or to relipidize the hair. None of these products address the root cause.

Hair needs conditioning because it is damaged. Damage can be either physical or chemical. Perhaps the best way to address the problem and to ensure the integrity of the hair is to protect the integrity of the disulfide bonds present in cysteine. Oxidation of sulfhydryl groups present on opposing cysteine molecules cause the formation of cysteine, with its characteristic disulfide bonds. Increased cysteine levels translate to stronger hair.

The disulfide bonds produce hair’s strength and elasticity. Degradation of cysteine produces labile, easily extractable proteins in damaged hair. The presence of oxidizers like hydrogen peroxide or other bleaching agents converts cysteine to cysteic acid, irreversibly breaking the disulfide bridge.

We have used fermentation of the fruit Solanum lycopersicon (Tomato) to harness a bi-enzyme complex. This fruit has several other advantages to offer other than just the enzymes themselves. Tomato is rich in vitamins, minerals and a variety of potent phytochemicals. For our purposes, there are two specific materials of interest: serine and lycopene. In plants, cysteine biosynthesis is critical for sulfur assimilation. Two enzymes that exist as a bi-enzyme complex govern the biotransformation of serine to cysteine. Serine is converted to O-acetylserine by acetyltransferase in the presence of acetyl-CoA. O-acetylserine is then condensed with sulfide by O-acetylserine thiol lyase to form cysteine. Serine is converted by the bio-enzyme complex to cysteine. By providing both substrate and enzyme together, we can allow for the formation of cysteine in-situ. By directly nourishing the hair with cysteine, we efficiently provide the hair with the building blocks it needs to maintain its integrity and in turn replenish cysteine levels.
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**BENEFITS**

Lycopene is the pigment that gives tomatoes and many other fruits their red color. A carotene similar to beta-carotene, it is a potent antioxidant being 10 times more efficient than Vitamin E at quenching singlet oxygen. With regard to hair, lycopene’s most important property is its solubility. Lipophilic by nature, it can readily penetrate deeply into hair fiber.

**EFFICACY DATA**

Once in the hair fiber, lycopene can protect cysteine from excess oxidation. This particular approach is ideal for use in conjunction with peroxidases, where peroxidase degrades peroxides and the lycopene decouples any lipid peroxidation.

Maintaining the hair’s integral structure, ACB Tomato Bioferment PF can effectively create the perception of long-term conditioning without the use of traditional substantive quats.

**Benefits of ACB Tomato Bioferment PF:**

- Nourishing
- Antioxidant
- Conditioning