

# Formulating With Lactic Acid

Lactic acid is a well known alpha hydroxy acid, exfoliant and pH adjuster, but did you know it can also act as a humectant and moisturiser? It has an array of uses, but exactly how do you use it in formulations - let's find out.

[Lactic acid](#) is produced by fermentation of carbohydrates, and also occurs naturally in the body - when it builds up it can give you a 'stitch'. It is a clear to brownish coloured liquid, has a pH: <2 and it is soluble in water and glycerine.

Alpha hydroxy acids have been shown to promote smoother, younger looking skin by increasing the rate of cell renewal, exfoliating the top layer of skin, helping smooth and even complexion, keep pores unclogged, brighten the skin and even fade dark marks and discoloration. As an AHA, lactic acid can help stimulate collagen and strengthen the skin, which equals fewer fine lines and wrinkles. No wonder we've all heard good things about it!

NB: when using AHAs in any form it is advised to be extra careful in the sun as they can make the skin more sensitive to sun exposure.

## Using Lactic Acid In Formulations

Lactic acid is recommended to be used in formulas from 0.5-10%, and it should be added to the cool down phase or cold processed as it is heat sensitive. Depending on the kind of product you make, you will need to check the final pH of your formulation so that it is not too low. If the pH of an emulsion drops too low it may destabilise and you'll end up with separation. So please adjust the pH if necessary.

## Creams and Lotions

As a humectant and moisturiser in creams and lotions, lactic acid should be added at 0.5-2%. You will need to check the pH as it can destabilise a formula if the pH drops too low.

If you aren't ready to formulate a lactic acid cream from scratch, you can easily add it to a cream base to get the benefits.

Easy Cream With Lactic Acid

97.5% [Escentia cream base](#)

2.5% [lactic acid](#)

[glass jar](#)

Weigh out the ingredients, blend together well and decant into a jar – that’s it! This gives a 2% lactic acid concentration so is easily suitable for everyday use.

## Hydrosols and Toners

You can add it at 0.5% to a hydrosol or toner for a moisturising, plumping effect.

Toner With Lactic Acid

99.5% [hydrosol of choice](#)

0.5% [lactic acid](#)

Weigh out the ingredients and blend well to incorporate. You can use it daily as a spritzer or apply with a cotton pad as a toner, but remember to wear sunscreen as lactic acid is still an AHA that can make your skin sensitive to sunlight.

## Exfoliating Peels

You can also make an AHA peel using lactic acid, xanthan gum gel, aloe vera and any other actives you like. We recommend keeping an eye on the pH here, and keeping it above 2.5–3, as products with a pH of 2 and below are typically only used under professional guidance.

Exfoliating peels should be used sparingly about once a week.

Aloe & Lactic Acid Peel

20g [xanthan gum](#) gel

1.5g [lactic acid](#)

Make up a portion of xanthan gum gel and weigh out 20g. You can include 50% [aloe vera](#) as part of the liquid in your gel if you like. You can also play around with using different kinds of [glycerites](#) such as cucumber instead of plain glycerine. Learn how to make a xanthan gum gel here: [Fun With Plant Based Gels](#)

Add in 1.5g lactic acid and add it to the gel. This gives a final lactic acid concentration of 5.5% which is decent for a peel. You can go higher if you want but we don’t recommend going over 8–10% lactic acid without professional guidance.

Apply the peel and leave on for 5–10 minutes then rinse off and apply a calming moisturiser.

## pH Adjuster

In formulations, lactic acid is also used as a pH adjuster to lower the pH. As it is quite strong, you can quickly adjust the pH level and very little is needed. You can add the 80% strength solution directly but as it is very powerful it can quickly lower the pH which may require re-adjusting up, so we suggest rather making a dilution of a lower strength as a pH adjuster.

## Diluting Lactic Acid

Lactic acid comes in different strengths and the one we have available is 80%. But what if you need a lower % lactic acid solution? Here’s how to dilute it:

Formula:  $C_1V_1 = C_2V_2$

Where  $C_1$  is the concentration of the starting solution and  $V_1$  is the volume of the starting solution;  
and  $C_2$  is the concentration of the final solution and  $V_2$  is the volume of the final solution.

You can decide what you want your final volume/amount to be ( $V_2$ ) which then allows you to calculate the starting amount ( $V_1$ ). You'll then know how much water to top it up with!

Let's calculate.

The starting concentration  $C_1$  is always going to be 80% (or 0.8) since that is the concentration of the lactic acid we have.

If you want a 10% dilution,  $C_2$  will be 10% or 0.1. And let's say you need to end up with 10g of it (your  $V_2$ ).

To calculate  $V_1$ , we reshuffle the equation to look like this:  $V_1 = C_2V_2/C_1$

$$V_1 = (0.1 \times 10) / 0.8 = 1.25$$

So your starting volume is 1.25g and your ending volume is 10g, therefore you add  $10 - 1.25g = 8.75g$  water!

We've worked out a few dilutions and put them in easier terms here, for those who don't like math:

1 part 80% solution + 1 part water = 40% solution

1 part 80% solution + 3 parts water = 20% solution

1 part 80% solution + 7 parts water = 10% solution

We hope you enjoy playing around with lactic acid and get to experience its many benefits for the skin!