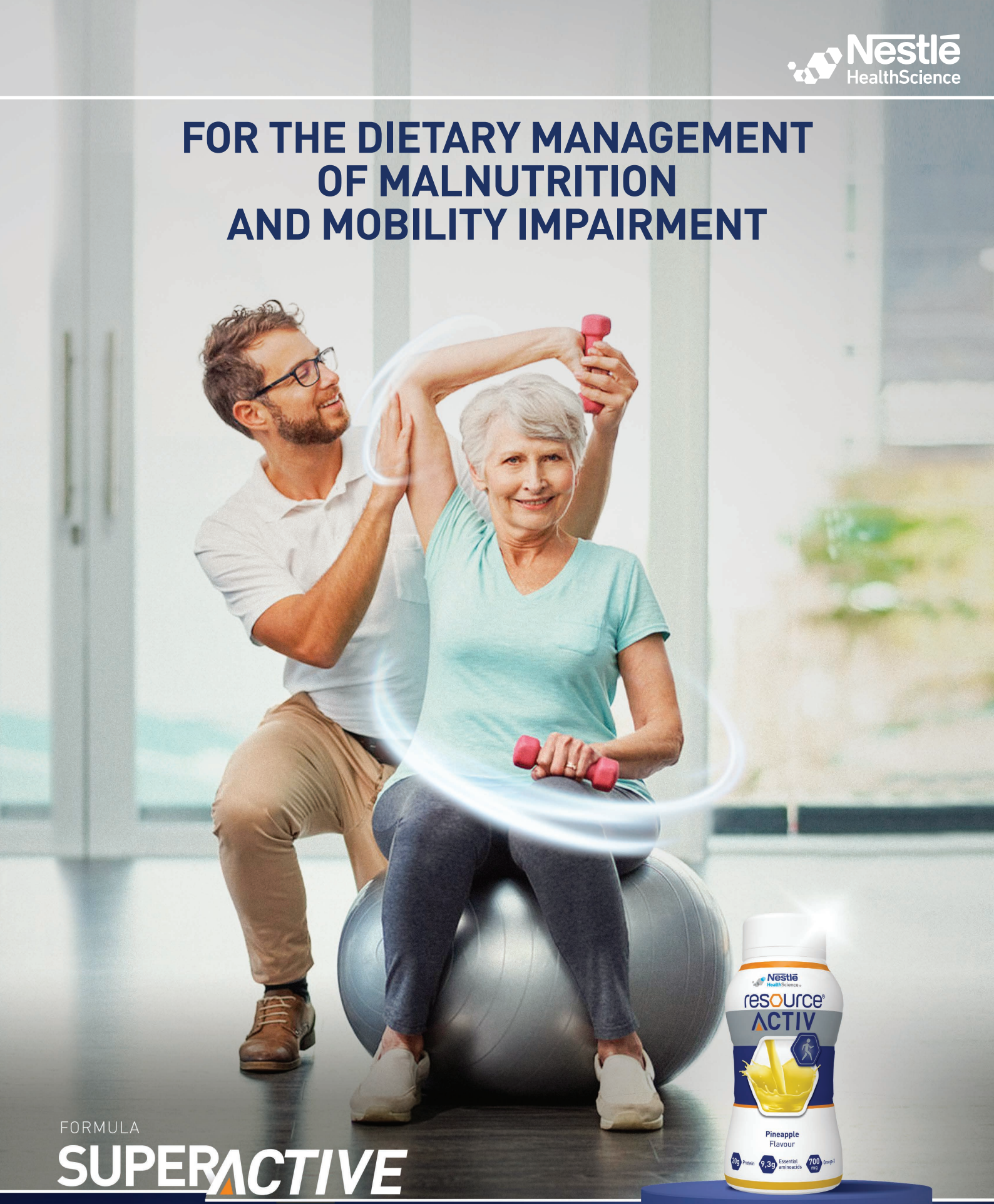
Nestlé HealthScience

FOR THE DIETARY MANAGEMENT OF MALNUTRITION AND MOBILITY IMPAIRMENT



FORMULA
SUPERACTIVE

THE POWER OF A UNIQUE COMBINATION.

RESOURCE® ACTIV offers a novel holistic approach to the management of malnutrition in mobility impairment by combining a unique blend of **high quality protein with omega-3 PUFAs, vitamin D and calcium** in order to improve nutritional status, muscle mass and function.

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A GREAT NUTRITIONAL FORMULA COMES WITH GREAT RESPONSIBILITY: REGAIN MOBILITY

RESOURCE® ACTIV IS A **NUTRIENT-SPECIFIC** COMPLETE ORAL NUTRITIONAL SUPPLEMENT THAT PROVIDES THE NUTRITIONAL NEEDS OF PATIENTS WITH (RISK OF) **MALNUTRITION** AND **MOBILITY IMPAIRMENT**.

RESOURCE® ACTIV offers a novel holistic approach to the management of mobility impairment by combining a unique blend of **high quality protein with omega-3 PUFAs, vitamin D** and calcium in order to improve **nutritional status, muscle mass and function.**

RESOURCE® ACTIV is targeted at patients with (risk of) malnutrition and mobility impairment associated with:

Age-related muscle loss (e.g. sarcopenia, frailty).

Mobility-reducing chronic diseases (e.g osteoarthritis).

Acute events (e.g. falls and fractures).

FORMULA

SUPERACTIVE

2 BOTTLES PER DAY OF **RESOURCE® ACTIV** PROVIDES:

640 kcal
1,6 kcal/ml

SUPPORTS PATIENT'S DAILY ENERGY REQUIREMENTS

RESOURCE® ACTIV helps to meet increased energy needs of individuals with (risk of) malnutrition and mobility impairment, hence reducing risk of body weight loss and supporting its recovery.

18,6g EAA
9,0 g BCAA
4,4 g Leucine

PROMOTES MUSCLE PROTEIN SYNTHESIS

RESOURCE® ACTIV contains **40g** of **high quality protein**, with high levels of essential amino acids (EAA) and branched amino acids (BCAA) including leucine to activate **muscle protein synthesis** and **muscle growth**[1-4].

Casein / Whey: 80/20

MINIMISES MUSCLE PROTEIN BREAKDOWN

RESOURCE® ACTIV has been specially formulated to combine fast & slow digestion of protein to minimise fasting between meals and during night sleep[5,6].

1088 IU Vit. D
960 mg Calcium

MAINTAINS BONE MINERAL DENSITY

RESOURCE® ACTIV provides high quantities of **calcium** and **vitamin D**, which have been proven to maintain bone mineral density and **reduce risk of falls/ fractures**[7].

1,4 g omega-3 PUFAs
440 mg EPA + 220 mg DHA
ω6 / ω3 ratio: 2:1

SUPPORTS INFLAMMATION MANAGEMENT

RESOURCE® ACTIV is enriched with fish oil with an optimal ratio of pro-inflammatory / anti-inflammatory LC-PUFAs (EPA+ DHA) to contribute to the daily intake of omega-3 and support management of disease-related inflammation[8-10].

High coverage of key vitamins and minerals*

Vitamins: A (95,6%), B6 (129%), B12 (83%) Folic (70%), C (71%), D (181%)
Minerals: Zinc (73%), Selenium (145%) Iron (90%), Chromium (133%)

HELPS TO MINIMISE KEY NUTRIENT DEFICIENCY

RESOURCE® ACTIV contains high amounts of key vitamins and minerals to minimise nutrient deficiency commonly found in older adults.

6 g Prebiotic Fibre (FOS + Inulin)

FOSTERS GUT HEALTH

RESOURCE® ACTIV contains a specific prebiotic fibre blend which increases growth of beneficial bacteria in the gut and supports colonic transit regulation[11].

*Based on Recommended Daily Allowances (RDA) for >70 years old.

MOBILITY IMPAIRMENT AND MALNUTRITION ARE HIGHLY PREVALENT CONDITIONS THAT DRASTICALLY AFFECT THE QUALITY OF LIFE OF PATIENTS

MOBILITY IMPAIRMENT AFFECTS UP TO **40% OF OLDER ADULTS**[12] AND MAY BE ASSOCIATED WITH FALLS, FRACTURES AND AGE-RELATED DISEASES.

Mobility impairment (MI) is characterised by **a loss of muscle mass and function, fatigue and inactivity** reducing the ability to perform activities of daily living[13].

It may be caused by **age-related muscle loss** (such as sarcopenia or frailty), **mobility-inducing chronic diseases** such as osteoarthritis, and **acute events** (such as falls and fractures)[13].

MALNUTRITION & MOBILITY IMPAIRMENT ARE STRONGLY ASSOCIATED IN A CAUSE AND EFFECT CYCLE WHICH MAY RESULT IN A **REDUCED QUALITY OF LIFE AND HIGH RISK OF MORTALITY**.

MI MAY LEAD TO MALNUTRITION AS A RESULT OF DECREASED FOOD INTAKE, WHILE MALNUTRITION MAY LEAD TO MI AS A RESULT OF PROTEIN DEFICIENCY.

(RISK OF) MALNUTRITION IS PREVALENT IN **MORE THAN HALF OF SARCOPENIC AND FRAIL OLDER ADULTS.**

Malnutrition or risk of malnutrition may be prevalent in up to **66%** of sarcopenic and **64%** of frail elderly adults in the community setting[16,17] and is associated with:

- **2x increase risk of mobility impairment**[18].
- **6x increase risk of institutionalisation**[18].
- **2x increase falls**[19].

PREVALENCE OF MALNUTRITION

- **20,3%** of sarcopenic older adults[20]
- **21% COPD** hospitalised patients[21]
- **40-50%** Polymorbid hospitalised patients[22]

PREVALENCE OF SARCOPENIA

- **80%** of malnourished older adults[23]
- **15-21% COPD** hospitalised patients[24]
- **21,8%** Polymorbid patients[25]

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SARCOPENIA AND FRAILTY ARE GERIATRIC SYNDROMES THAT ARE ASSOCIATED WITH FUNCTIONAL DECLINE IN OLDER ADULTS

THE NATURAL AGEING PROCESS CAN RESULT IN A **LOSS OF MUSCLE MASS AND STRENGTH** RESULTING IN SERIOUS CONSEQUENCES SUCH AS **SARCOPENIA AND FRAILTY**.

Physiological, psychological and social changes that occur during the ageing process are associated with **changes in the musculoskeletal system** which may lead to **decline in muscle mass, muscle strength, bone health and overall weight**.

SARCOPENIA

- Progressive and generalised **loss of skeletal muscle mass, strength and function** as a result of ageing[26].
- Worldwide prevalence is **10%** for both men and women[25] and **37%** among hospitalised individuals[20].
- Recognised as a **muscle disease** and has an assigned **ICD-10 code** (as of 2018)[28].

Sarcopenia is associated with a **5x** increase in the risk of developing mobility impairment[29].

Sarcopenia leads to a **1,8-fold** increased risk in recurrent falls and impairs activities of daily living[30,31].

FRAILTY

- Defined as a **clinical syndrome** using the Fried Frailty Index where 3 or more criteria are present[32].
- Prevalence in community-dwelling adults above 65 is estimated to vary between **4,9%** to **27,3%**[33] and **68,8%** in the institutionalised older adults[34].

Frailty is associated with increased hospitalisation and falls[35] and **3x** increased risk of developing MI[36].

FALLS AND HIP FRACTURES ARE SERIOUS CONSEQUENCES OF NUTRITIONAL DEFICIENCIES IN OLDER ADULTS

ACUTE EVENTS AND CHRONIC DISEASES RELATED TO **LOSS OF MUSCLE MASS AND STRENGTH.**

Fall experience and hip fractures are increasingly common in elderly people[37-40] as the health of bones, muscles and joints deteriorates with advancing age.

- **Bone mineral density** decreases with advancing age, resulting in chronic conditions such as **osteoporosis and osteopenia**[37].
- Loss of bone mineral density is caused by **lack of vitamin D and calcium** and is associated with ageing[41].

PATIENTS WHO EXPERIENCE HIP FRACTURES ARE...

5,6x
More likely to require institutionalisation in the year following hip fracture[43]

4,2x
More likely to have mobility limitations 2 years after hip fracture[42]

Bone mineral density loss due to a lack of vitamin D and calcium may result in chronic conditions such as osteoporosis, osteopenia and osteosarcopenia.

MALNUTRITION AND MOBILITY IMPAIRMENT: A SUBSTANTIAL HUMANISTIC AND ECONOMIC BURDEN

QUALITY OF LIFE

Malnutrition and MI has a negative impact on an individual's health-related quality of life due to **increased pain/discomfort, poor mental health and a reduced ability to engage with activities of daily living**[44-49].

Sarcopenic patients have:

- **26% lower SarQoL** scores in activities of daily living compared to non-sarcopenic patients[45].
- **9% lower SF-36** physical and mental component scores compared to non-sarcopenic patients[46].

Frail patients suffer from increased bodily pain compared to non-frail patients[47].

ECONOMIC BURDEN

Malnutrition and MI generate a **substantial economic burden** due to a patient's **increased number of hospitalisations, greater reliance on residential care services and increased use of GP services**:

- The direct cost of musculoskeletal disease-associated malnutrition is estimated to be around **EUR 9.5 billion in Europe.**[50].
- Patients with muscle weakness have **higher annual healthcare costs in primary and secondary care** and require more prescription medications[51].
- Patients who have had a fall resulting in hip fractures have **higher mean treatment costs** compared to non-fracture injuries (1.289€ vs 135€)[52].
- Sarcopenia is associated with **increased hospital length of stay** from post-operative complications[53].

CLINICAL NUTRITION THERAPY IN INDIVIDUALS WITH MOBILITY IMPAIRMENT AND MALNUTRITION

OBJECTIVES

01 Improve and recover nutritional status.

02 Prevent/delay the onset of chronic complications by modifying nutrient intake.

03 Improve functional status and promote autonomy by modifying lifestyle.

NUTRITIONAL RECOMMENDATIONS

Early interventions are **essential to prevent mobility impairment and malnutrition.** The most promising nutritional interventions to prevent skeletal muscle loss and improve nutritional status **in malnourished adults with loss of muscle and function** in clinical populations include **high quality protein**-enriched oral nutritional supplements that contain essential amino acids; **fish oil-derived**, long-chain **omega-3** polyunsaturated fatty acids; and multivitamin/multimineral supplements, with special attention to **vitamin D** intake[54].

BENEFITS OF NUTRITIONAL SUPPLEMENTS PLUS PHYSICAL EXERCISE

Personalised physical exercise **reduces the rate of falls and improves gait ability, balance and strength performance**, which all help maintain the functional capacity during ageing[55].

The combination of oral nutritional supplementation with physical exercise **induces an increase in muscle mass and function**, and a decrease in adipose muscle infiltration that ultimately leads to an improvement in frailty and sarcopenia conditions[56-58].

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NUTRIENTS REQUIRED FOR THE DIETARY MANAGEMENT OF INDIVIDUALS WITH MOBILITY IMPAIRMENT AND (RISK) OF MALNUTRITION

PROTEINS ARE KEY MACRONUTRIENTS FOR THE PRESERVATION AND IMPROVEMENT OF THE FUNCTIONAL CAPACITY.

Inadequate dietary protein intake is generally recognised as a **risk factor contributing to low muscle mass and function**[58,59].

While protein needs seem to **increase** with ageing, protein intake **decreases** with advancing age[56].

RECOMMENDATIONS

PROT-AGE / ESPEN GUIDELINES[58-60]

1,2-1,5 g/kg/day: for malnourished older adults or those at risk of malnutrition because they have acute or chronic illness[59].

Maximal stimulation of muscle protein synthesis (MPS) can be achieved by the nutritional supplementation of ~15 g EAA per day*[1].

- BCAAs (leucine, isoleucine and valine) have been shown to **increase muscle growth and prevent muscle wasting** by activating biochemical pathways in the body that stimulate muscle protein synthesis[2,3].
- **Leucine is the most potent amino acid for muscle growth and repair**, with an evidence-based recommendation of 2,5 - 2,8 g of leucine per meal for healthy older adults[56].

The combination of fast and slow type high-quality proteins can be **an effective strategy to reduce muscle breakdown between meals and during sleep hours**[61].

- **Whey protein is a high-quality protein with a fast digestion rate** which can directly stimulate amino acid oxidation and protein synthesis, thus acting as a quick source of EAAs[62].
- **Casein is also a high-quality protein with a slower digestion rate** which can sustain amino acid production over a longer time period (6-7 hours), thus helping to reduce muscle breakdown between meals and during sleep hours[5,63].

*This requirement may be slightly increased for elderly individuals and those with mobility impairment.

VITAMIN D AND CALCIUM

Vitamin D and calcium supplementation is also commonly provided for the **maintenance of bone strength and fracture risk reduction, particularly in patients prone to falls[60].**

OMEGA 3

Individuals with (risk of) malnutrition and MI also commonly suffer from risk of **inadequate PUFA intake**[68]. **Marine fish** has numerous **health benefits** for people of all ages but particularly in elderly people when it comes to the **management of inflammation**.

- **Omega-3 polyunsaturated fatty acids** contained in marine fish are responsible for numerous **cellular functions**, such as signaling, cell membrane fluidity and structural maintenance[69].
- **EPA** and **DHA** can **prevent the development of inflammatory diseases** and can alleviate inflammatory processes that already exist[9,10].

Western diets are **deficient in omega-3 fatty acids** and have **excessive amounts of omega-6 fatty acids (ω6:ω3 ratio is 15:1-16,7:1)[70].**

- **A low n-6: n-3 ratio is recommended** to maintain the optimal balance between the pro-inflammatory properties on n-6 PUFAs and anti-inflammatory properties of n-3 PUFAs[71].
- Recommendations for **optimal n-6:n-3 ratios** across European countries vary between **2:1** and **10:1**[72].
- Use of **dietary supplements containing omega-3** also contributes to total omega-3 intakes.

HIGHLIGTHS ON MOBILITY IMPAIRMENT AND MALNUTRITION: A VICIOUS CYCLE TOWARDS REDUCED QUALITY OF LIFE AND HIGH RISK OF MORTALITY

REASONS

- Reduced protein and caloric intake.
- Involuntary loss of muscle mass & strength (sarcopenia).
- Decreased physical activity.
- Higher protein needs.
- Deficiency in key nutrients related to inflammatory status and immune health.

EFFECTS

Insufficient intake of energy, protein and other key micronutrients to meet an individual's nutritional requirements.

Mobility Impairment related to malnutrition.

CONSEQUENCES ON HEALTH

- Loss of muscle mass, strength and function: poor physical performance, functional decline, fatigue and physical disability, falls, etc.
- Constipation.

HUMAN AND CLINICAL BURDEN

Reduced quality of life.

Pain/ discomfort.

Poor mental health.

Higher risk of falls and hospitalisation.

Increased hospital stay length and use of healthcare resources.

REGAIN MOBILITY WITH THE NEW RESOURCE® ACTIV

RECOMMENDED DOSE AND FLAVOURS

3 NEW TASTY FLAVOURS

INDICATION

For the dietary management of patients with malnutrition or at risk of malnutrition and mobility impairment which causes a reduction in functional capacity, such as:

- **FRAILTY**
- **SARCOPENIA/ OSTEOSARCOPENIA**
- **FALLS, FRACTURES AND OSTEOPOROSIS**
- **INFLAMMATORY CHRONIC DISEASES SUCH AS OSTEOARTHRITIS**
- **POLYMORBIDITY**

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PRODUCT NUTRITIONAL INFORMATION*

		100ml	200ml
Energy	kcal	160	320
	kJ	670	1340
Fat (42% kcal)	g	7,4	14,8
Saturated fatty acids	g	1,2	2,4
Monounsaturated fatty acids	g	4,0	8,0
Polyunsaturated fatty acids	g	1,6	3,2
Total n-3 PUFA	mg	350	700
• α-linoleic acid	mg	180	360
• **EPA**	mg	110	220
• **DHA**	mg	55	110
Carbohydrates (31% kcal)	g	12,6	25,2
• Sugars	g	6,7	13,4
• Lactose	g	<0,50	
Total Dietary Fibre	g	1,5	3,0
Protein (25% kcal)	g	10	20
• **EAA**	g	4,65	9,3
• **BCAA**	g	2,25	4,5
• L-Leucine	g	1,1	2,2
Minerals			
Sodium	mg	65	130
Chloride	mg	165	330
Potassium	mg	320	640
Calcium	mg	240	480
Phosphorus	mg	120	240
Magnesium	mg	28	56
Iron	mg	1,8	3,6
Zinc	mg	2,0	4,0
Copper	µg	220	440
Iodine	µg	18	36
Selenium	µg	20	40
Manganese	mg	0,3	0,6
Chromium	µg	10	20
Molybdenum	µg	12	24
Fluoride	mg	0,20	0,40

		100ml	200ml
Vitamins			
A	µg RE	215	430
D	µg	6,8	13,6
E	mg	3,6	7,2
K	µg	18	36
C	mg	16	32
B1	mg	0,26	0,52
B2	mg	0,45	0,90
B6	mg	0,55	1,1
Niacin	mg NE	3,7	7,4
Folic acid	µg	70	140
B12	µg	1,1	2,2
Pantothenic acid	mg	1,1	2,2
Biotin	µg	7,2	14,4
Other nutrients			
L-Choline	mg	70	140
Taurine	mg	8,5	17
L-Carnitine	mg	14	28
Osmolarity	**mOsm/l**	**730**	
Water content	**g/100ml**	**75**	

* Values and information refer to tropical vanilla variety.

Ingredients*:

Water, milk proteins, glucose syrup, vegetable oils (sunflower, rapeseed), sucrose, fibres (fructo-oligosaccharides, inulin), minerals (calcium lactate, potassium chloride, calcium citrate, sodium citrate, magnesium citrate, magnesium oxide, ferrous sulphate, zinc sulphate, manganese sulphate, copper sulphate, sodium selenate, sodium fluoride, sodium molybdate, chromium chloride, potassium iodide), fish oil, emulsifier (E471), L-leucine, choline bitartrate, vitamins (C, E, B6, pantothenic acid, niacin, D, biotin, folic acid, A, K, B12, thiamine, riboflavin), flavourings, L-carnitine, stabilizer (E407), taurine, colorant (E160a).

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