

## Novel Liquid Patch Emulsion

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### Introduction

It is a challenge to develop scientifically proven active cosmetic creams. But it is even more challenging to create these active creams at a reasonable cost.

In order to develop such active products, the formulator will select a suitable active that supports the desired claim. However, active products are expensive. As the active is a small part of the formulation, it is logical to assume that the ingredients which form the base (and which are more abundant) can also have an influence on the performance of the selected active. In this article the influence of a gel, a classic O/W emulsion and a liquid patch emulsion are investigated on the activity of a skin firming active.

### Description of the Different Vehicles

A gel is a one phase vehicle. The phase can be water based or oil based. In this study only a water-based gel vehicle was investigated. In this case the active is incorporated in a hydrophilic environment.

An O/W emulsion is a two phase vehicle. Both phases are unmixable. One phase is the water phase, while the other is the oil phase. The water phase is the external phase, while the oil phase is dispersed into this external water phase.

In order to obtain a homogenous and stable mixture of both unmixable phases, an emulsifier is used. Without the emulsifier the O/W emulsion would become unstable, which means that oil would separate from the mixture.

### Parameters that Influence the Performance of Actives

It is quite obvious that the performance of an active depends on the nature of the active itself. For example, Vitamin E is a better performing antioxidant than Vitamin E acetate. However the performance of the active also depends on its ability to penetrate into the skin. Indeed a substance that stays on the surface of the skin cannot have an activity on skin cells, stem cells, melanocytes, fibroblasts or collagen, as all these cells are located deeper within the skin.

The skin is not a percolator but an efficient barrier against penetrating substances. In fact the skin 'defends' itself against cosmetic products, which lowers and often completely eliminates the performance of an active.

### Methods to Improve the Performance of Actives

As the nature of a substance cannot be changed, we can only consider improving the performance by enhancing the penetration of an active. To improve the penetration, several methods are at our disposal.

#### Method 1: Weakening the Skin Barrier

The most commonly used method is to weaken the barrier of the skin. Indeed a weakened barrier will allow more substances to penetrate into the skin. The use of ethanol is a well-proven method for destroying the skin barrier by dissolving the hydrolipidic layer of the skin. Dissolving this hydrolipidic layer is like dissolving the cement between the bricks of a wall.

Other methods to weaken the skin barrier are the use of micro emulsions which make holes in the hydrolipidic layer or the use of glycolic acid which dissolves skin cells.

#### Method 2: Cleaning the Skin Surface

On top of the skin sebum, sweat and dead skin cells cover the actual skin structure. When a cosmetic product is applied on top of it, it is partially absorbed by this 'dirt' layer. This absorbed part of the product is then lost for the treatment of the skin. A good practice is to clean the skin with a mild cleansing product or to use a scrub, before applying an active product.

#### Method 3: Using a Patch

However the most successful way of increasing the availability of an active to the skin is to assure that the active is in contact with the skin for a sufficiently long time. When a substance is only in contact with the skin for a short time, it is very unlikely that it can penetrate and become available for the targeted cells that are located deeper in the skin.

A patch is a well-proven way of increasing the penetration of difficult to penetrate substances such as nicotine. The active