

Vitamin C derivatives: skin benefits of ascorbic acid without the downside

Vitamin C (L-ascorbic acid) is one of the relatively few topical agents whose effectiveness against wrinkles and fine lines is backed by a fair amount of reliable scientific evidence. Unfortunately, the practical use of vitamin C in skin care presents some difficulties due to its lack of stability. When exposed to air, vitamin C solution undergoes oxidation and becomes not only ineffective but also potentially harmful (oxidized vitamin C may increase the formation of free radicals).

Some skin care companies offer stabilized vitamin C products, which oxidize less rapidly. However, these products are usually very expensive (especially the ones concentrated enough to be effective) and may still be excessively oxidized by the time you use them.

Is it possible to get the skin benefits of vitamin C at lower cost and without the risk of using a degraded product? Yes -- and in more ways than one. For instance, you can relatively easily prepare a high potency vitamin C serum on your own. If you make fresh batches often and store them properly, you can ensure a reliable supply of effective topical vitamin C. If you do not wish to go the DIY route, or high potency vitamin C irritates your skin, you can use vitamin C derivatives.

To improve the practicability of vitamin C in skin care, scientists have been looking for its relatives with comparable or superior skin benefits. An ideal vitamin C derivative should be able to easily penetrate into skin cells and release L-ascorbic acid in amounts sufficient to boost collagen synthesis. Also, it should be more stable and less irritating than vitamin C. So far, two compounds have found their way into the broad skin care market: ascorbyl palmitate and magnesium ascorbyl phosphate. A few other highly promising derivatives are on the horizon.

Ascorbyl palmitate

Ascorbyl palmitate is the most widely used fat-soluble derivative of vitamin C in skin care. It is nonirritating and more stable than vitamin C. Furthermore, ascorbyl palmitate is a fat-soluble antioxidant and is at least as effective as vitamin E in protecting the skin from lipid peroxidation (a key type of free radical damage in the skin). Unfortunately, it appears that the concentrations of ascorbyl palmitate achievable in skin care formulas do not boost collagen synthesis as much as vitamin C.

Numerous skin care products containing ascorbyl palmitate are commercially available. When buying products with ascorbyl palmitate (or other vitamin C-derived skin care for that matter), it is best to choose colorless or white formulation. That way you can spot the advanced stages of oxidation of the active ingredient by the emergence of a yellowish tint. Unfortunately, the lack of tint does not guarantee complete lack of oxidation because the early oxidation products are colorless.

Magnesium ascorbyl phosphate

Magnesium ascorbyl phosphate is a water-soluble derivative of vitamin C rapidly gaining popularity in skin care. It is nonirritating and more stable than vitamin C. Most importantly, magnesium ascorbyl phosphate appears to have the same potential as vitamin C to boost skin collagen synthesis but is effective in significantly lower concentrations. Overall, magnesium ascorbyl phosphate appears to be a better choice than vitamin C for people with sensitive skin and those wishing to avoid any concomitant exfoliating effects. (Most vitamin C formulas are highly acidic and therefore produce exfoliation.)

Skin care products with magnesium ascorbyl phosphate are available and their number is growing. Be careful though. Many products contain less than effective concentration and fail to boost collagen synthesis. Also, even though magnesium ascorbyl phosphate is several times more stable than vitamin C, it still gradually degrades when exposed to light and air. Hence freshness and proper storage are important.

Next generation of vitamin C derivatives

Most vitamin C derivatives on the market, including ascorbyl palmitate and magnesium ascorbyl phosphate, consist of the ascorbic acid fragment (ascorbyl) and a fragment of another acid (e.g. palmitate or phosphate). Recent research indicates that new vitamin C derivatives consisting of multiple chemical fragments bound to a single ascorbic acid fragment may work even better. These new derivatives are more stable compared to both vitamin C and older derivatives. Furthermore, some of these newcomers (particularly the so-called tetrasubstituted lipophilic ascorbates) also appear to be more powerful boosters of collagen synthesis. Even though relatively few skin care products currently on the market contain these new compounds, they may become widely used as more evidence of their benefits accumulates.

Bottom line

While unmodified vitamin C remains an important skin care ingredient, its derivatives may do a better job in some situations. They tend to be more stable, more affordable and less irritating. Furthermore, some of the derivatives may even be as effective in boosting skin collagen synthesis. On the other hand, unmodified vitamin C may be a better choice if you want to stimulate collagen synthesis and exfoliate at the same time. (High potency vitamin C products are highly acidic and therefore have an exfoliating effect and are generally more affordable.)