

INSTITUT EUROPEEN DES ANTIOXYDANTS
(IEA)



EVALUATION OF TOTAL
ANTIOXIDANTE AND NUTRITION
FACT (INCO) OF LYOPHILIZED EGGS

STUDY N°: ST_SCEA_PROPL_08_2021_44

INSTITUT EUROPEEN DES ANTIOXYDANTS (IEA)

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INTRODUCTION

Antioxidants are molecules with various origins able to neutralize activated forms and toxic oxygen species (singlet oxygen, superoxide anion, hydrogen peroxide and Peroxyl radicals, hydroxyl radical) and to slow the degradation of materials or organic compounds due to oxidation effects.

The total antioxidant activity is the ability of antioxidant compound (or a set of compounds) to trap free radicals. It can be assessed using different classical measurement (DPPH, TEAC (ABTS), ORAC, FRAP) and with a new exclusive method "PAOT Liquid Technology®": Total Antioxidant Power.

PAOT Technologies® is more precise because it measures all antioxidants molecules present in the extract, unlike other classical tests. This may be explained by the fact that standard methods do not take account on nature, the specificity of the antioxidants, nor the solvent / extract interaction.

Company: **SCEA**

Interviewees: **GRANGE BASSE (BASIT IGTET)**

Date of receipt: **01/07/2021**

Product number: **31**

Order n°: **44**

Image placeholder: product_image:350:350

Specification: **072021IEA**

Date of order: **26/07/2021**

Date of analysis: **13/07/2021**

Date of report sending: **08/12/2021**

Table 1: list of analyzed products

Ref. Formule	Lot	Aspect	Test reference	Quantity	Conservation	Conditions de test	Risks
<u>Lyophilized eggs</u>	xxx	xxx	xxx	xxx	xxx	xxx	xxx

The product Lyophilized eggs was tested pure. For the analysis, 1g of the product was introduced into the cell of PAOT Liquid Technology® device

TOTAL ANTIOXIDANT POWER (PAOT TECHNOLOGIES®)

Technologies PAOT/POTScore® (Total antioxidant/oxidant Power) is based on the electrochemical nature of oxidation-reduction reactions (balance antioxidants/oxidants). The principle is based on the change in the ratio of forms oxidized and reduced components of the medium. This change is the result of concentrations of the oxidized / reduced forms during the reaction (1) for antioxidants and the reaction (2) for oxidants:

Reaction medium + AO (Antioxidant) → AOOx reaction medium + (oxidation of the antioxidant Result) (1)
Reaction medium + OA (Oxidizer) → reaction medium OA + Red (Result reducing oxidative) (2)

The experimental conditions were carried out in triplicate (n = 3).

The total antioxidant power of product is expressed in PAOT Score® (/ l or / g of the product) which measures the ability of product to neutralize free radicals. This index (PAOT Score) is used by to select products that provide the best antioxidant protection. It is obtained by PAOT Liquid Technology® (developed by the European Antioxidant Institute (IEA) and can be expressed relative to reference antioxidants² (trolox, vitamin C...).

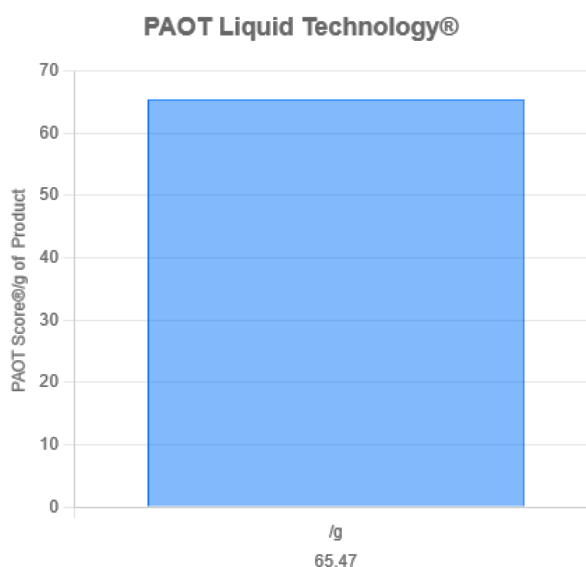


Figure 1: Total antioxidant power expressed with PAOT Score® /g of Lyophilized eggs.

At the study conditions, the product Lyophilized eggs obtained a PAOT Score of 65.469 /g (SD= 1.051).

1 Poutaraud A, Guilloteau L, Gros C, Lobstein A, Meziani S, Steyer D, et al. Lavender essential oil decreases stress response of horses. Environ Chem Lett. 2017;1–6.

1 Kaci M, Belhaffef A, Meziane S, Dostert G, Menu P, Velot É, et al. Nanoemulsions and topical creams for the safe and effective delivery of lipophilic antioxidant coenzyme Q10. Colloids Surf B Biointerfaces. 2018;167:165–75.

1. Total antioxidant activity presented by reference equivalent

The equivalence is expressed with g of reference per g of product. When equivalence value is higher, the product is more efficient.

- AAEAC : Ascorbic Acid Equivalent Antioxidant Capacity;
- BHEAC : BHA Equivalent Antioxidant Capacity;
- BHEAC : BHT Equivalent Antioxidant Capacity;
- TOEAC : Tocopherol Equivalent Antioxidant Capacity
- ...

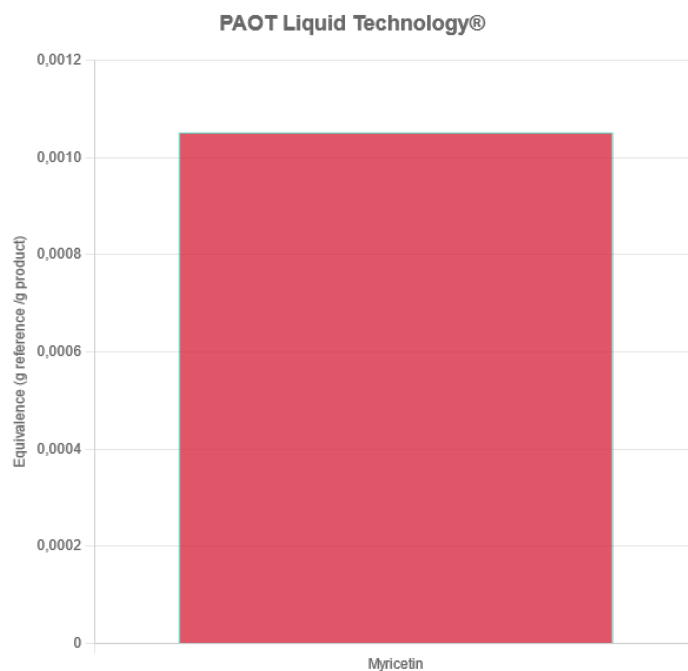


Figure 2: Total antioxidant activity expressed with equivalence g of antioxidant per g of product.

Ex: The total antioxidant power (PAOT Score®) of 1 g Lyophilized eggs is equivalent to 0,001133 g of ascorbic acid.

NUTRITION FACT (INCO)

2. The analytical methods for the determination of nutrients in Lyophilized eggs

The following table includes the list of nutrients and their methods of analysis.

Table 2 : The list of nutrients and their analytical methods

Nutrient	Unit	Analytical method / method of determination
Edible portion	ratio	Calculated as the edible portion of the total food as purchased (Pod 10 ml)
Énergie	kJ, kcal	The metabolizable energy values of all foods are given in both kilojoules (kJ) and kilocalories (kcal). The energy values have been calculated based on protein, fat, available carbohydrates, fibre and alcohol values and by applying the energy conversion factors
Water	g	Drying
Protein, total	g	The protein content was calculated by multiplying the nitrogen values with the nitrogen conversion factors of Jones. If no specific factor is given, the general nitrogen conversion factor of 6.25 was used.
Fat, total	g	Mixed solvent extraction or [Soxhlet extraction for cereals]
Dont Acide gras	g	Gas chromatography (GC)
Carbohydrate available by difference	g	100 - 100 - (Water + Protein + Fat + Ash + Fibre + Alcohol)
Sugar	g	High performance liquid chromatography (HPLC)
Dietary Fiber, total	g	AOAC Prosky method or [Weende method]
Salt (calculated from the determination of sodium)	g	Ion Chromatography / flux

NUTRITIONAL MEAN VALUES

The table below (Table 3) shows the average nutritional values Lyophilized eggs

Lyophilized eggs
Average nutritional values

	100g	
Energy values	591,4 Kcal	
	141,5 KJ	
Protein	45,2 g	(g/100g)
Carbohydrates	3,2 g	(g/100g)
of which sugars	0,3 g	(g/100g)
Fat	44,2 g	(g/100g)
of which saturated fatty acids	14,7 g	(g/100g)
Fibr	1,1 g	(g/100g)
Salt	1,300 g	(g/100g)

of % of the nutritional reference values, for an adult with an average intake of 2000 Kcal per day.

Table 4 : Amino acid profile mean values Lyophilized eggs

Methods	Results (mg/100g of product)
Acide aspartique	5124
Thréonine	2374
Sérine	3791
Acide glutamique	6641
Proline	1885
Glycine	1611
Alanine	2818
Valine	2986
Cystéine	1833
Méthionine	1801
Isoleucine	2465
Leucine	4160
Tyrosine	1929
Phénylalanine	2702
Lysine	3481
Histidine	1250
Arginine	3005
Tryptophane	706
TOTAL	50562

CONCLUSION

The results obtained by PAOT Liquid Technology® show that product Lyophilized eggs tested pure, obtained a PAOT score of 65.469 /g (SD= 1.051). It is considered as product with effective antioxidant power (Effective).

According to the scale (fig 3), the Lyophilized eggs may be labeled (PAOT® label below) for certify his *In vitro* antioxidant effectiveness.

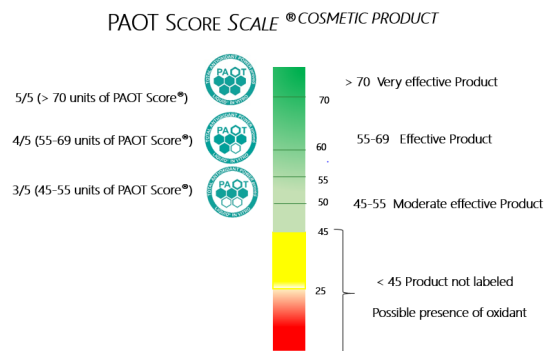


Figure 3: PAOT Liquid Technology scale.



Figure 4: PAOT Score® of Lyophilized eggs
 Score 4/5 classified product:
 effective efficiency

Nancy, Monday, July 26, 2021

Analysis Responsible

Dr. Mouna KACI

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A handwritten signature in blue ink, appearing to be 'Mouna Kaci', written over a faint grid background.