

EMULSIONS & FORMULATIONS

True North Labs 



INTRODUCTION

WHAT ARE THE KEYS TO UNLOCKING CANNABINOIDS WHEN LOOKING FOR PRODUCT DEVELOPMENT?

THE PLANT- BASIC MATERIAL

Starting with high quality material is the key/most important step of the process. Without this all processes down the line are compromised.

We work with Swiss and central European growers to minimize the environmental impact and only those who maintain the highest standards. Soil tests, environmental impact and pesticide free growing programs are critical to our selection process. We select phenotypes based on cannabinoid content and terpene profile and we carefully monitor and analyse the environmental conditions, moisture content and storage conditions

All our raw materials are put through a rigorous qualification process that includes multiple analysis for heavy metals, pesticides and micro-bio

THE EXTRACT – THE PURIFICATION OF CANNABINOIDS STARTING WITH RAW PLANT MATERIAL

Everything we do is done to the highest standards in our facility in the heart of Switzerland.

Ten years extraction experience in the North American markets has taught us that in-line cryogenic ethanol extraction yields the best results. Separating the cannabinoids from the plant material, leaving behind undesirables like chlorophylls, lipids and fats followed by cold filtration yields a ‘crude oil’ of the highest quality

The next step - distillation further removes undesirables from the crude oil material leaving us with a high purity CBD extract that is clean and standardized.

If further refinement is required for the production of crystalline cannabinoid in its purest form we have a number of options to choose from including crystallization in a glass reactor or flash chromatography. We control every step of the process in our own facility.

FORMULATION AND INFUSION

With the best quality raw materials we can help you unlock the full potential of cannabinoid ingredients. Extracts that are standardized are the basis for consistent high quality products

THE PRODUCT

Using our high bioavailability water soluble technology, we are able to create custom tailored solutions that take into account primary packaging materials, compatibility of formulation ingredients and shelf stability over time.



Benefits

- ❖ Better Bioavailability
- ❖ Better Stability
- ❖ Better Flexibility
- ❖ Better Reliability
- ❖ Better Consistency



Types of Emulsions

- **Oil in water (O/W):** An O/W emulsion consists of oil (or other nonpolar liquid) dispersed in water. Milk is a good example of an O/W emulsion, as it consists of fat globules (dispersed phase) in water (dispersing medium).
- **Water in oil (W/O):** A W/O emulsion consists of water dispersed in oil. Butter and margarine are examples of W/O emulsions. A small amount of water is dispersed in a larger volume of oil.



Emulsions are common in cooking and everyday products

- **Oil and water, when vigorously shaken**
- **Egg yolk (water and fat emulsified by lecithin)**
- **Vinaigrette (an emulsion of oil and water)**
- **Butter (an emulsion of water in fat)**
- **Mayonnaise (oil in water stabilized by lecithin in egg yolk)**

EMULSION ARE THE SCIENCE OF A BALANCE BETWEEN CHEMISTRY AND PHYSICS

WHAT ARE EMULSIONS?

An emulsion is a homogeneous, colloidal mixture of two or more liquids that normally don't mix

TYPES OF EMULSIONS

There is one key element that each emulsion needs. An emulsifier who has the property of combining the two unmixable parts. Emulsifiers have two elements: One is called hydrophilic (non polar)-meaning it likes water, the other part is hydrophobic (polar)-meaning it likes oil. The emulsifier is the free agent which brings both sides together, it lowers the chemical energy between oil and water and makes them like each other. This allows oil to be suspended in water and the other way around.

HOW EMULSIFICATION WORKS

The production of an emulsion usually needs new external energy. The energy breaks up the big oil droplets dramatically increasing the surface area. As new surfaces are created, the emulsifier steps in the fill the gap and stabilize the interface between the two.

WHY EMULSIONS LOOK CLOUDY

Emulsions tend to look cloudy because of the suspension of oil droplets in water. Because of this event, the light is scattered when it passes through the emulsion.



Emulsification occurs via several mechanisms

HOW EMULSIFICATION WORKS

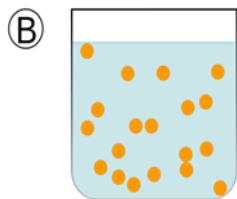
EXAMPLES OF COMMON EMULSIFIERS

- Soy lecithin
- Egg yolk (which contains lecithin)
- Sodium phosphate
- Cellulose
- Quillajah extract
- Polysorbate 20 and 80
- Mustard
- DATEM (diacetyl tartaric acid ester of monoglyceride)
- Sodium stearoyl lactylate

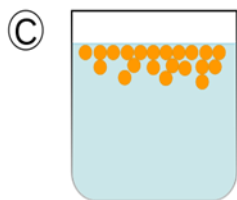
HOW EMULSIFICATION WORKS -



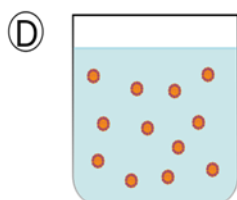
Mechanical mixing-external force breaks liquids into smaller particles, so it takes longer for the components to separate. For example, if you shake a bottle of oil and water, it separates pretty quickly. If you use a blender, the emulsion takes longer to revert to its previous state.



Some emulsifiers reduce the interface surface tension between the two liquids, allowing them to mix. Surfactants work using this principle.



Some emulsifiers encapsulate or form a film over one component of a mixture. The coated particles repel each other, so the contents remain evenly dispersed.



An emulgent may increase liquid viscosity (resistance to flow or deformation) so it's easier for particles to remain suspended

WHAT'S NEXT

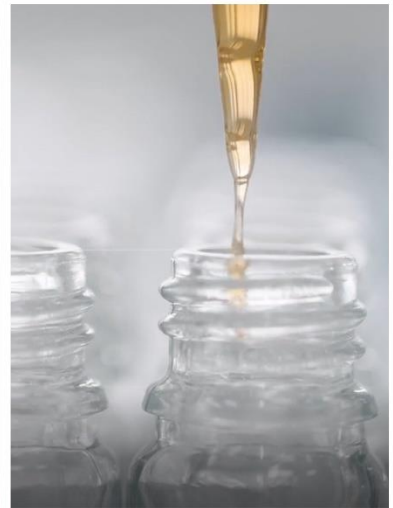
APPLICATIONS

A lot of times, businesses want to transform their material into more readily acceptable forms. The emulsions allow us to create a product from two self-repelling liquids and by so doing create a better and more functional product.

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WHY WORK WITH US

Custom tailored solutions that take into account primary packaging materials, compatibility of formulation ingredients and stability over time. All formulations are also highly bioavailable with organic options available. Either we can help get your concept off the ground or maybe you are looking for a way to improve your existing formulation. We are going to support your idea from start to finish.





TECHNICAL DATA SHEET

WATER COMPATIBLE CANNABINOID EMULSION

DESCRIPTION

APPLICATION AND USE

Food, Beverages and cosmetic infusion

ACTIVE INGREDIENT

Hemp derived cannabinoids

IN-ACTIVE INGREDIENT

Water, medium chain triglycerides from coconut oil, quillaia extract, citric acid, mixed tocopherols (vitamin e), potassium sorbate and sodium benzoate (as preservatives)

STORAGE AND HANDLING

Store in refrigeration upon receiving and when not in use.

SHELF LIFE

Shelf Life 12 months with storage in refrigeration (4oC, 40oF)

PACKAGING

1L, 5L, 10L, 20L tamper sealed HDPE container or UN alum bottles

PHYSICAL PROPERTIES

Production form: Pre-suspended liquid emulsion

Appearance: milky, white

Sensory: mild characteristic odor, very mild bitter taste

ALLERGENS

Below table indicates the presence of the following allergens and products thereof

Milk	NO
Egg	NO
Fish	NO
Crustacean shellfish	NO
Tree Nuts	NO
Peanuts	NO
Wheat	NO
Soybean	NO

NUTRITIONAL INFORMATION

Below table indicates the presence of the following allergens and products thereof

Typical Value	Per 100g
Calories	110
Fat	15g
Sat Fat	15g
Trans Fat	0g
Cholesterol	0mg
Sodium	10g
Total Carb	3g
Protein	0g
Calcium	11mg
D, Iron, Potassium	0g