FROM FRESH TO TOXIC:

HOW NITRITES, PRESERVATIVES & OMEGA-3 OXIDATION DRIVE DNA DAMAGE & HOW FLAVOR CORRELATES WITH THIS

Presented by Philip Bromley

INTRODUCTION

Philip Bromley, CEO & Co-Founder of Virun Inc. and Co-Founder O3Omega®

O3Omega® Smoothies are a delicious range of lipid encapsulated Omega 3s.

Virun® specialize in formulating and co-manufacturing lipid emulsions which truly look to improve health.

V vanadium 50.9415 22
Ir iridium 192.217 77
U uranium 238.02891 92
N nitrogen 14.0067 7

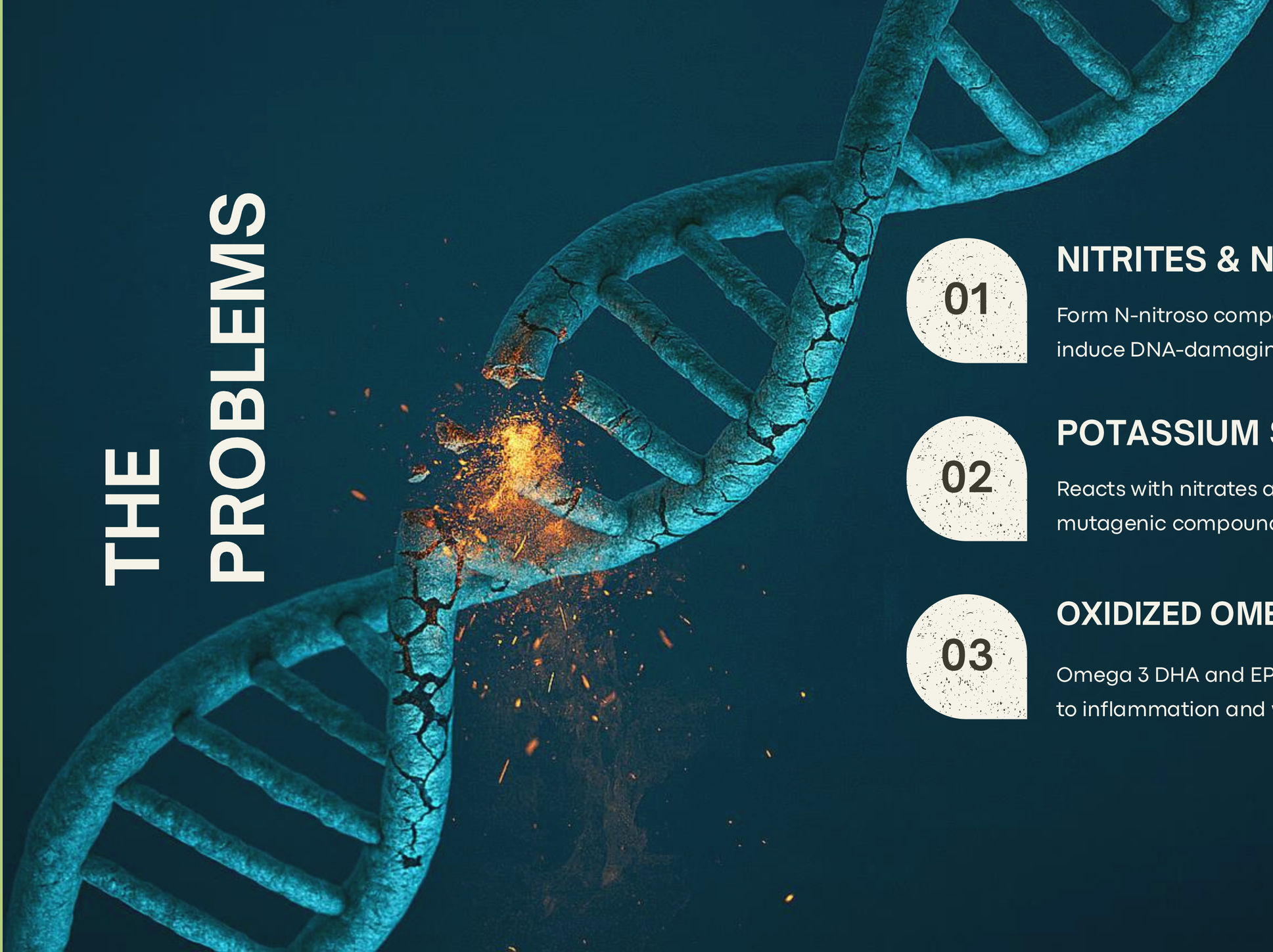
WHAT DO WE DO?

V Ir U N

EFFICACIOUS DELICIOUS BIOAVAILABLE NON TOXIC!

omega SMOOTHIES

THE PROBLEMS



01 NITRITES & NITRATES

Form N-nitroso compounds (NOCs) that can induce DNA-damaging metabolites

02 POTASSIUM SORBATE

Reacts with nitrates and iron in water to form mutagenic compounds.

03 OXIDIZED OMEGA 3

Omega 3 DHA and EPA oxidize easily, leading to inflammation and worse.

🔬 **Conversion Pathway of Nitrites**

can undergo several chemical reactions that produce **carcinogenic compounds**:

Nitrosation Reaction (Acidic stomach conditions or heat in cooking):

Nitrosamines ($R_2N–NO$)

Nitrosamides (RCONR–NO)

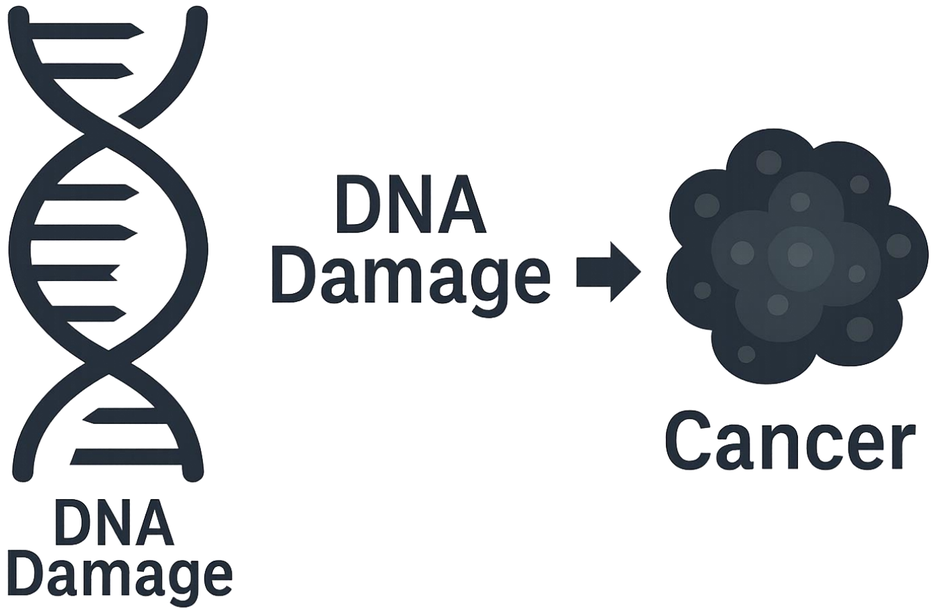
Metabolic Activation:

In the body, enzymes like **cytochrome P450** can further activate nitrosamines. This leads to **α-hydroxylation** and formation of **diazonium ions** ($R–N_2^+$), which are extremely reactive.

DNA Damage:

Diazonium compounds and nitrosation byproducts are **strong alkylating agents**. They attach to DNA bases, forming **DNA adducts**, causing:

- **Mutations**
- **Strand breaks**
- **Genotoxic lesions**



DNA Damage → Cancer: Why It Happens

DNA is the instruction manual for how cells grow, divide, and die.
Damage to DNA (from chemicals, radiation, oxidation, preservatives, etc.) can create **mutations** (permanent changes in the genetic code).

Damaged cells may:

- Ignore “stop” signals for growth
- Evade programmed cell death (**apoptosis**)
- Divide uncontrollably

Over time, this unchecked cell division leads to **tumor formation**.
Accumulation of multiple DNA errors increases the risk of transformation into **cancerous cells**.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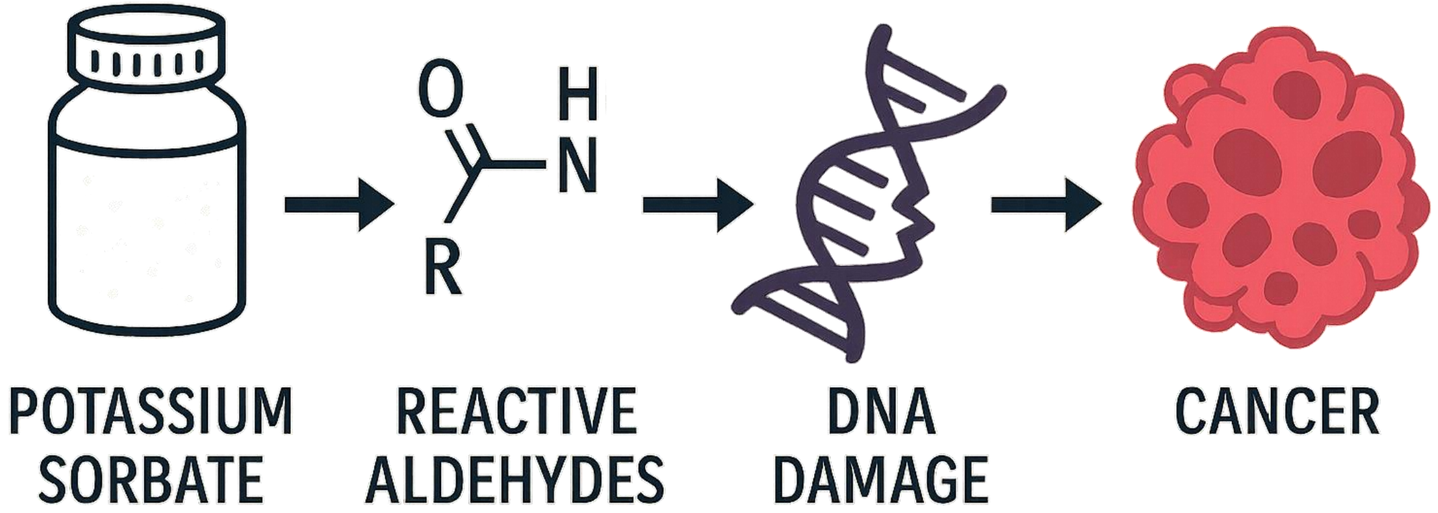


POTASSIUM SORBATE → REACTIVE ALDEHYDES

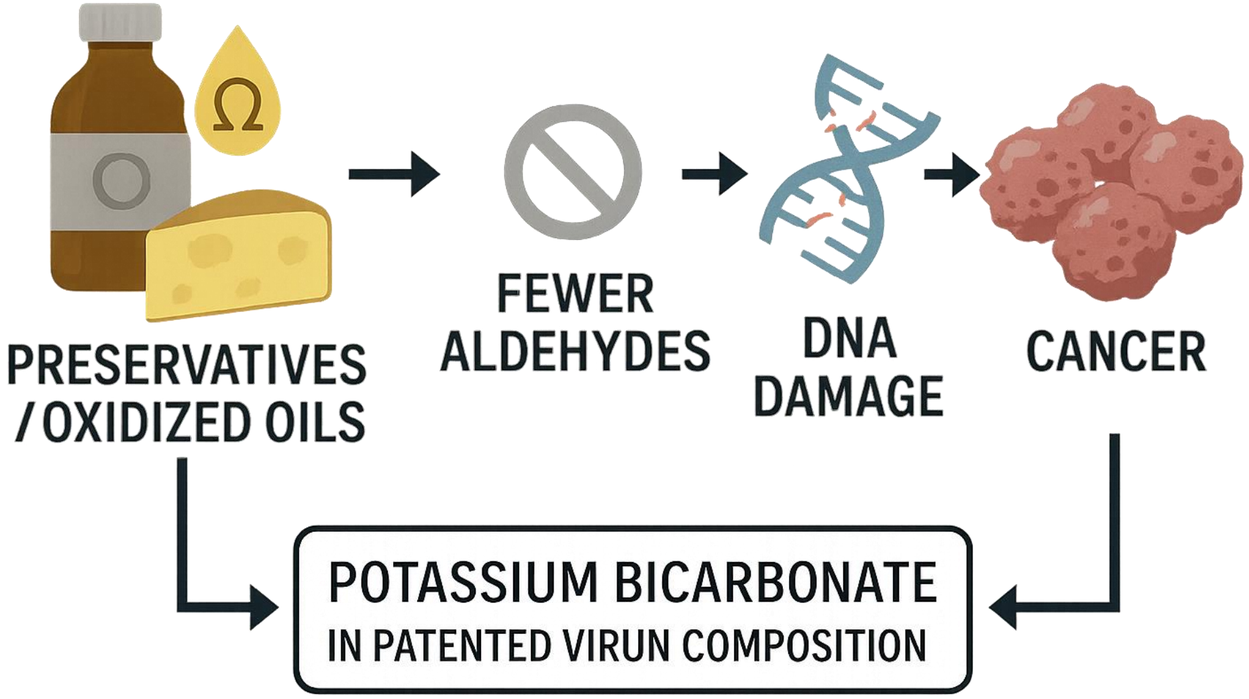
- **Potassium Sorbate** (food preservative)
- Converting into **Reactive Aldehydes** (formaldehyde, acetaldehyde, crotonaldehyde, etc.)
- Leading to **DNA Damage** (broken DNA helix)
- Progressing to **Cancer** (cluster of abnormal cells)

SOLUTION

BICARBONATE DOWNSTREAM PROCESS

Bicarbonate downstream process to deodorize chemicals that would otherwise have strong odors and to and remove oxidative contaminants.

We therefore do not need to use potentially toxic preservatives.



🔬 **Summary of Potassium Bicarbonate's Protective Role**

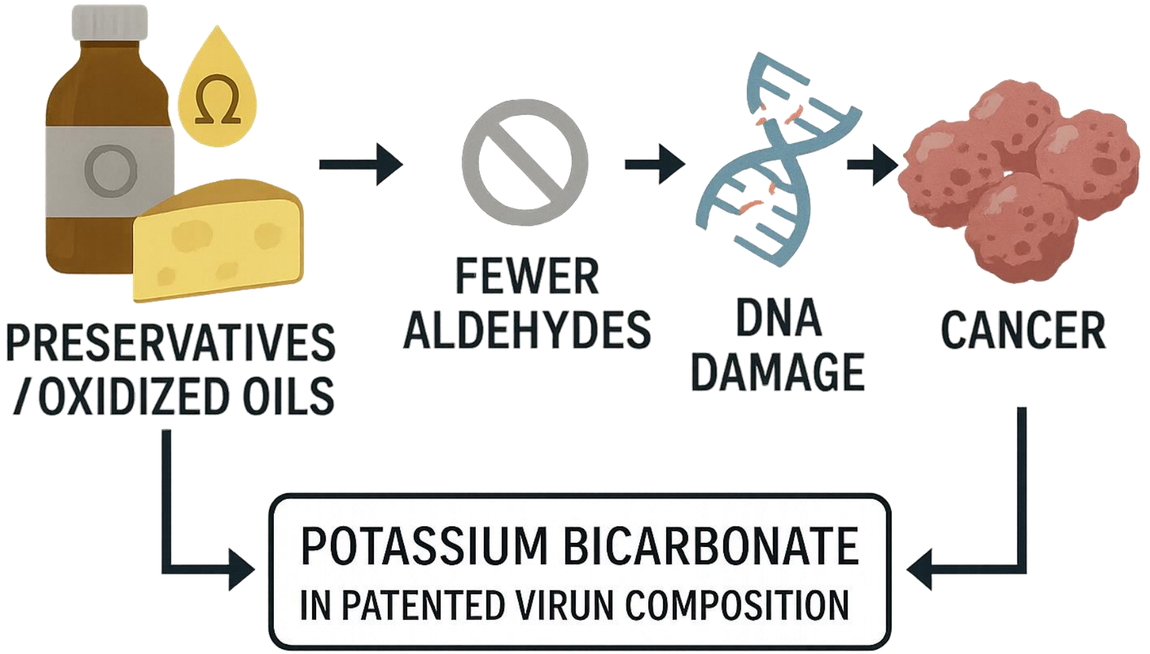
•By shifting pH and scavenging intermediates, potassium bicarbonate:

- **Deodorizes rancid/oxidized compounds** (removing "fishy" or "off" odors).
- **Reduces formation of carcinogenic aldehydes** (like formaldehyde, acetaldehyde, 4-HNE).
- **Mitigates DNA-damaging chemistry** before it occurs.

SUSCEPTIBLE TO OXIDATION

“Free radicals, toxic aldehydes and reactive oxygen species are all byproducts from lipid peroxidation (oxidized fats) that work in unison to wreak inflammatory havoc on our metabolic, neurological and cardiovascular health.”*

*Matsuo N. Studies on the toxicity of fish oil.
The Journal of Biochemistry. 1954;41:481–487

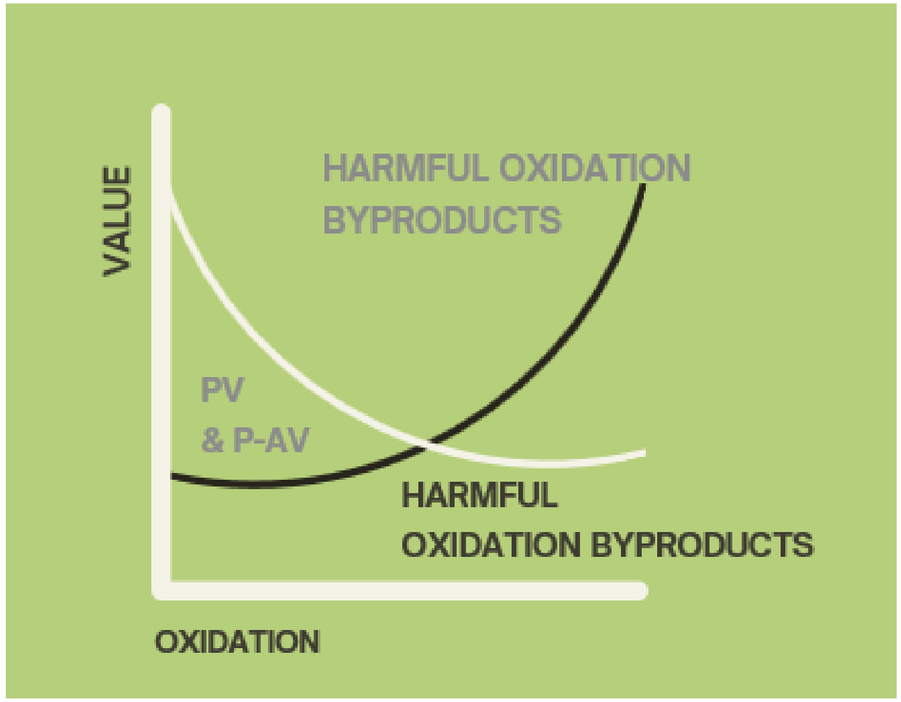


🔬 **Summary of Potassium Bicarbonate's Protective Role**

•**Potassium Bicarbonate ($KHCO_3$)** is part of VIRUN's patented processes and composition.

•*"Potassium Bicarbonate helps stop harmful chemistry before it starts — reducing aldehydes, deodorizing rancid oils, and protecting DNA."*

•It works by **neutralizing acidity** and altering reaction conditions that normally convert preservatives (like nitrites or sorbates) and oxidized lipids into **reactive aldehydes/nitrosamines**.



Better detection methods include volatile profiling (GC–MS for propanol and 1-penten-3-one), specific aldehyde quantification (LC–MS/MS for 4-HHE), and conjugated diene/triene UV absorbance — all of which detect rancidity beyond PV/p-AV's reach.

The problem:

1. PV and p-AV can decline over time as oxidation progresses, not because the oil is fresher, but because hydroperoxides and reactive aldehydes are breaking down into more harmful byproducts

2. These byproducts include volatile aldehydes and ketones (e.g., propanol, 4-hydroxy-2-hexenal, 4-hydroxy-2-nonenal, 2,4-heptadienal) — compounds linked to mutagenicity, DNA damage, non-alcoholic fatty liver disease (NAFLD), and cardiovascular disease.

1. Omega 3 oil manufacturers and brands often market low PV/p-AV values as a "good" thing, exploiting the fact that these lower readings can actually mean the oil has progressed further into dangerous oxidation stages, byproducts (carcinogenic compounds).

Patents & Processes

PURE VEGAN ALGAL DHA

CO_2-extracted, frozen & nitrogen-protected

CREAMY EDIBLE EMULSIONS

Our Creamy Edible Emulsions® patent allows supplements to taste more delicious.

BICARBONATE DOWNSTREAM PROCES

Allows us to deodorize, purify and improve the smell and flavor profile of nutrients without the need for preservatives.

Deionized WATER

Deionized water is used in the polar phase to produce the Liposomal/Micelle emulsions.

NITROGEN DOSING

Displace oxygen in the head space of the bottle or pouch. Then Nitrogen Liquid dosing is used to remove dissolved oxygen in the bottle or pouch.

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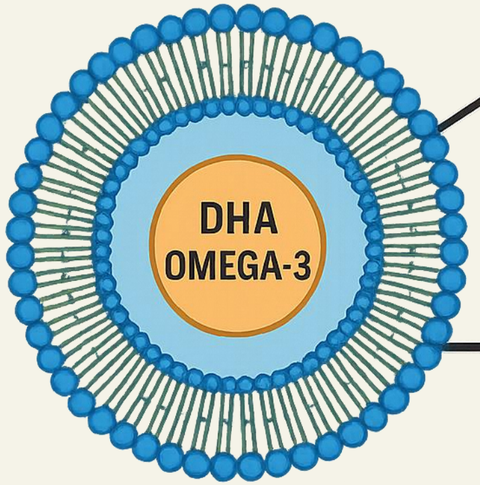
omega 3 SMOOTHIES

SOLUTION

LIPOSOMES MICELLIZE DHA OMEGA-3 TO BE MORE BIOAVAILABLE

LIPOSOMES



More assimilated for micellization

✓ More bioavailable

V Ir U N

GET EMULSIFIED!

Our technology, patents and innovative approaches solve some major problems in the supplement industry—pertaining to DNA disrupting preservatives, oxidized oils and unpalatable, ineffective supplements.

FLAVOR – NO PRESERVATIVES – NO HARMFUL BYPRODUCTS

Avoid these pitfalls and liquify bioavailable and delicious supplements with us!

V Ir U N

THANK YOU!

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