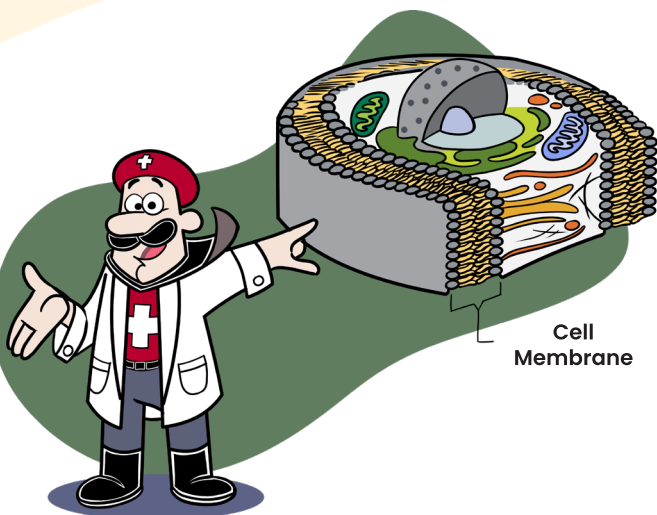
 **sundalp**<sup>®</sup>  
Liposomal Technology



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# Doctor Alpmüller explains the Sferalp's proprietary technologies



## Why to choose Sundalp®?

- Natural components suitable for a vegan diet
- Allergen-free, NO GMOs
- Easily digestible
- Biocompatible with stomach and intestines
- "Friends" of the microbiota

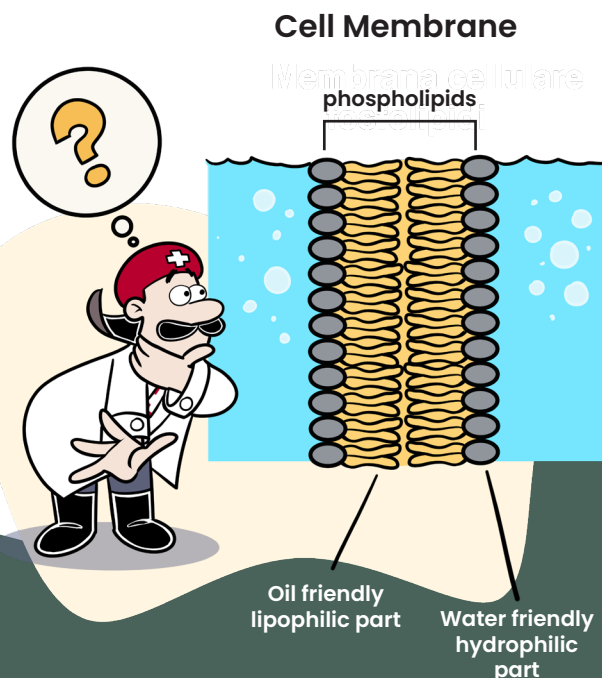
## The cell membrane

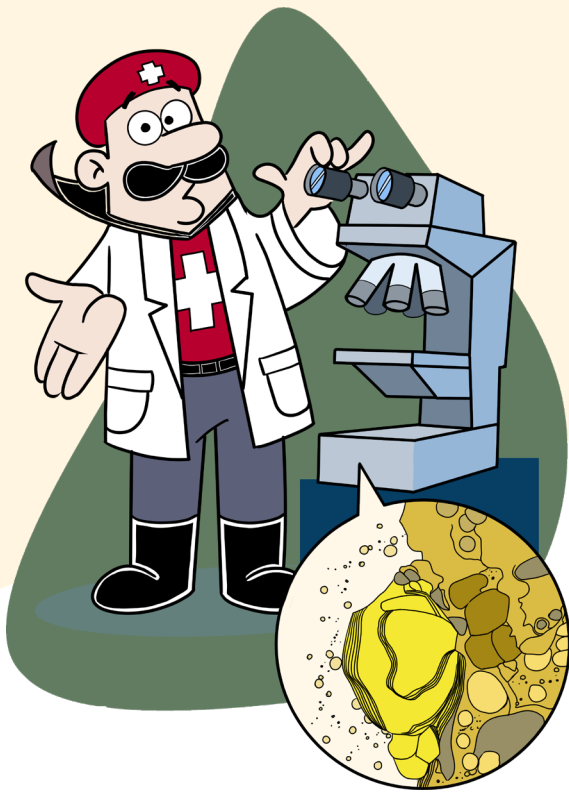
Every living cell is enclosed by a membrane consisting mainly of phospholipids.

## The phospholipids

Phospholipids arrange themselves in a double layer by orienting the polar heads outside (water) and the hydrophobic tails inside the membrane.

They are present in a multitude of foods, but most notably in eggs, soy lecithin, sunflower lecithin, milk and other dairy products.





## What is Sundalp®?

Sundalp® is an auxiliary preparation that facilitates the digestion of a substance, extract, salt, or vitamin, particularly suitable for fat-soluble substances. It is composed of sunflower lecithin and triglycerides of vegetable origin.

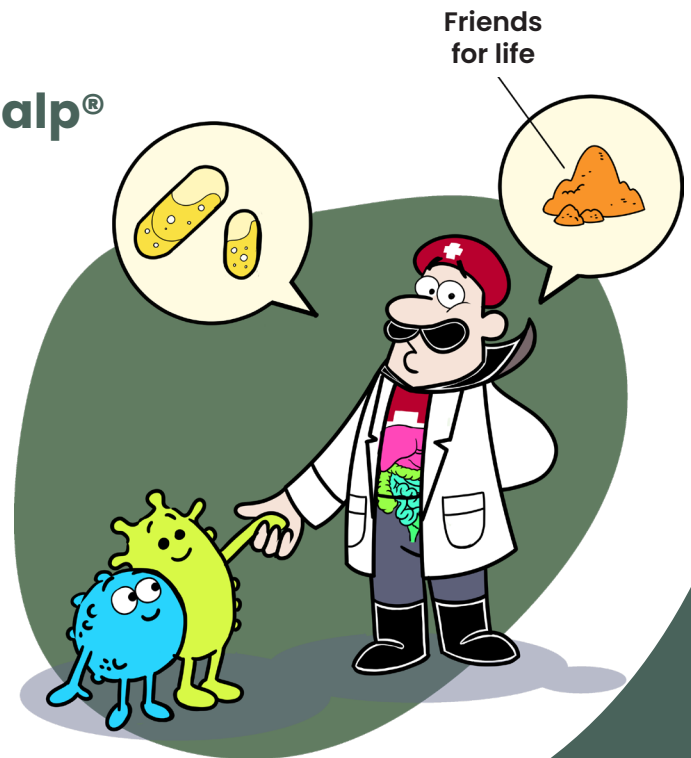
## Why is Sundalp® special?

The main characteristic of the mixture is that it forms a multilayered lipid dispersion upon contact with water or gastric juices.

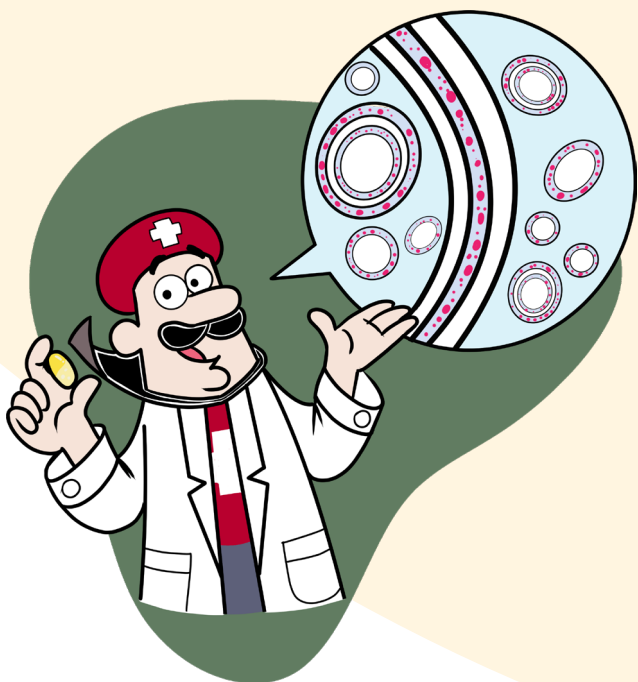
## What advantages does Sundalp® lipid dispersion possess?

Sundalp® lipid dispersion has the following basic characteristics:

- All components are of natural origin suitable for a vegan diet
- Absence of allergens and GMOs
- Biological affinity with the membranes of stomach and intestinal cells
- "Friends" of the intestinal microbiota
- Easier digestion
- Absence of synthetic emulsifiers







## Sundalpal® and fat-soluble substances

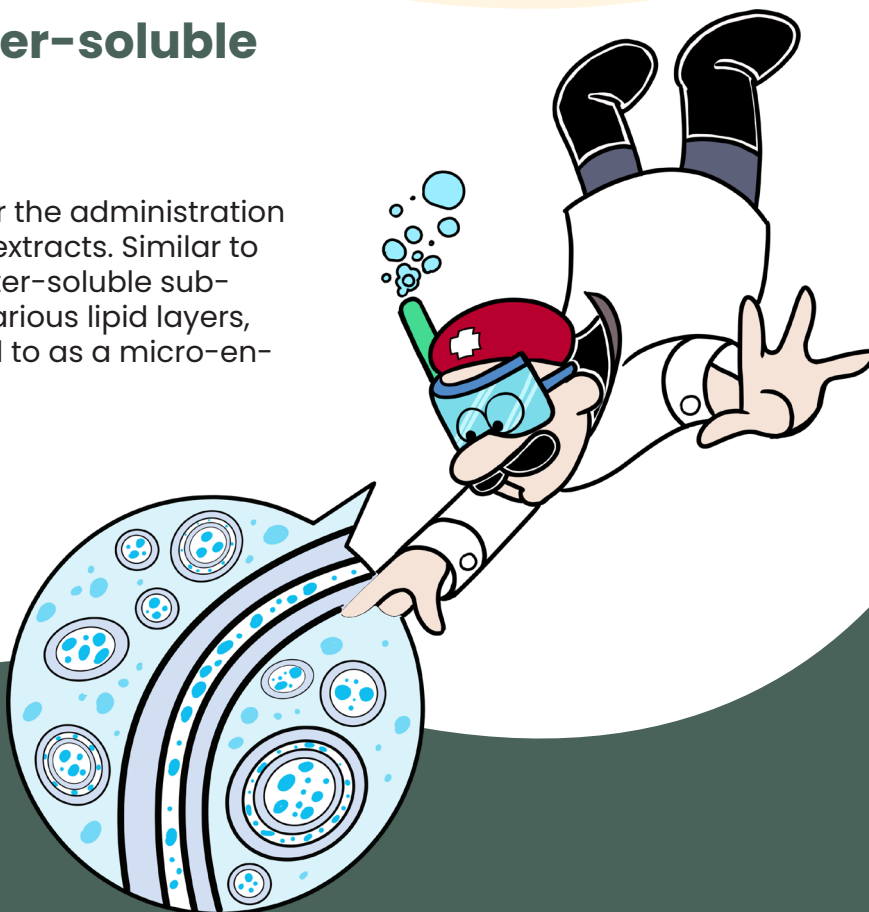
Sundalpal® oil in capsules:  
this presentation is suitable for the administration of substances/extracts that are liposoluble.

When the Sundalpal®/extract mixture encounters the gastric juices, the lipophilic substances remain incorporated into the lipid layers of the dispersion or they remain micro-encapsulated.

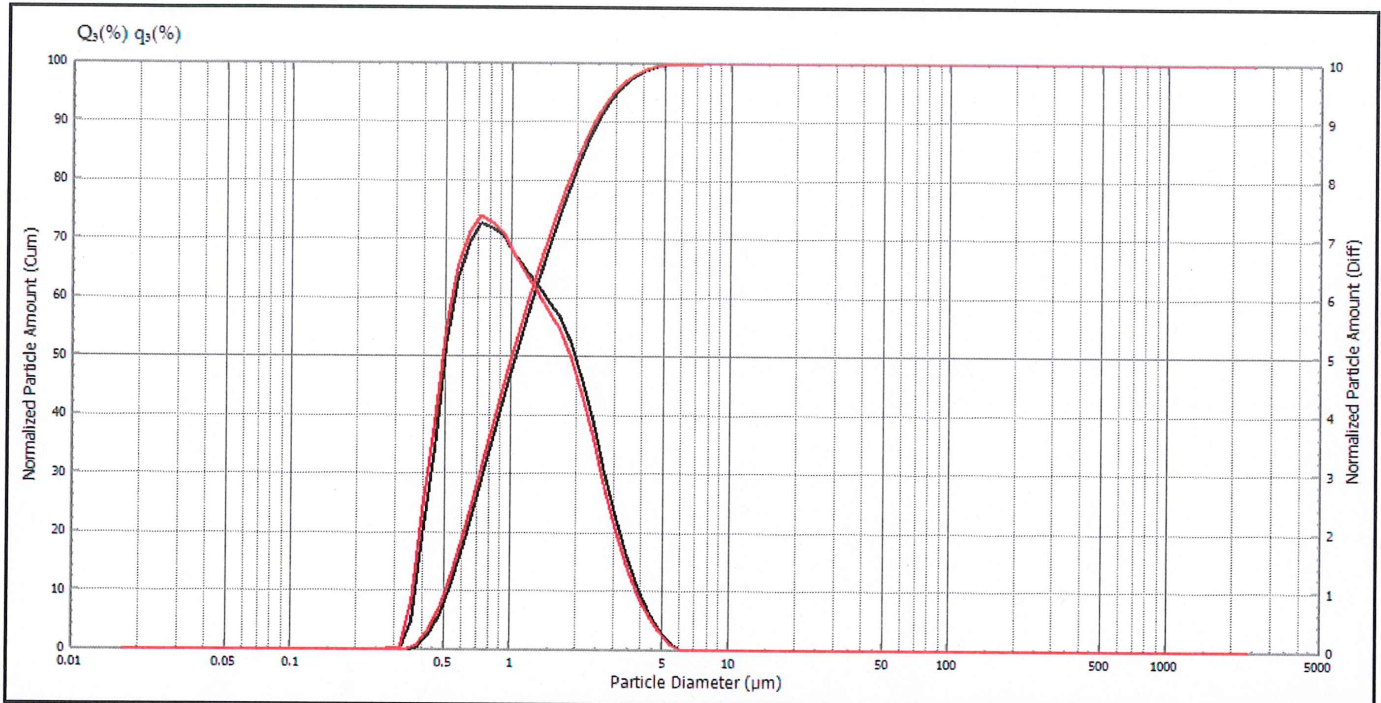
This dispersion is thus ready to be well digested. Examples of this presentation are black cumin oil (*Nigella sativa*), Indian frankincense extract (*Boswellia serrata*), and whole turmeric extract (*Curcuma longa*).

## Sundalpal® and water-soluble substances

Sundalpal® powder in capsules:  
this presentation is suitable for the administration of water-soluble substances/extracts. Similar to the above description, the water-soluble substances will go between the various lipid layers, and again this can be referred to as a micro-encapsulated product.



# Particle size analysis of Sundalp® lipid dispersion in water



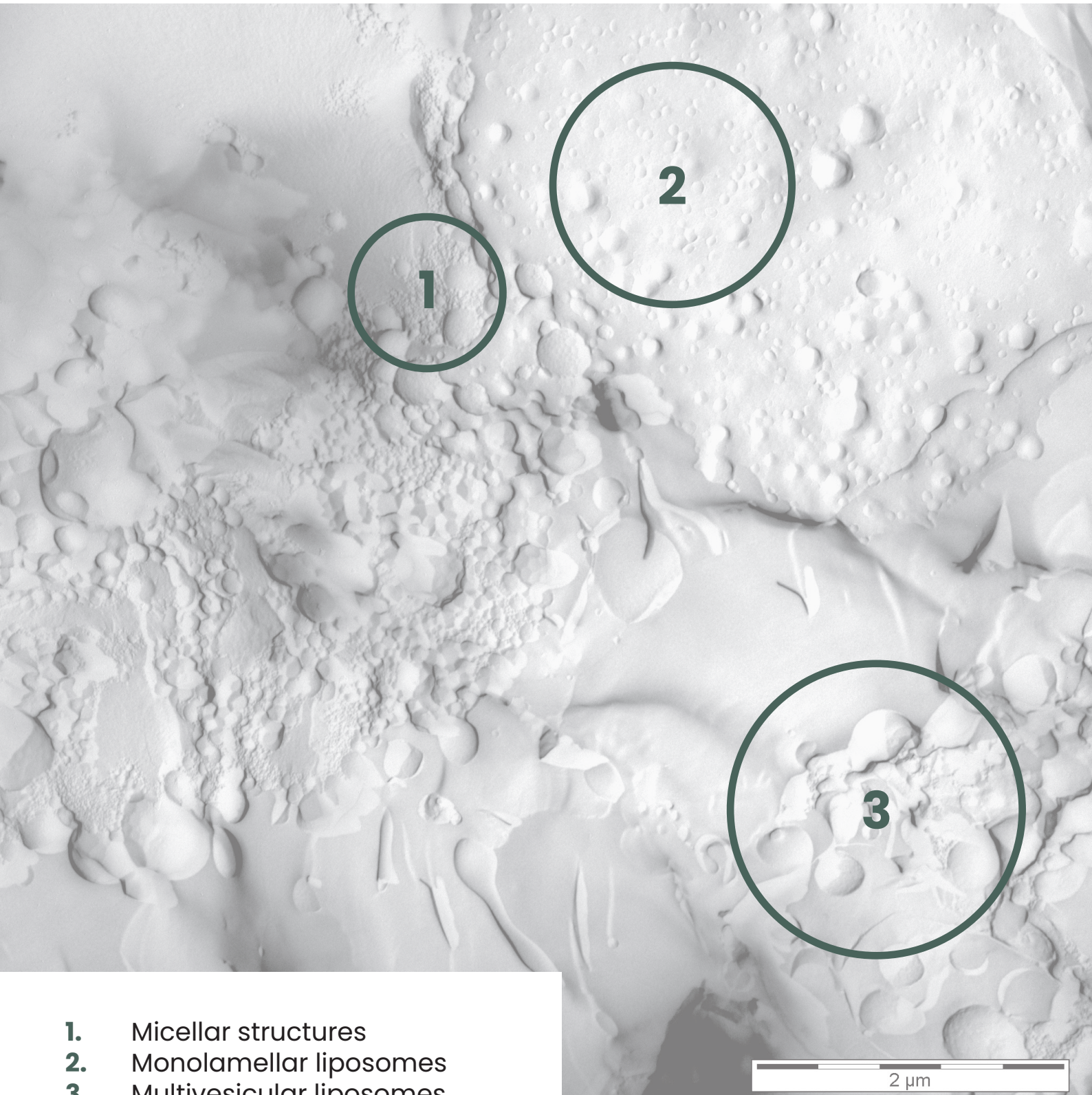
## Particle size:

- approx. 50% between 300 nanometers and 1 micrometer
- approx. 50% between 1 and 6 micrometers



# Sundalp® lipid dispersion

SEM pictures courtesy by Prof. Dr. P. Walther, University of Ulm



1. Micellar structures
2. Monolamellar liposomes
3. Multivesicular liposomes