Northstar Lipids

NorOmega PC369

A balanced lipid formulation for effective skin nutrition

Introduction

Natural Oils are well known in the personal care industry for providing emollience and generally improving the condition of the skin.

The benefits they impart are largely a function of the primary constituents , the Fatty Acids, and the action of any one oil on the skin (and therefore its use) can be determined by studying the composition and ratio of these fatty acids in the candidate oil.

Type and Function of the Fatty Acids

The major fatty acids commonly found in natural oils are grouped into one of 3 categories, in accordance with their molecular structure. These are known as the Omega 3, Omega 6 and Omega 9 families and research compiled over recent years has provided a lot more information as to their function in the human body. In particular, the Omega 3 and 6 fatty acids are the raw materials used by the body to produce a very importance series of hormone-like chemicals known as Prostaglandins

Omega 3 fatty acids are used in the synthesis of the PGE3 Prostaglandins which regulate the inflammatory response. In simple terms, provision of Omega 3's is believed to help to reduce a number of inflammatory related disorders from which the body suffers, including skin rashes and redness

Omega 6 fatty acids are used in the synthesis of 2 different Prostaglandins. The PGE1 series are very important in helping to regulate a number of bodily functions, including blood circulation, but more relevantly have been shown to help treat dry or damaged skin conditions such as eczema. In particular, GLA from Evening Primrose, Borage and other oils has been shown to be very effective in treating skin conditions.

The PGE2 series help to cause clotting which is obviously important when the body needs to repair torn tissue. However, an excess of these compounds has been shown to trigger the inflammatory response , this is regulated production of the 'good' PGE1 and PGE3 Prostaglandins which act to reduce the release of the PGE 2.

Omega 9 fatty acids are found in cell membranes, especially in skin tissue, where flexibility is important. Oleic Acid in particular is abundant in skin cells and is a very good medium for transferring nutrients across the skin barrier. Oils rich in oleic acid are generally very absorbent and as a result in wide use in the skin care industry.

Metabolism of Fatty Acids and its links to skin care – why the right balance is important

The body metabolises fatty acids using a series of enzyme catalysed steps. However the pathways used to convert the vital Omega 3 and Omega 6 fatty acids are slow, competitive with each other and can lead to problems if not kept in balance. In such circumstances an overproduction in the body, of either of the fatty acid groups, can lead to a reduction in the synthesis of the vital compounds produced from the other group and in turn lead to problems with health.

Inflammatory problems caused on the skin, such as eczema and sun burn, have been linked to the excess production of PGE 2 Prostaglandin. To combat this supplementation or application of Fatty acids such as GLA (from Primrose) and even Omega 3 fatty acids' such as ALA, is believed to help the body produce more of the good Prostaglandins which reduce the inflammatory response .

In conclusion it is important to maintain a balanced intake of the key fatty acids so that the body can produce the right levels of hormones which maintain good health both internally and in relation to the skin.

What does this mean to the Skin care formulator?

Recent research has promoted the virtues of a balanced fatty acid intake and a result a number of products are now on the market which are designed to deliver the optimal ratio of Omega 3, 6 and 9. However, many of the oils used in dietary supplements are unsuitable for use in skin care, due for example to issues of stability or odour.

In response to this, the NorOmega PC 369 formulation has been specifically developed for the skin care market in mind.

What is NorOmega PC369?

NorOmega PC 369 is a 100% naturally derived lipid formulation which contains all of the essential nutrient fatty acids and delivers them in a ratio which favours good skin nutrition and absorbance whilst maintaining good product stability and odour
It is formulated using a number of specially selected natural lipids which contain high levels of the key fatty acids found in the skin which the body uses to maintain healthy skin condition and combat inflammatory related skin disorders.
The formulation is slightly biased toward the Omega 9 Oleic Acid as this gives the product a greater affinity with the skin, making the product easier to absorb and aiding the intake of the other essential fatty acids.

Product Composition
NorOmega PC 369 standard formulation is made using lipids from the following naturally grown non GM seeds :

Helianthus Annus – Sunflower oil - HO
Camelina Sativa – Camelina Oil
Echium Plantageneium – Echium Oil
Ribes Nigrum - Blackcurrant seed oil

The exact ratio of these can be modified to suit customer requirements but in the standard formulation the ratio of Omega 3:6:9 is 1:1:1.5 respectively.

The formulation consists of the following fatty acid groups in the proportions shown

Fatty Acid Group	% of formulation	Principle Active Fatty Acids
Omega 3	25-30%	C18:3w3 Alpha Linolenic Acid (ALA) C18:4w3 Stearidonic Acid (SDA)
Omega 6	25-30%	C18:2w6 Linoleic Acid (LA) C18:3w6 Gamma Linolenic Acid (GLA)
Omega 9	40-45%	C18:1w9 Oleic Acid

Total Essential Fatty Acid Content 50%

Active Fatty Acids

In addition to the Alpha Linoleic (ALA) and Linoleic Acids (LA), the product incorporates Gamma Linoleic Acid and Stearidonic Acid , the latter being found in only a select number of plant seeds. Both GLA and SDA are metabolised quicker and more efficiently than either LA or ALA, giving the body a boost in its fight against dry and damaged skin.

Co Factors to consider

Whilst this product is designed to provide a wide range of nutrient fatty acids it is also advisable to consider the use of certain vitamins. In particular Vitamins A, C,E and the B series should be considered as part of the final product formulation as they not only protect the fatty acids from oxidation (A&E) they also aid the metabolism of the acids into the more functional compounds. We recommend the addition of 250ppm natural mixed tocopherols to the oil as an antioxidant

Clinical Results

The following is a summary of the clinical studies carried out using the standard formulation of NorOmega PC 369 against a blank untreated area as the control. The testes were carried out on up to 20 human subjects in the age range 18-63.

Skin Hydration – using Corneometer measurements
In comparison to untreated skin, NorOmega PC 369 increased skin hydration by 25% within 28 days of treatment.

Biomechanical properties (Firmness and Elasticity) – using Cutometer measurements
In comparison to untreated skin, NorOmega PC369 not only increased skin firmness but at the same time also increased skin elasticity. The overall improvement over 28 days was calculated to be between 12% and 14% compared to untreated skin,

Skin Roughness – PRIMOS measurement
In comparison to untreated skin, NorOmega PC369 made a 16% improvement in skin smoothness over 28 days

Decrease in Wrinkle Depth – PRIMOS measurement.
In comparison to untreated skin NorOmega PC369 made a small but measurable reduction in wrinkle depth of 6% over 28 days.

Protection against UV Induced Skin Irritation – Skin redness and TEWL
The objective of this test was to determine the potential protective properties of NorOmega PC369 against UV irritation under accelerated conditions.
The UV irradiation induced reddening in the test area after 18-24 hours. During the following application phase, skin redness was found to decrease more quickly in the areas treated with NorOmega PC 369 compared to the untreated areas over the first 3 days but the effect was minimal thereafter.

UV irradiation had a limited influence on TEWL in both the treated and untreated areas. NorOmega PC 369 did not significantly reduce TEWL under accelerated irritation conditions

Summary and Conclusions

1) NorOmega PC 369 (standard formulation) is a nourishing lipid formulation which improves skin condition with regard to hydration, firmness and elasticity. It gives the skin a softer, smoother feel and also makes a small but measurable reduction in winkle depth. Whilst it reduces skin redness it does not provide significant protection against uv irritation and TEWL under accelerated conditions.

2) For cost reasons, the standard formulation was developed using higher levels of Linoleic and Linolenic Acids, these take longer to metabolise. By changing the ratio in favour of GLA and SDA it is believed that the product will have improved effects upon wrinkle depth and uv protection as these fatty acids are metabolised and become more effective more quickly – to test this theory an enriched grade known as NorOmega PC 369 Premium will be formulated and subject to further tests early in 2006

3) The metabolism of fatty acids is a slow but progressive process which delivers benefits to the skin over a longer period of time compared to other non vegetable and synthetic materials (which give quick but short lasting improvements). However, these trials support the proposal that the use of NorOmega PC369 will engender long lasting improvements to a range of skin conditions by providing a range of nutrient lipids in a balanced, easily absorbed formulation.

Suggested Applications and Addition rates of NorOmega PC369

1. Body oils: 50 - 100%
2. Light body moisturising creams: 3-10%
3. Anti ageing/night time hand & face rejuvenating creams 5-15%

Manufacturing Process

The component oils are extracted from their parent seeds using traditional physical and chemical extraction processed.
The extracted oils are then formulated in accordance with the specification and recipe.
The resultant blend is then refined using traditional techniques so as to reduced colour and odour to an acceptable level.
Natural tocopherols are then added to the bulk refined oil.
Finally the oil is packed into 190kg or 23kg drums under nitrogen blanket.

GM statement

To the best of our knowledge NorOmega PC369 is not made from nor contains any ingredients derived from GM sources.

Animal testing Declaration

NorOmega PC369 has not at any time been tested on animals other than consenting human subjects.

Product Specification

Spec Ref No	NOR 001 – draft 1	Issue Date	01/09/05
Product Name:	NorOmega PC369 cosmetic formulation		
Origin	EU		
Description	A specially formulated blend of plant derived lipids which improves a number of skin conditions when applied topically		

Test Parameter	Range/Max/Min	Typical Value
Acid Value	2 max	0.8
Peroxide Value	10 max	2.0
Iodine Value	138-158	143
Apeearance	Clear Golden yellow liquid , may form waxes at temps below 10 C	
Fatty Acid Profile (Key Fatty Acids)		
Fatty Acid	Range/Max/Min	Typical Value
C16:0	3-9	4.0
C18:0	3-6	4.0
C18:1	32-38	36.0
C18:2	18-22	20.2
C18:3 ALA	18-22	19.9
C18:3 GLA	4-6	4.6
C18:4 SDA	2.5-4.5	3.1
C20:0	0-2	1.0
C20:1	2.5-7.5	4.2
C22.0	0-2	1.0
C22:1	0-2	0.8

Additives Added	250ppm Tocomix is recommended
Additional information	This specification has been developed using a limited number of formulations. We reserve the right to modify it as larger commercial batches are produced on a more regular basis

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