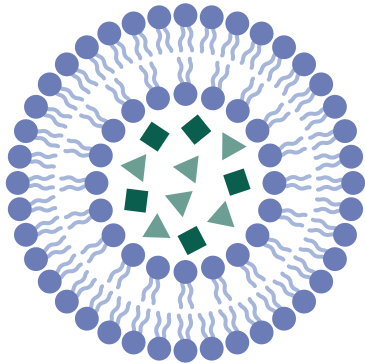


## Liposomal encapsulation

Small liposomes (nanosomes) are spherical vesicles consisting of phospholipid bilayers, that – due to their unique properties – are suitable for application to the skin.

Liposomes can be utilized as carriers for delivery of the active substances. These phosphatidylcholine liposomes in Lipoxellin® specifically deliver the encapsulated contents to the hair follicles, making them particularly suitable for the stimulation of melanocyte precursor cells in the hair follicles.

Targeted delivery to hair follicles through encapsulation in liposomes drastically increases the efficacy of khellin while reducing the required total exposure levels, thus minimizing the potential for undesired side effects.



### Schematic cross-section of a liposome.

The active ingredients of Lipoxellin® (green) are encapsulated in a spherical vesicle - or a 'bubble' - which is made from two layers of phospholipids (purple) and is similar to a cell membrane.

## Instructions for use

Lipoxellin® should be applied twice daily (in the morning and evening) to the affected vitiligo areas.

Lipoxellin® is a liposomal spray loaded with *Khellin*, a compound extracted from the *Ammi Visnaga* plant, which is known to function as an antioxidant only at low concentrations.

The spray has been shown to increase effectivity of UV therapy for the treatment of vitiligo. The mechanism of action is likely through interruption of free radical chain reactions induced by UV therapy and/or the clearance of excess oxidative damage generated endogenously in vitiligo patients.



**+ UV**

Use Lipoxellin® as an integral part of a UV-therapy for vitiligo.



Prior to first use it is advised to press the spray applicator several times to fill the spray chamber with the liquid.



Apply Lipoxellin® twice daily.



Preserve a distance of 15cm between the spray and the skin and apply Lipoxellin® as a thin layer on the affected areas.



Lipoxellin® should always be applied to clean and intact skin.

**Ingredients:** Khellin, aqua purificata, soyalecithine, L-phenylalanine, 2-phenoxyethanol

**Do not use in case of allergy to any of the ingredients.**

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CE Medical Device Class I

**MULTICARE**  
Europe BV

# LIPOXELLIN

**KHELLIN  
LIPOSOMAL  
SPRAY**

to enhance  
the  
uv-treatment  
of  
**VITILIGO**



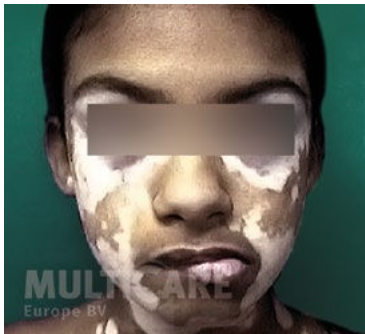
## Vitiligo

Vitiligo is characterised by the absence of pigment producing cells of the skin. The resulting white patches can be a source of a negative self-image and thereby exert a strong negative impact on the quality of life of those affected. The exact cause of vitiligo is unknown. Current hypotheses focus on an interplay between the oxidative status of the tissue, the immune system and external factors.

The gold standard in the treatment of vitiligo is UV therapy. Both UVA, UVB, and a combination of both have been administered with varying success. Khellin is a natural compound which complements UV based therapies. Due to its unique properties, it increases the efficacy of UV therapy and can aid in the prevention and minimisation of the side-effects of light therapy.

The safety of the therapy is further enhanced by liposomal encapsulation. This allows for a reduction of the applied dose by a factor of 40.

## Treatment results



Start of treatment



2 years later



17 years later

## Lipoxellin® Khellin Liposomal Spray

The combination of UV-therapy and Lipoxellin® has been scientifically proven to be effective in the treatment of vitiligo. The protective effects of khellin can reduce the likelihood of a further progression of the disease and mitigate the formation of oxygen radicals formed during light therapy. The result is an earlier and more complete repigmentation of the skin. In addition people using Lipoxellin® report a greater tolerance for natural sunlight, allowing them to full participate in outdoor activities.



## Khellin

Khellin is a naturally occurring substance present in the Khella plant (Ammi Visnaga) that is native to the Mediterranean. Several medicinal properties have been ascribed to khellin. It constitutes approximately 0.3-1.2% of the khella fruit.

Khellin is safe to use: It is a poor photosensitizer, does not induce phototoxic erythematous responses, has a low photo genotoxicity and does not induce DNA crosslink formation after UV irradiation.

Khellin has been shown to exhibit antioxidant capacity at low concentrations. The mechanism through which Khellin exerts its effect preceding and during UV treatment of vitiligo is likely mediated by this specific molecular property. The antioxidant capacity of Khellin at low concentrations is non-enzymatic and works by interrupting free radical chain reactions through relocation of electrons. Khellin appears to exert its function not through pharmacological, immunological or metabolic means but rather through a physical, non-enzymatic anti-oxidant radical scavenger activity that directly counteracts UV-induced oxygen radical formation and potentially halts disease progression by reducing vitiligo-associated endogenous oxidative stress.