Sapropel

Ideal standards of nature

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ABOUT PRODUCT

Sapropel is a substance of biological origin, which forms on the bottom of freshwater lakes as a result of natural bacterial decay of animal and vegetative products with limited oxygen access. **Sapropel** are used as the best organic fertilizers, soil-former, soil amendments, sorbents, food additives for livestock production, valuable component in medicine, pharmacology, cosmetology.

This is a material of biological origin, formed on the bottom of freshwater reservoirs from the plant and animal products in the result of the bacterial processes under a low level of oxygen. It consists of a sludge solution, organic, ashy elements and colloidal complex. The basis of **Sapropel** represents plant origin remnants and colloidal complex organic substances that give **Sapropel** jelly-like consistency. The wealth of different compounds in **Sapropel** is created by the protozoa diversity of animal and vegetable origin. **Sapropel** has organic matter not less than 15%, otherwise, it is lake rainfall. The basis of **Sapropel** represents remained plant origin and colloidal complex – complex organic substances that give **Sapropel** jelly-like consistency.

Sapropel - supervisory body of the amount of water in soils: with en excess of water, it prevents the leaching of the necessary nutrients from it, with a lack of water it is able to provide the necessary nutrients.

Sapropel – centuries-old ground deposits of fresh water lakes of Ice Age. Oxygen depletion in bottom waters then favors the enhanced preservation of the sinking organic matter during burial in the sediments

ABOUT PRODUCT

Sapropel includes three important components: water, ash (inorganic part) and organic matter with very complex and non-uniform structure:

Organic part of the **Sapropel** ●

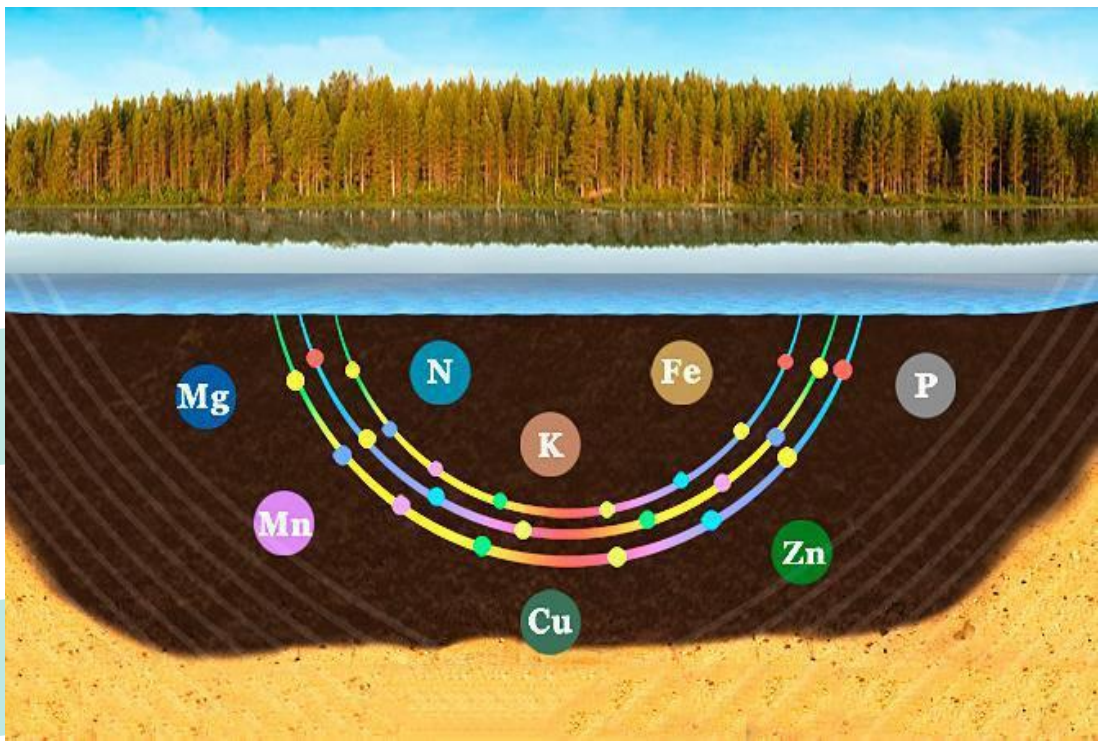
Centuries-old lack of oxygen, small fluctuations of temperature create special conditions for bottom deposits, in which all living and dead cells of plants, animals, seaweed are slowly divided into the making components – amino asids and low-molecular peptides, nucleotides, nucleosides highly active for reproduction of biological substances. Humic and flvic acids have different levels of chemical activity that affect the bactericidal properties of sapropel.

Humic acids are the main group of biologically active agents in sapropels. In sapropel booms special microflora, which enriches its active compounds: α-, β-carotene, chlorophyll, xanthophyll, sterols,organicacids, alcohol compound. A valuable group of biologically active substances form vitamins B (B1, B2, B3, B6, B12), C, E and other. It was established that *sapropel* contains glucose, galactose, mannose, xylose, arabinose and rhamnose.

In *sapropel* 17 amino acids are emitted (lysine, arginine, methionine, glutamic acid and others). Also it is very rich with nitrogen. No other mineral resource (peat, oil, slates) has such amount of nitrogen.

● **Non-organic** part of the **Sapropel**

- contains silicon, calcium, compounds of iron, magnesium, potassium, aluminum, sulfur, phosphorus and other elements.
- Due to the content of natural antibiotics, among which there is natural silver (argentum naturalis), sapropel leads to self-purification of soil from plant pathogens, fungiand harmful microorganisms.
- Sapropel has a high absorption capacity (190-220 mg-Eq / 100g), through which it clears the soil from heavy metals, petroleum products, pesticides, herbicides and other chemical pollutants.



Sapropel – 10 000 years of anaerobic biological processing

ABOUT PRODUCT

Sapropel - biogenous material which hasmulti-purpose value:

the most valuable, environmentally friendly organo-mineral fertilizer. It is absolutely universal, applied to all types of soil and all species of plants. *Sapropel* improves soil structure, texture and its agrochemical composition. Under the influence of *sapropel* soil pH is regulated, content of nutrients and moisture absorption and retention ability is increased, soil aeration is improved, soil processes are activated, which replenishes humus fund.

Period of validity of useful substances in *sapropel* makes not less than 5 years in relation to crops.

Soil-former, soil amendments and sorbent for restoration of the destroyed lands, renewal of efficiency of soil at an erosion and radiation pollution, depletion of ground. *Sapropel* can create fertile soil even on sand, the closest on the properties to the chernozem (natural black soil); irreplaceable product for high-quality improvement, for recultivation and sanitation.

Sapropel allows to create oases in deserts, to change the unsuitable land plots to highly productive.

Sapropel is of great interest in the feeding of animals, which is determined by their strong physiological effect on the body as compared to the traditional mineral additives (mono-ditricalcium phosphate, limestone, chalk, etc.).

Food additives with *sapropel* have biogenous stimulation and contribute to a more intensive growth, reproduction, lactation, resistance and other organism processes, aimed at the improving physiological state of animals.

The unique composition of sapropel, including organic and mineral substances, makes possible to use it in such major areas as:

crop - as a universal fertilizer and soil improver;

livestock and poultry - as a feed additive;

manufacturing of various feed products- as a main component (for feed concentrates, combined fodders) and filler (for premix production);

manufacturing of sorbents for purification of water and soil from oil, heavy metals, radionuclides - as a main component.

ABOUT PRODUCT

Ecological:

- Does not include artificial chemical components and harmful substances;
- Does not have weeds, causative agents of diseases, wreckers;
- While extracted from the bottom of a lake, the process clears water reservoirs and promotes improvementof the environment;
- The high absorbing ability of *Sapropel* purifies soil of heavy metals and herbicides, other polluting chemicals (as a result of experiences it is proved that plants in *sapropel* accumulate twice less heavy metals, than in usual soil).

Time factor:

- efficiency of effect of *sapropel* fertilizer remains during a period of not less than 5 years.

Efficiency:

highly effective environmentally friendly organic soil-former, having everything all nutritious properties of fertilizer, necessary for growth and development of plants, and also a natural humus, as soil amendments, which create fruitful soil even on sand.

Fertilizer ensures a high increase in yield.

Depending on crops type harvest can be increased as follows:

for vegetables – by 100-200%,

for grain crops – by 60-100%,

for corn – by 100-150%,

for potato – by 30-50%,

for fruit and berry crops – by 30-40%,

for annual and perennial grasses – by 25-30%;

our fertilizer allows to reduce and even exclude additional application of NPK fertilizers as it has an optimal content of nitrogen, phosphorus and potassium calculated for different crops;

ABOUT PRODUCT

Types of products and sales markets

- Priority markets
- Perspective markets

1 *Sapropel* products

- Organic Fertilizers
  - Free-flowing (EU standards, MENA, USDA)
  - Granulated (EU standards, MENA, USDA)
  - Tableted (EU standards, MENA, USDA)
  - Concentrated (EU standards, MENA, USDA)
  - Liquid (EU standards, for internal market)
- Soil-formers and amendments
  - Free-flowing (EU, MENA, USDA)
  - Granulated (MENA, USDA)
  - Tableted (MENA, USDA, Asia)
  - Combined (MENA, Southeast Asia)
- Components
  - Organics (peat moss, coconut fiber, compost)
  - Minerals (glauconite, sokirnite)
  - Pelleting of seeds
  - Protection against weed seeds and nematodes

The study of Sapropel was started by Swedish scientists in 1862 and continued by the German scientist R. in 1901, which is called "sapropel". Organic sapropel is the basis of humus reproduction, an energetic material for microorganisms, a source for plant nutrients and an important means of regulating all the agronomically valuable soil properties

There are only a few lakes in the world with sapropel: lakes in Canada, Germany, Latvia and Ukraine.

Our sapropel is extracted from the bottom of the lake Synove, Western Ukraine. The lake is 9000 years old. It has been recognized as Ace Age Lake with unique deposits of organic matter of plant origin.

Characteristics of the field: Name of the field: lake "Synove"

Location: Volyn region, Starovizhevskiy district

Area of the taken subsoil : 73,38 ha

Permitted for extraction volume of *Sapropel:* 1 017 100 tones

Category: C1

Volyn region located in North-West part of Ukraine. Administrative center of Volyn region is city Lutsk

Area of the region is 20 144 sq2.

The extracting parameters

(according to the working draft):

Annual production rate of the final product — 25 000 t.

Area of the field: 72,51 ha

Ukrainian Organic Resources LLC

The company which specializes in production and processing of pure organic sapropel fertilizers in Ukraine

Web: http://ukrorganicres.com

UKRAINIAN ORGANIC RESOURCES GROUP

The company was created in 2011 with the purpose to become the largest producer of organic fertilizers in Europe. Authoritative research associates from Europe and Great Britain develop fertilizers, by our order, free flowing organic fertilizers, granulated environmentally friendly fertilizer, hydrogels, humates, complex multicomponent fertilizers and soil formers and amendments, which can be applied to all types of agricultural and decorative cultures.

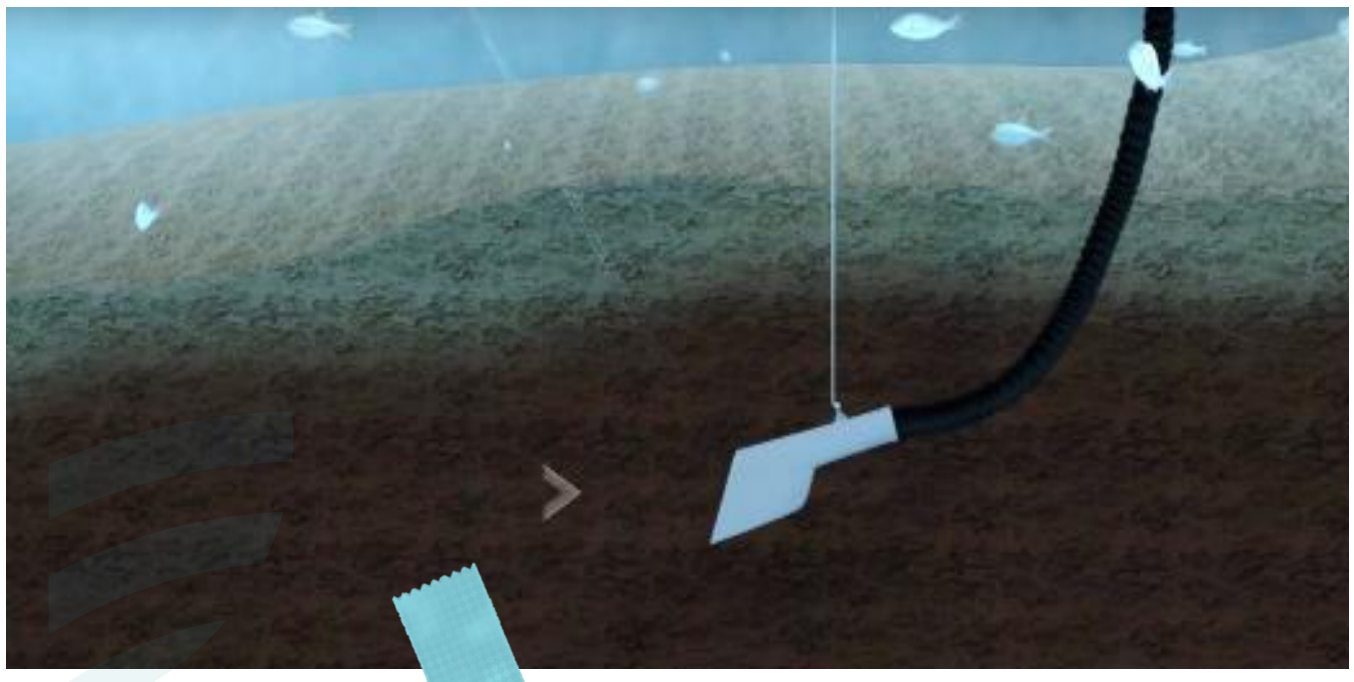
Mission - a fertility raising of dry steppe and desert regions, with harsh difference in seasonal and day temperature changes; lands with saline soils prone to wind, lack of rain.

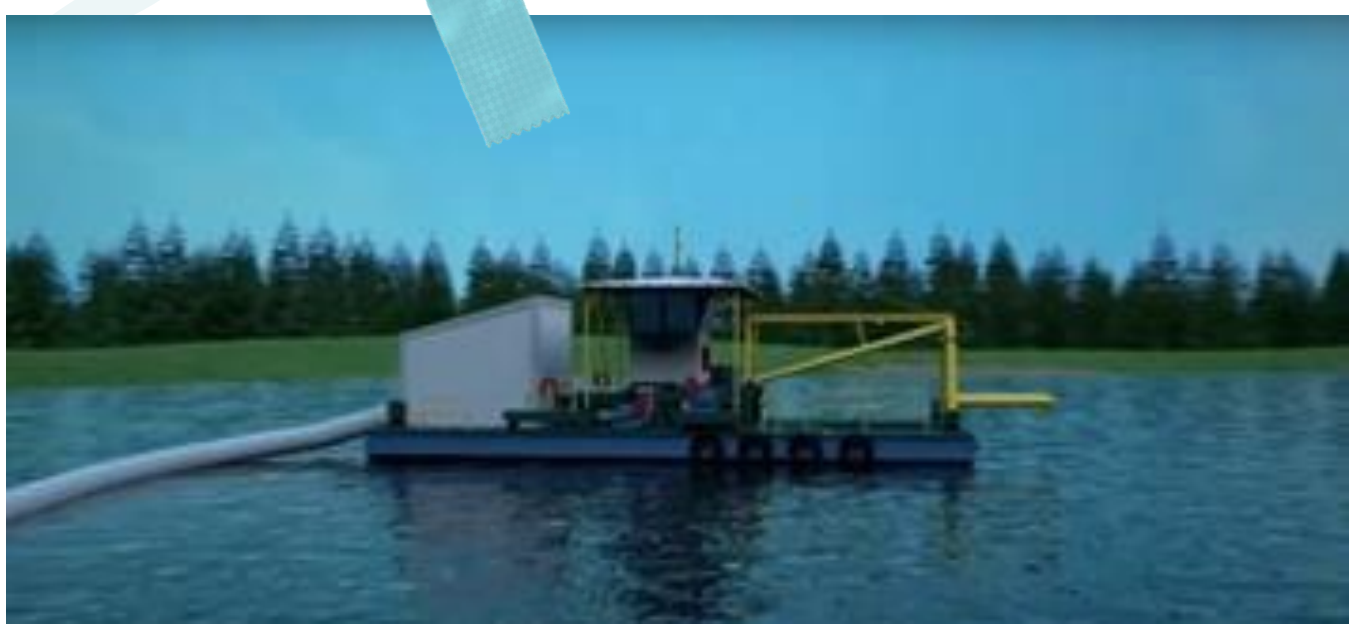
The company has the license (special permission) for production and processing of *Sapropel* with extraction volume permit for 1 017 000 tons and validity period until 2033.

Quality of initial raw materials is the best in the world according to the characteristics that is confirmed by numerous analyses of the leading international laboratories and certification authorities.

The technologies of production and processing of *Sapropel* developed by experts in ecological pure organic fertilizers and soil formers and amendments conform to the highest international standards. The main innovation of the production process is that the company receive a ready-made product in an hour after a *Sapropel* extraction from the bottom of fresh water lake.

ABOUT PRODUCT





Part 1 - Sapropel extraction

is carried out by means of modern technological equipment used for raw material removal.

Technology of project «UOR Group», provides opportunity to extract *Sapropel* from under the bottom layer of the lake (5-15 meters underground). This technique does not render negative influence on the aquatic life and preserves ecosystem of the pond, does not pomp needless water – takes only the sediments and doesn't destroy the ecosystem of the lake's bank.

Part 2 - processing of Sapropel

- After the *Sapropel* is extracted safely from the lake bottom it is piped to the factory premises, located on the bank for further processing into organic fertilizer.
- Organic Invest LLC cooperates with leading institutes and laboratories in Ukraine and UK and abroad in the field of agriculture and developed its own technologies for producing organic fertilizers based on *Sapropel*.
- General process of *Sapropel* treatment includes such steps: Initial dehydration of sapropel from 99% moisture to 85% moisture, using special dehydration equipment, Mixing *sapropel* with heated peat and/or coconut fiber (coir).
- This allows to balance the nutrients of the future fertilizer and also to further dehydrate the mass to 75%.

ABOUT PRODUCT

If required and based upon client request, organic NPK (nitrogen, phosphorus, potassium) components can be added to the fertilizer, The fertilizer is ready to use and is packed into Big Bags or other packaging upon client demand. Production of liquid humate based on *sapropel* – Saprohumate.

The companies subordinated to «Ukrainian Organic Resources»

Ukrainian Organic Resourses LLC, Ukraine
Saprotrade LLC, Ukraine
Scorin Industrial LLC, Ukraine
Organics Volyn LLC, Ukraine
Bulgaria

Державна служба геології та надр України

СПЕЦІАЛЬНИЙ ДОЗВІЛ
на користування надрами

Реєстраційний номер № 5762
Дата видачі від 15 квітня 2013 року
Підстава надання наказ від 21 лютого 2013 року № 85
Вид користування надрами відповідно до статті 14 Кодексу України про надра, статті 13 Закону України «Про нафту і газ» та пункту 5 Порядку надання спеціальних дозволів на користування надрами: видобування
Мета користування надрами: видобування сапропелю
Відомості про ділянку надр (геологічну територію відповідно до державного балансу запасів корисних копалин України), що надається у користування:
назва родовища: Родовище "Синове"

Географічні координати:	Т.1	Т.2	Т.3	Т.4
ПШ	51°28'17"	51°28'31"	51°28'56"	51°28'42"
СхД	24°40'18"	24°40'04"	24°41'11"	24°41'24"

місцезнаходження: Волинська область, Старовижівський район
прив'язка за місцевістю відповідно до адміністративно-територіального устрою України: між селами Синове на північному заході і Шкроби на південному сході (озеро Синове)
площа 73,38 га
Обмеження щодо глибини використання (у разі потреби)
Вид корисної копалини відповідно до переліку корисних копалин загальнодержавного та місцевого значення, затвердженого постановою Кабінету Міністрів України від 12 грудня 1996 р. № 827: сапропель
Загальний обсяг запасів (ресурсів) на час надання спеціального дозволу на користування надрами (основні, супутні): сапропель (тис. т): балансові - C_1 - 1017,1
Ступінь освоєння надр:

Відомості про запаси (виробіток) запасів корисної копалини (мінеральної сировини) у разі видобування: ДКЗ України, протокол від 20-23.11.2012 № 2781
Джерелі фінансування робіт, які планує виконати надрокористувач під час користування надрами: -
Особливі умови:
1. Протягом п'яти років затвердити запаси сапропелю ДКЗ України.
2. Виконання рекомендацій ДКЗ України, протокол від 20-23.11.2012 № 2781 (сапропель).
3. Виконання умов:
   - Старовижівської районної ради – рішення від 04.01.2011 № 13/4, від 14.12.2012 № 22/25;
   - Мінприроди України – лист від 27.01.2012 № 1876/06/10-12;
   - Державного управління охорони навколишнього природного середовища в Волинській області від 25.01.2012 (екологічна карта 0/4);
   - Держгірпромнагляду – від 29.02.2012 № 1685/0/3.1-6/12.
4. Щорічно затверджувати перед ДНВП "Геоінформ України" про стан запасів корисних копалин за формою 5-гр.
5. Своєчасно і в повному обсязі сплачувати обов'язкових платежів до Державного бюджету згідно з чинним законодавством.
6. Обов'язковий моніторинг та науково супроводження виконання особливих умов передбачених дозволом та угодою про умови користування надрами відповідно до абзацу третього пункту 26 Порядку надання спеціальних дозволів на користування надрами, затвердженого Постановою Кабінету Міністрів України від 30.05.2011 року № 615.
Відомості про заявника: ТОВАРИСТВО З ОБМЕЖЕНОЮ ВІДПОВІДАЛЬНІСТЮ «ДПЗКУ - УКРАЇНСЬКІ ОРГАНІЧНІ РЕСУРСИ» КОД 37626795 44400, ВОЛИНСЬКА ОБЛ., СТАРОВІЖІВСЬКИЙ РАЙОН, СЕЛИЩЕ МІСЬКОГО ТИПУ СТАРА ВИЖІВКА, ВУЛИЦЯ ЖОВТНЕВА, БУДИНОК 3-А
Відомості про погодження надання спеціального дозволу на користування надрами: Старовижівська районна рада – рішення від 04.01.2011 № 13/4, від 14.12.2012 № 22/25; Мінприроди України - лист від 27.01.2012 № 1876/06/10-12; Держгірпромнагляд - лист від 29.02.2012 № 1685/0/3.1-6/12
Строк дії спеціального дозволу на користування надрами (кількість років): 20 (двадцять) років
Умови користування надрами: від 15 квітня 2013 року № 5762
Особа, уповноважена підписати спеціальний дозвіл на користування надрами:
Заступник начальника управління-начальник відділу з надання надр у користування Управління з надання надр у користування — О.М. Толочко
(посада) (підпис) (ініціали та прізвище)
МП
АА№002141

SAPROPEL IN COMPOSITES

BIOCHAR

Product of green waste recycling. Green Waste may include grass cuttings, tree clipping, leftovers, leaves, green twigs, weeds, dry trunks, etc. It could be further processed into compost or get carbonized through pyrolysis process. Our own technology for processing large chips at mobile pyrolysis plants allows us to produce biochar. Biochar is an organic fertilizer that can store water and nutrients in the soil for a long period of time, which sharply increases soil fertility and agricultural productivity. The content of organic carbon in our product reaches 90%, which allows to very intensively influence the process of humus formation.

ORGANIC MINI-PELLETS

BASED ON COMPOST

BioGran is a biologically active product that improves physical, chemical and biological fertility of soil and plant yields. The resulting fermented compost is specifically ground to ensure that weed seeds are not present in the final product. At the final stage, granulation is carried out exclusively under pressure without the use of chemical agents, adhesives and adherents. As a result, compact granules of ø4 mm each with very low humidity (8-10%) are obtained, which is very convenient for use and transportation.

Microbacterial composition with nitrogen fixing and phosformobilising bacteria is applied to the granules, which will ensure maximum full use of active substances fixed in the granule. The raw materials are thoroughly processed by a mineral-bacterial method. With the help of zeolite and microbacterial complex (mesophilic, thermophilic, nitrogen-fixing bacteria), the compost is completely purified from both pathogenic bacteria (99.4%) and helminths (100%), as well as weeds (100%). The heavy metal salts are completely neutralized by zeolite.

SAPROPEL IN COMPOSITES

PRODUCT of ADVANTAGES of ORGANIC MINI-PELLETS

Absolutely all components of the product are BioGran of organic origin, which allows you to improve the structure of the soil, reduce soil erosion, increase soil moisture retention, raise the content of humus in your soil.

The total organic substance introduced into the soil with each ton of granules is 800 kg, including total carbon from 350 kg.

Logistics and introduction - low rates of introduction - 150-180 kg/ha; sowing unit autonomy, saving on time of application, fuel, other transportation costs. Also, in addition to direct application with sowing material, granules can be added by a spreader of organic fertilizers with an applicator.

Convenient packaging ensures efficient storage and stock-piling. Packaging: bags 25 kg/big bags 500 kg.

WASTE PROCESSING LIVESTOCK AND PRODUCTION ORGANIC FERTILIZERS

The following project aimed at turning waste processing and recycling into organic fertilizers and soil formers: Accelerated composting of wastes in the process of mineralization, fermentation and treatment with agitators. Specialists have developed unique composting systems based on the best available technologies, which allow to quickly and efficiently neutralize organic biogenic waste of animal and plant origin and obtain high-quality organic and organic mineral fertilizers from them- composts from litter mass, manure and sewage, food and forest park waste. Raw materials: chicken droppings, cow, horse, camel, sheep manure, waste from growing vegetables and fruits, grapes, tree foliage, branches, chips and so on.

SAPROPEL IN COMPOSITES

WASTE PROCESSING LIVESTOCK AND GROUP PRODUCTION

This project is simple to scale and increase the production capacity without any additional construction.

In the project development phase, it is also possible to extend it to all nearby agricultural clusters. Export seems promising. It is possible to sell final products and semi-finished products.

Particular advantages: complete, waste-free processing of a wide range of organic waste thereby solving the whole range of environmental problems; plus obtaining high-efficiency organic fertilizers and soil formers - as the first step towards increase in the natural fertility of the earth.

MICROBACTERIAL PREPARATIONS

Biological fertilizers and growth stimulants.

These are preparations based on specific soil microorganisms, which, together with biologically active substances synthesized by them, are used to supply plants with accessible forms of nitrogen, phosphorus and potassium, as well as to stimulate their growth and development, increase yield and improve product quality.

SAPROPEL IN COMPOSITES

IN VITRO SAPLING

Microclonal propagation of plants (in vitro, which means 'in glass') is a new technology for vegetative propagation of plants, which allows you to obtain a large number of identical copies (clones) of the original plant within limited period of time.

In addition to direct reproduction, the technology makes it possible to get rid of the vast majority of infections (viruses, bacteria, fungi, etc.), subject to abiding by technological techniques. Due to this approach, after in vitro reproduction plants have significantly better characteristics (growth strength, productivity, resistance to diseases, etc.) compared to the original plants. Such seeding materials are classified as "super elite".

SAPROHUMUS™

SaproHumus™ is 100% organic soil improver and soil -former based on pure organic sapropel of plant origin.

SaproHumus™ is unique combination of organic compounds, humic acids, fulvic acids, peptides, aminoacids, hormones and a wide range of substances that increase humus and activate the existing potential soil fertility, physiological metabolic processes in plants and soil microbiota.

SAPROPEL IN COMPOSITES

SAPROHUMUS™

- 61 % organic matter
- 5,3 % humic acids
- 5,4 % fulvic acids
  - natural N, P, K Ca, Mg, Fe, S
  - 6,5 - 7,5 PH

50,3% labile substances (easily soluble organic compounds) with a physiologically accessible content of a wide range: **amino acids, peptides, hormones, microbial biomass, detritus and humic substances** of other easily soluble organic compounds.

EFFECT ON SOILSTRUCTURE:

SaproHumus™ enriches the absorbing complex of the soil, saturating it with deficient organic compounds. Increased soil fertility with the help of *sapropel* works for 2-3 years, accumulating and giving plants moisture, gradually giving their own and available in the soil nutrients

Restoration or improvement of soil fertility with *sapropel* products helps nature to balance the soil ecosystem and minimize harmful processes from modern types of soil pollution: pesticides, agrochemicals, industrial emissions, natural disasters from fire and plastics and pests

EFFECT ON FERTYLITY:

SaproHumus™ accelerates metabolic processes in plants and soil, thickens cell membranes, increases plant turgor. Humic and fulvic acids, which are part of **SaproHumus™** form a long-term stimulating food for soil and plant microbiota, provide them with more accessible labile organic substances, which quickly and generously enrich soil reserves with amino asids, hormones proteins and other deficient organic compounds. As a result - by the use of SaproHumusTM the harvested crop increases up to 40%.

SaproHumus™ helps to keep humidity in the soil (”sponge effect”)
SaproHumus™ let the oxygen get into the soil by making the soil more loose. **SaproHumus™** creates healthy layer of the soil and prevent migration of the salt from the bottom levels of the soil to topsoil.

SAPROPEL IN COMPOSITES

SAPROHUMUS™

QUALITY CHARACTERISTICS

	SAPROHUMUS	DEHYDRATED SAPROPEL
ISSUE FORM:	soil structure	paste / gel
packaging	PP bags 5/10/20kg, big-bags 600kg	big-bags 600кг
humidity, **%**	64,00	83/ 90
INGRIDIENTS:		
organic matter, %	61,00	73,25
includes, %:		
humic acids	5,29	5,10
fulvic acids	5,44	4,90
labile organic substances	50,27	63,25

	SAPROHUMUS	DEHYDRATED SAPROPEL
Labile organic substances:	%	%
amino acids	5,73	7,03
detritus	10,10	18,12
microbial biomass	1,30	1,80
inert organic substances	8,30	10,43
peptides	18,10	18,12
humic substances	6,74	7,75
exogenous substances	0,00	0,00
Macro- and microelements		
nitrogen, N, кг/т	24,90	22,40
phosphorus, P2O5, кг/т	2,90	1,90
potassium, K2O, кг/т	1,20	0,60
calcium, Ca, кг/т	10,40	7,10
magnesium, Mg. кг/т	1,22	0,45
iron, Fe, кг/т	13,00	9,10
acidity, PH	7,30	7,30

APPLICATION OF SAPROHUMUS™

Cultivated plants	Rates	Method, processing time, limitations
Crops	1-3 t / ha	under the main tillage
	1-3 t / ha	in rows when sowing / near roots - during the growing season
Essential oils	1-6 t / ha	under the main tillage
	1-3 t / ha	in rows when sowing or planting crops
Potato	1-6 t / ha	under the main tillage
	1-3 t / ha	in rows when sowing or planting crops
Vegetable, fruit and berries	1-6 t / ha	under the main tillage
	1-3 t / ha	in rows when sowing or planting crops
Floral and decorative plants	1-2 t / ha	under the main tillage
	1-3 t / ha	in rows when sowing or planting crops

SAPROPEL IN COMPOSITES

SAPROHUMUS™

PACKAGING OPTIONS

Big-bags 600 kg

10, 20, 30 liters PP bags

TESTS OF SAPROPEL

Case 1. Salt lake test. 2012-2014, JEBELALI, UAE

Case 2. Landscape test. 2015, AMMAN, JORDAN

Case 3. Palm trees decoration test. 2016, DUBAI

TESTS OF SAPROPEL

Case 4. The “organic sponge” effect

On the photos you can see 2 flower pots with potting soil. The potting soil consists of soil and perlite. We added 5% of SaproHumus in the pot #1 and watered both pots. The result after 5 days: the pot #2 lost the water (the water leaked to plate underneath) The pot #1 still keeps the water. Also you can see the growing effect (the plant has been growing more faster)

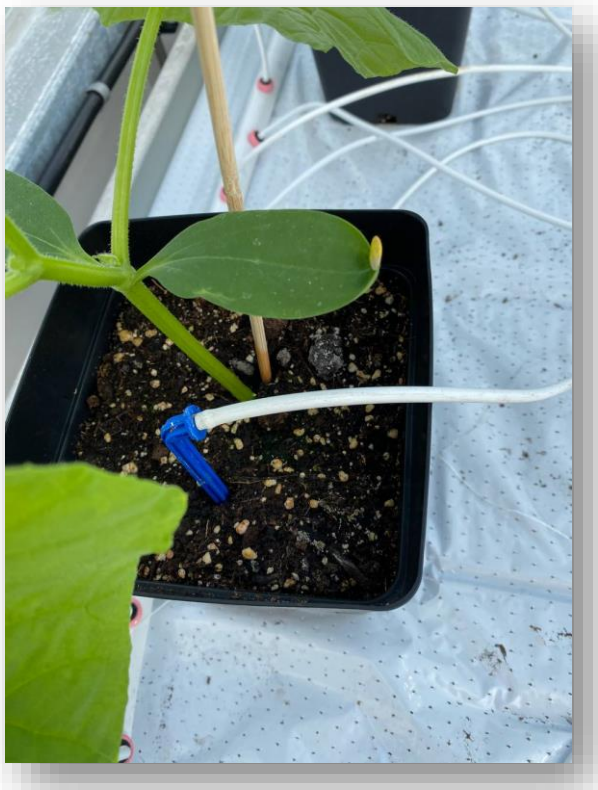
Case 5. Plant without watering

This test shows what will happen if you stop watering the plant

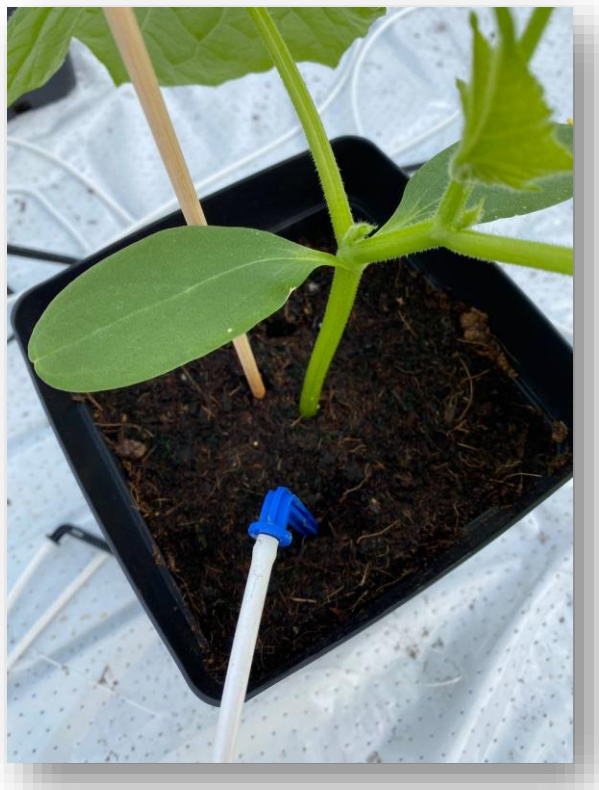
In the pot #9 we added 10% of SaproHumus. Then we stopped watering both plants #2 and #9. This photo was made after 1 week. The plant in the pot #2 was completely dehydrated and was going to die. The plant in the pot #9 was still growing by receiving of minerals and vitamins from SaproHumus

TESTS OF SAPROPEL

TESTING SAPROPEL AT THE WAGENINGEN UNIVERSITY & RESEARCH



a. Mix of white peat with 30% Sapropel



b. Mix of cutting coco peat with 30% Sapropel

Step 1. Planting cucumbers in the ground

Step 2. Planting asters in the ground

c. Mix of 20, 30, 40% black peat

d. Mix of 20, 30, 40% **Sapropel**

ACCORDING TO THE RESULTS OF TESTS HELD AT THE UNIVERSITY IN THE SPRING OF 2023, SAPROPEL IS INCLUDED IN THE LIST OF RECOMMENDED SOILS AND SUBSTRATES UNTIL 2030

https://www.wur.nl/en/research-results/research-institutes/plant-research/greenhouse-horticof-project-that-will-substantiate-2030-goals-for-sustainable-potting-soil-and-substrates.htm

SAPROHUMATES

Sapropel is a high-quality raw material for the production of liquid fertilizers - humates.

Saprohumate is a liquid biostimulant of natural origin from environmentally friendly fossil material - saprobes of relict freshwater lakes, which is a product of bottom sediments, which were formed over several millennia as a result of biotransformation of dead plant and animal organisms, residues of microorganisms and soil particles, in anaerobic state, under water pressure.

The production of 1,000 liters of finished liquid product requires 440-450 kg of saprobe dehydrated.

Components of the preparation Saprohumate:

- physiologically active forms of humic salts (humic and folic acids);
- macronutrients (nitrogen, phosphorus, potassium, calcium, magnesium, sulphur);
- trace elements (iron, copper, cobalt, manganese etc.)
- amino acids;
- natural phytohormones (auxins, hyberelins, cytokinins)
- Vitamins (cyanocobalamin - B12, thiamine - B1, riboflavin - B2, pantothenic acid
- B3, pyridoxine-B6, folic acid, ascorbic acid-C, carotene A);
- antioxidants;
- carotenoids.

SAPROHUMATES

The main qualities of Saprohumate:

- improving the laboratory values of seeds (germination energy, germination rate);
- promotion of better rooting of seedlings and nurslings;
- stimulates the formation of roots, growth and development of plants;
- increases the yield;
- shortens the time of ripening;
- increases plant immunity to diseases, frost and drought;
- reduction of nitrates, heavy metals and radionuclides;
- improves the taste and the longevity of the produce.

Application:

- pure form;
- in mixtures with or on the background of mineral and organic fertilizers;
- with simultaneous application of pesticides.

HUMIC ACIDS

Humates are sodium and potassium salts of humic acids (fulvic acids and humic acids) that are formed in the ground as a result of degradation of plant fiber.

Humic acids, or humates, are derived from peat, brown coal (leonardite) or sapropel. Humates are a natural plant growth stimulants. The content of humic acids and fulvic acids is at least 18%.

In crop production, humic stimulants are used in

the form of aqueous solutions for treatment of seeds, seedlings and adult plants. When humates are absorbed by plant roots or shoots, the cells of the green body normalize metabolic processes and increase the rate of protein synthesis.

FEED ANIMALS

In animal husbandry, sapropel is effective as a mineral-vitamin supplement. They have strong adsorption, bacteriological properties in relation to micro flora, enhance the activity of leukocytes, etc.

Sapropel is used in the production of mixed fodder, as a feed organomineral additive and as a filler in the manufacture of vitamin premixes.

Dehydrated sapropel can be used in its natural form (with humidity up to 60%), played type (with humidity up to 12%). It is introduced into the diet of animals in an amount of 3 to 10% of the feed mixture.

According to the chemical composition, Sapropel refers to organomineral additives with a high content of macro- and microelements in the absence of pathogenic pathogens, toxic substances, radionuclides, nitrates and nitrites.

All these useful properties of sapropel are due to the presence of two main components that are in interaction with each other:

Organic + Mineral

<u>Organic part of sapropel:</u>

Humic substances – up to 40%

Bitumen — 3–11%

Amino acids, including essential

Vitamins (B1, B2, B3, B5, B6, B12, C, D, E)

Enzymes (protease, reductase, peroxidase, etc.)

Other biologically active components (antiseptics, hormones, growth stimulants, antibiotics)

<u>The mineral part of sapropel</u> contains a large number of macro- and microelements:

P, K, Ca, Si, Fe, Al, Mg, S

Co, Mn, Cu, B, Br, Mo, V, Cr, Ni, Ag, Ti.

FEED ANIMALS

The organic matter of sapropel has a high content of carbon and nitrogen, a wide variety of amino acids. Sapropels are especially rich in microorganisms - beneficial bacteria and mold fungi. As a result of the vital activity of microorganisms, biologically active substances - antibiotics, enzymes, vitamins - accumulate in sapropel. Hormones and hormone-like compounds have been found in many types of sapropel. The mineral part of sapropel is made up of compounds of calcium, silicon, sulfur, aluminum, magnesium, and iron. Many trace elements are widely represented here - manganese, copper, iodine, cobalt, boron, molybdenum, which make especially valuable additives prepared on the basis of sapropels.

Sapropel is used as a feed additive not only to reduce feed consumption, but also to enrich the diet with minerals, amino acids, vitamins and biologically active substances. Sapropel is a valuable vitamin and mineral feed additive.

Sapropel is given to animals and birds in a mixture with feed, gradually accustoming to higher doses.

CHICKEN FARMING

Sapropel is used as a feed additive to enrich the diet with minerals, amino acids, vitamins and biologically active substances for adult chickens of egg and meat breeds. The use of sapropel in the diets of laying hens increases the safety by 3-6%, improves the quality of eggs (protein content), increases the yield of hatching eggs.

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Is there an ideal bird feed?

Yes, there are.

Germination of grain on sapropel deserves special attention. The optimal ratio of soaked grain and sapropel by weight is 1:3-4. Sapropel is laid on the bottom of the boxes, covered with a film at the rate of 12-16 kg per 1 m2, and the soaked grain in the amount of 3.8-4 kg is distributed over the sapropel layer in an even layer. The germination process lasts up to 9 days at room temperature. At the end of germination, the seedlings, together with the radicular and sapropelic mass, are cut with a knife into briquettes and fed to animals. With this method of grain germination, the protein content in the entire crop of barley green mass is 2.5 times, and carotene is 1.6-2 times higher than in the mass grown without sapropel.

BEEF FARMING

The introduction of sapropel into the diet of fattening bulls in the amount of 5% by weight of the dry matter of the feed accelerates growth, increases the average daily gain in live weight, the yield of meat carcasses and improves organoleptic indicators. The use of sapropel in the compound feed in an amount of up to 8% by weight increases the conversion of metabolic energy into products by steers by 3.4-12.5%, its productivity coefficient from 0.27 to 0.29-0.33, which provides average daily gains at the level of 814-835 g or 2-3.5% higher than with the usual feeding option, while reducing feed costs by 6-8%.

FEED ANIMALS

Sapropel can be fed to calves from 11 days of age at 50 g per day, increasing each decade up to 6 months of age at 10 g, bringing to 12 months of age up to 500 g, and to 18 months of age up to 700 g. It is shown that the introduction of sapropel feed additives to bulls 6-8 months of age for 180 days of the spring-summer period led to an increase in the average daily gain by 16.6% and the yield of first grade meat by 53%.

The use of sapropel for fattening bulls at a dose of 150 g/head per day and from 150 to 550 g/head per day showed that the increase in live weight increased by 8.1% and 10.5% per day, respectively.

MILK FARMING

Studies on the effect of sapropel on milk production and the physiological state of dairy cows show that feeding 1.2 kg. sapropel per head per day improves the digestibility of nutrients in the diet, allows you to increase milk yield by 2.3 kg. or 10.3%, favorably affects the course of pregnancy and separation of the afterbirth, improves the reproductive function of cows. Adult heifers and infertile cows can be fed up to 1 kg, pregnant and lactating cows - up to 1.5 kg. per day.

PIG FARMING

Sapropel as a food supplement with enrichment of the diet with mineral supplements, amino acids, vitamins and biologically active supplements for adult pigs and young animals during the period of accustoming to roughage

FEED ANIMALS

CONTAINS biologically active substances, vitamins, amino acids, essential animals.

- Increases weight gain of pigs when added to the main diet.
- Increased immunity, morbidity;
- Prevention of hypovitaminosis, microelements, rickets, anemia;
- Increasing the safety of livestock, especially young animals;
- Improves reproductive functions;
- Improves lactation.
- Feed savings due to the replacement of part of the compound feed and the better use of the components of the main diet due to the release of nutrients from the main diet under the action of biologically active substances of sapropel:

We selected two groups of weaned piglets at the age of 2 months, 20 animals per group. Piglets received a normal diet of 1.5 kg. compound feed and 1 litre. back. In the experimental group, natural sapropel was fed from feeders together with food at the beginning of the experiment at 300 g per head per day and gradually increased to 400 g by the end of the experiment (4 months).

The average daily gains of piglets of the experimental group were higher than in the control group by 26.5%. The introduction of crude sapropel in the amount of 0.330 g/head per day into the diet of piglets of 80-147 days of age contributed to an increase in average daily gains for the specified period by 4.5% than that of analogues and by the end of the experiment amounted to 663 g, with a saving of 12.2 - 13.5 % feed. Feeding piglets with sapropel at 6-7 months of age increases their growth by 11-30% compared to animals that received chalk or bone meal, and feed costs for growth are reduced by more than 14%.

By mechanized or manual feed supply, crushed sapropel (at 50% humidity, sapropel remains friable, however, during long-term storage, it may caking) to a fraction no larger than 3 (three) centimetres in diameter, distribute into feeders in the amount of 0.5-1 for adult animals, 0 kg per head. For fattening pigs, sapropel is given in a mixture with the main diet 1:10-1:20 or in separate feeders for mineral supplements ad libitum. For suckling piglets, sapropel is introduced into the diet in the form of feeding a separate feeder at 50-100 grams per day from 1 month of age

FEED ANIMALS

Adult animals and young animals are accustomed to eating sapropel gradually over 5-10 days, giving at first 1/4 of the recommended portion and, gradually increasing the portion, bring it to the recommended one. At the same time, it is desirable to flavor the sapropel with the usual food (tear, mixed fodder, milk, powdered milk, skim).

The use of sapropel as an organomineral supplement for rabbits, especially young animals as a growth stimulant. This is explained by the fact that sapropel is a valuable fodder rich in minerals. It contains carotene, vitamins D, E, B1, B2, B6, B12, C, P, calcium, phosphorus, sulfur, iron: trace elements - iodine, cobalt, copper, manganese, bromine, biologically active substances, as well as proteins and protein is necessary for the good growth of animal.

Sapropels contain substances that stimulate digestion, cardiac activity, absorption and accumulation of nutrients, hematopoiesis, the development of a healthy skeleton and increase the body's resistance to diseases. The bactericidal effect of sapropel in relation to pathogenic microorganisms and the presence of microbes in it that secrete antibiotics against certain pathogens have been established. No pathogenic microorganisms for animals and humans were found in sapropel.

RABBIT FARMING

Sapropel is a source of microelements and vitamins for rabbits. The norm of giving sapropel is from 10 to 100 g, taking into account the age and physiological state of the animals. This type of feed is best fed mixed with concentrates or in the form of so-called "sapropel bread" (25-30% barley or oatmeal, 25% grass meal and 40-45% sapropel).

For rabbits of one month of age, sapropel can be given 10 g per day, from 2 to 6 months old 30 g, up to 8 months old 50 g, up to 10 months old - 70 g, and pregnant and suckling rabbits 100 g.

It is also advisable to feed the rabbits with a mixture of drinking water and sapropel in the ratio of 25 g per 1 liter of water.

FEED ANIMALS

Greenery on sapropel. In the winter-spring period in the body of rabbits and especially young animals, there is an acute lack of vitamins, which hinders their growth and reduces their resistance to various diseases. Among the simple methods of obtaining feed rich in vitamins, one can recommend a technology available to all rabbit breeders, amateurs and professionals.

In contrast to the traditional method of growing greenery using the hydroponic method, this technology uses sapropel instead of the traditional preparation of solutions from a scarce, expensive and rather complex set of microelements. For greens suitable chamois barley, oats, wheat, peas or mixtures thereof.

Previously, the grain, scattered in a thin layer, is irradiated with a mercury-quartz lamp for 20-30 minutes. As a result of this, fungi, bacteria are destroyed, all kinds of putrefactive processes are prevented. Then it is soaked in water at room temperature for 25-30 minutes.

The rate of laying grain with a germination capacity of at least 90% per 1 m2 of the tray is, respectively, kg: barley and oats - 2 and 4, wheat and rye - 2, peas - 5 kg.

Mixtures of crops are used in the following ratios: vetch - oats or vetch - barley 1:1, peas - oats 2:1. The swollen grain should exceed by weight 3-4 times fresh sapropel, which is placed in open boxes with a side height of 7-8 cm. A plastic film is placed on the bottom of them. The germinated grain is distributed in a thin layer over the sapropel layer.

For further growth, plants require heat, lighting and systematic watering (twice a day). Water consumption 0.8 - 1 liter per 1 m2 of sowing. At a positive temperature of 25 - 27 degrees C, after 6 - 7 days, the germinated grain is a green carpet 7 - 8 cm high, and on days 9 - 10, 10 - 12 cm. The root mass of the grain, consisting of white delicate roots, penetrates the sapropel layer.

When crops are illuminated with electric lamps for 12 hours a day, the yield of green fodder from 1 m2 can reach 18–22 kg, while the average plant height is 15–18 cm, that is, up to 10 kg of green mass is obtained from each kilogram of dry grain.

The grown seedlings, together with the root system and sapropelic mass, are cut into briquettes, which are then given to rabbits per head per day: rabbits 30-35 gr, pregnant and lactating females 90-110 gr.

The introduction of sapropel into the diet of rabbits provides weight gain by 5 - 7% per month, strengthens immunity, reduces losses during vaccination in the first 40 days from 10% to 5%. It relieves the load from the liver and intestines, removes fatty inclusions in the liver. Prevents hepatic coccidiosis.

FEED ANIMALS

HORSE FARMING

The use of sapropel as an additive to horse feed.

We have set ourselves the following tasks:

- to determine the increase in live weight gain when using sapropel in the diet of horses as a feed additive.

- evaluate the healing properties of sapropel

- compare experimental data.

To successfully complete the tasks, we used such research methods as observation, comparison, measurement and experiment. Based on the study, conclusions were drawn about the importance of using sapropel in horse breeding as a feed additive.

Since ancient times, natural formations such as peat sapropel, bentonite clays, and marl have been used for therapeutic and prophylactic purposes for animals. The organic matter of sapropel has a high content of carbon and nitrogen, a wide variety of amino acids. Sapropels are especially rich in microorganisms - beneficial bacteria and mold fungi. As a result of the vital activity of microorganisms, biologically active substances - antibiotics, enzymes, vitamins - accumulate in sapropel. Hormones and hormone-like compounds have been found in many types of sapropel.

The mineral part of sapropel is made up of compounds of calcium, silicon, sulfur, aluminum, magnesium, and iron. Many trace elements are widely represented here - manganese, copper, iodine, cobalt, boron, molybdenum, which make especially valuable additives prepared on the basis of sapropel. Sapropel is used as a feed additive not only to reduce feed consumption, but also to enrich the diet with minerals, amino acids, vitamins and biologically active substances. Sapropel is a valuable vitamin and mineral feed additive.

FEED ANIMALS

Sapropel is mixed with salt and grain fodder. The basic diet of animals should consist of 5 kg of hay and 1.5 kg of oats in order to provide sufficient energy and fiber content.

Replenishing the lack of minerals in the diet of young animals from 1 to 2 years old with winter stationary feeding helps to maintain the fatness of animals in the coldest months of winter.

Recipe for a sapropel supplement for low-fat young animals 1.3 years old:

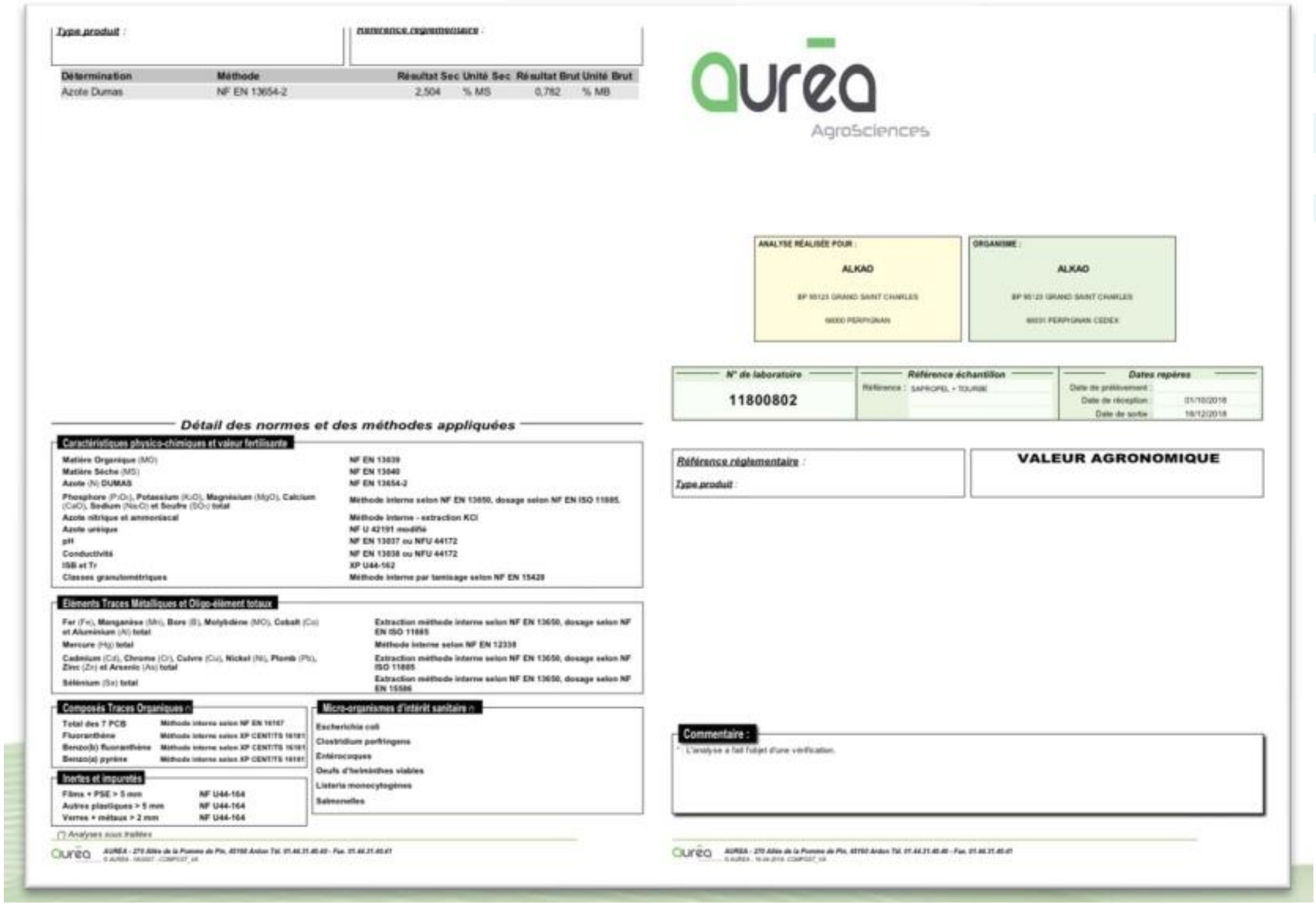
Component	**Quantity**
Sapropel, g	**300**
Salt, g	**30**
Oats, kg	**1**

The effectiveness of the use of sapropel when feeding horses depends on the method of feeding, the dose of its introduction into the diet, as well as on the moisture content of sapropel. We used the method of feeding through the introduction into the feed mixture, the dose of introduction into the diet per head per day is 300 grams, the moisture content of sapropel is 65%.

Norms of feeding sapropel in kg per head per day:

Young	Growth Sapropel	Norma feeding
from 2 to 3 years	60-70%	0.5-0.6
from 1 to 2 years	60-70%	0.3-0.4

LICENSES AND CERTIFICATES



Détermination	Méthode	Résultat Sec	Unité Sec	Résultat Brut	Unité Brut
Azote Dumas	NF EN 13654-2	2,504	% MS	0,782	% MB

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ANALYSE RÉALISÉE POUR : ALKAO

ORGANISME : ALKAO

N° de laboratoire	Référence échantillon	Dates repères
11800802	Référence : SAPROPEL + TOURBE	Date de prélèvement : / Date de réception : 01/10/2018 / Date de sortie : 18/12/2018

Référence réglementaire :

Type produit :

VALEUR AGRONOMIQUE

Détail des normes et des méthodes appliquées

Caractéristiques physico-chimiques et valeur fertilisante

Matière Organique (MO)	NF EN 13039
Matière Sèche (MS)	NF EN 13040
Azote (N) DUMAS	NF EN 13654-2
Phosphore (P_2O_5), Potassium (K_2O), Magnésium (MgO), Calcium (CaO), Sodium (Na_2O) et Soufre (SO_3) total	Méthode interne selon NF EN 13650, dosage selon NF EN ISO 11885.
Azote nitrique et ammoniacal	Méthode interne - extraction KCl
Azote uréique	NF U 42191 modifiée
pH	NF EN 13037 ou NFU 44172
Conductivité	NF EN 13038 ou NFU 44172
ISB et Tr	XP U44-162
Classes granulométriques	Méthode interne par tamisage selon NF EN 15428

Elements Traces Métalliques et Oligo-élément totaux

Fer (Fe), Manganèse (Mn), Bore (B), Molybdène (MO), Cobalt (Co) et Aluminium (Al) total	Extraction méthode interne selon NF EN 13650, dosage selon NF EN ISO 11885
Mercure (Hg) total	Méthode interne selon NF EN 12338
Cadmium (Cd), Chrome (Cr), Cuivre (Cu), Nickel (Ni), Plomb (Pb), Zinc (Zn) et Arsenic (As) total	Extraction méthode interne selon NF EN 13650, dosage selon NF ISO 11885
Sélénium (Se) total	Extraction méthode interne selon NF EN 13650, dosage selon NF EN 15586

Composés Traces Organiques (*)

Total des 7 PCB	Méthode interne selon NF EN 16167
Fluoranthène	Méthode interne selon XP CEN/TS 16181
Benzo(b) fluoranthène	Méthode interne selon XP CEN/TS 16181
Benzo(a) pyrène	Méthode interne selon XP CEN/TS 16181

Micro-organismes d'intérêt sanitaire (*)

Escherichia coli
Clostridium perfringens
Entérocoques
Oeufs d'helminthes viables
Listeria monocytogènes
Salmonelles

Inertes et impuretés

Films + PSE > 5 mm	NF U44-164
Autres plastiques > 5 mm	NF U44-164
Verres + métaux > 2 mm	NF U44-164

(*) Analyses sous traitées

Commentaire :

* L'analyse a fait l'objet d'une vérification.

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ALKAO — BP 95123 GRAND SAINT CHARLES — 66000 PERPIGNAN

ALKAO — BP 95123 GRAND SAINT CHARLES — 66031 PERPIGNAN CEDEX

Légende: ✓ conforme X non conforme

N° de laboratoire	Référence échantillon	Dates repères
11800802	Référence : SAPROPEL + TOURBE	Date de prélèvement : / Date de réception : 01/10/2018 / Date de sortie : 18/12/2018

Type produit :

Référence réglementaire :

Caractéristiques physico-chimiques

	Résultats	Normes	Conformité
Matière Organique (% brut)	24.33		
Matière Sèche (% brut)	31.2		
C organique / N total (Dumas)	15.5		
Matière Organique (% sec)	77.9		
Azote total (N) (% brut)	0.78		
N Nitrique + N ammoniacal + N urétique (% ou % brut)	0.1		
Phosphore sur brut (P_2O_5) (% brut)	0.07		
Potasse sur brut (K_2O) (% brut)	0.04		
N + P_2O_5 + K_2O (% brut)	0.89		

Composés Traces Organiques (CTO)

	Résultats (mg / kg MS)	Valeur limites (mg / kg MS)	Conformité
Total des 7 PCB			
Fluoranthène			
Benzo (b) fluoranthène			
Benzo (a) pyrène			

Détail des PCB

Congénères	28	52	101	118	138	153	180	Somme / total

Micro organismes d'intérêt sanitaire

		Résultats Valeur	Résultats unité	Valeurs limites boîtes ouvertes avant cultures manuscrites	Conformité pour boîtes ouvertes avant cultures manuscrites	Résultats Valeur	Résultats unité	Valeurs limites boîtes cultures neuf cultures manuscrites	Conformité boîtes cultures neuf cultures manuscrites
Agents indicateurs de traitement	Escherichia coli								
	Clostridium perfringens								
	Entérocoques								
Agents pathogènes	Oeufs d'helminthes viables								
	Listeria monocytogenes								
	Salmonelles								
	Entérovirus								
	Coliformes thermotolérants								
	Oeufs de nématodes								

Eléments traces métalliques

	Résultats (mg / kg MS)	Valeur limites (mg / kg MS)	Conformité
Arsenic (As)			
Cadmium (Cd)			
Chrome (Cr)			
Cuivre (Cu)			
Mercure (Hg)			
Nickel (Ni)			
Plomb (Pb)			
Sélénium (Se)			
Zinc (Zn)			

	Résultats (mg / kg MS)	Valeur limites (mg / kg MS)	Conformité
Cuivre (Cu)			
Zinc (Zn)			

Inertes et impuretés

	Résultats (% sec)	Valeur limites (% sec)	Conformité
Films + PSE > 5 mm			
Autres plastiques > 5 mm			
Verres + métaux > 2 mm			

Films + PSE : films plastiques souples majoritairement en polyéthylène. Le polystyrène expansé (PSE) et les mousses sont rattachées aux films car ils ont un impact visuel important.

Autres plastiques : matières plastiques synthétiques autres que les films, essentiellement les PE, PET, PVC, etc. ...

Verres et métaux : verre vert, brun, blanc et verres spéciaux ainsi que les métaux ferreux, inox, aluminium.

Type produit :

Référence réglementaire :

N° de laboratoire : 11800802

Caractéristiques physiques

	Résultats
Humidité (% produit brut)	68.8
Matière sèche (% produit brut)	31.2
Matière minérale (% produit brut)	6.9
Matière organique (% produit brut)	24.3
pH	* 4.80
Conductivité	
Masse volumique compactée (en g/l)	
Refus à 40 mm (% produit brut)	

Classes granulométriques	Résultats

Utilisation de tamis à mailles carrées

Valeur amendante (apport de matière organique)

	Résultats
Carbone organique (% MS)	38.94
N total (% MS)	2.50
Rapport C/N (brut)	15.5
Rapport C/N (organique)	15.6
Indice de Stabilité Biochimique (ISB en % MS)	
Teneur en Carbone résiduel (T) en % MS)	
MO potentiellement résistante à la dégradation (kg / t de produit brut)	

Dose d'apport maximale conseillée *

t / ha	Si apport tous les 5 ans
t / ha	Si apport tous les ans

Apport de MO à la dose conseillée

t / ha =	kg de MO dont	kg de MO stable
t / ha =	kg de MO dont	kg de MO stable

Valeur fertilisante (apport d'éléments minéraux)

		g / kg (sur équivalent produit brut)	g / kg produit sec
AZOTE	Azote organique	7.8	25.02
	Azote Nitrique (N NO_3)	0.01	0.02
	Azote ammoniacal (N NH_4)	0.0	<0.01
	Azote minéral (N NH_4 + N NO_3)	0.01	0.03
	Azote Dumas (N orga + N NO_3)	7.8	25.04
ELEMENTS MAJEURS	Azote total (N)	7.8	25.05
	Phosphore (P_2O_5)	0.7	2.15
	Potassium (K_2O)	0.4	1.35
	Magnésium (MgO)	0.4	1.35
	Calcium (CaO)	5.1	16.22
	Sodium (Na_2O)		
	Soufre (SO_3)		

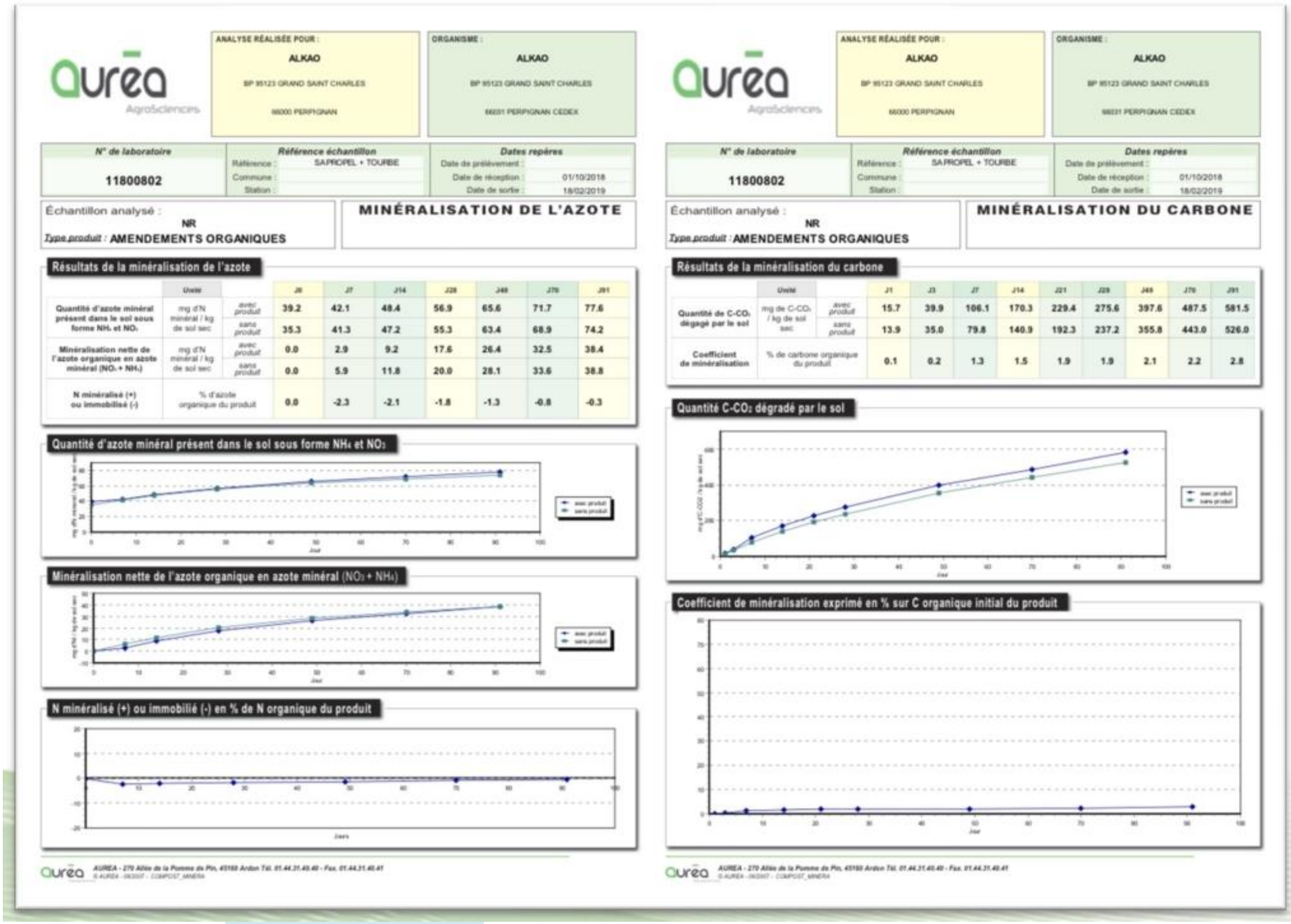
		mg / kg (sur équivalent produit brut)	mg / kg produit sec
OLIGO - ELEMENTS	Zinc (Zn)		
	Cuivre (Cu)		
	Fer (Fe)		
	Manganèse (Mn)		
	Bore (B)		
	Molybdène (Mo)		

Equivalent engrais à la dose conseillée

dose d'apport	t / ha	
dose d'apport	t / ha	
N	à	kg/ha
	à	kg/ha
P_2O_5	à	kg/ha
	à	kg/ha
K_2O		kg/ha
		kg/ha
M_gO		kg/ha
		kg/ha
CaO		kg/ha
		kg/ha

Autres éléments

LICENSES AND CERTIFICATES



aurea Agrosciences

ANALYSE RÉALISÉE POUR : ALKAO, BP 95123 GRAND SAINT CHARLES, 66000 PERPIGNAN

ORGANISME : ALKAO, BP 95123 GRAND SAINT CHARLES, 66031 PERPIGNAN CEDEX

N° de laboratoire	Référence échantillon		Dates repères	
11800802	Référence :	SAPROPEL + TOURBE	Date de prélèvement :	
	Commune :		Date de réception :	01/10/2018
	Station :		Date de sortie :	18/02/2019

Échantillon analysé : NR

Type produit : AMENDEMENTS ORGANIQUES

MINÉRALISATION DE L'AZOTE

Résultats de la minéralisation de l'azote

	Unité		J0	J7	J14	J28	J49	J70	J91
Quantité d'azote minéral présent dans le sol sous forme NH_4 et NO_3	mg d'N minéral / kg de sol sec	avec produit	39.2	42.1	48.4	56.9	65.6	71.7	77.6
		sans produit	35.3	41.3	47.2	55.3	63.4	68.9	74.2
Minéralisation nette de l'azote organique en azote minéral (NO_3 + NH_4)	mg d'N minéral / kg de sol sec	avec produit	0.0	2.9	9.2	17.6	26.4	32.5	38.4
		sans produit	0.0	5.9	11.8	20.0	28.1	33.6	38.8
N minéralisé (+) ou immobilisé (-)	% d'azote organique du produit		0.0	-2.3	-2.1	-1.8	-1.3	-0.8	-0.3

Quantité d'azote minéral présent dans le sol sous forme NH_4 et NO_3

Minéralisation nette de l'azote organique en azote minéral (NO_3 + NH_4)

N minéralisé (+) ou immobilié (-) en % de N organique du produit

AUREA - 270 Allée de la Pomme du Pin, 45160 Ardon Tél. 01.44.31.40.40 - Fax. 01.44.31.40.41

aurea Agrosciences

ANALYSE RÉALISÉE POUR : ALKAO, BP 95123 GRAND SAINT CHARLES, 66000 PERPIGNAN

ORGANISME : ALKAO, BP 95123 GRAND SAINT CHARLES, 66031 PERPIGNAN CEDEX

N° de laboratoire	Référence échantillon		Dates repères	
11800802	Référence :	SAPROPEL + TOURBE	Date de prélèvement :	
	Commune :		Date de réception :	01/10/2018
	Station :		Date de sortie :	18/02/2019

Échantillon analysé : NR

Type produit : AMENDEMENTS ORGANIQUES

MINÉRALISATION DU CARBONE

Résultats de la minéralisation du carbone

	Unité		J1	J3	J7	J14	J21	J28	J49	J70	J91
Quantité de $C\text{-}CO_2$ dégagé par le sol	mg de $C\text{-}CO_2$ / kg de sol sec	avec produit	15.7	39.9	106.1	170.3	229.4	275.6	397.6	487.5	581.5
		sans produit	13.9	35.0	79.8	140.9	192.3	237.2	355.8	443.0	526.0
Coefficient de minéralisation	% de carbone organique du produit		0.1	0.2	1.3	1.5	1.9	1.9	2.1	2.2	2.8

Quantité $C\text{-}CO_2$ dégradé par le sol

Coefficient de minéralisation exprimé en % sur C organique initial du produit

AUREA - 270 Allée de la Pomme du Pin, 45160 Ardon Tél. 01.44.31.40.40 - Fax. 01.44.31.40.41

LICENSES AND CERTIFICATES

VIETCERT

CERTIFICATE
GIẤY CHỨNG NHẬN

Số: 3212242310

Chứng nhận sản phẩm:

PHÂN BÓN

(Chi tiết sản phẩm xem danh mục đính kèm)

Đơn vị nhập khẩu:

CÔNG TY TNHH AGRO TECHNOLOGY

Địa chỉ:

Phòng 901, tầng 9, tòa Sky City Tower A, số 88 Láng Hạ, phường Láng Hạ, quận Đống Đa, Hà Nội

Thuộc bộ hồ sơ nhập khẩu:

Hợp đồng:	1-05.2021	Ngày:	20/05/2021
Hóa đơn:	1/2021	Ngày:	17/09/2021
Vận đơn:	HLCUUAO210900725	Ngày:	02/10/2021
Tờ khai hải quan:	104414480813	Ngày:	14/12/2021
Số lượng:	22,8 tấn		

Được Trung tâm Giám định và chứng nhận hợp chuẩn hợp quy VietCert đánh chứng nhận phù hợp QCVN 01-189:2019/BNNPTNT và các quy định tại Nghị định 84/2019/NĐ-CP ngày 14 tháng 11 năm 2019 của Chính phủ.

Và được phép sử dụng dấu Hợp quy

Phương thức chứng nhận: phương thức 7

(Thông tư số 28/2012/ TT-BKHCN ngày 12/12/2012 (Sửa đổi: Thông tư 02/2017/TT-BKHCN ngày 31/03/2017) của Bộ Khoa học và Công nghệ)

Giấy chứng nhận này có giá trị theo lô và chỉ có giá trị đối với lô hàng có thông tin hồ sơ nhập khẩu như trên. Vui lòng truy cập tại www.vietcert.org hoặc liên hệ email: info@vietcert.org (hotline: 0903.570.959 và 0905.527.089) để biết tình trạng hiệu lực của Giấy chứng nhận này

Ngày cấp giấy: *29/12/2021*

KT. GIÁM ĐỐC
PHÓ GIÁM ĐỐC

PHAN THANH TUẤN

Trung tâm Giám định và Chứng nhận Hợp chuẩn Hợp quy VietCert
28 An Xuân, Phường An Khê, Quận Thanh Khê, Tp. Đà Nẵng

Approved by ECOCERT INPUTS

ATTESTATION

for inputs suitable for use in Organic Farming according to the National Organic Program (NOP)

Attestation reference: 158383GB1700n2e
Number of products: 1

This attestation is issued to the operator below:

ZANDER CORPORATION Ltd
The Manor House, Mells
BA11 3BN Frome
UNITED KINGDOM

Ecocert SA confirms after inspection that the following products are approved for use in NOP organic production:

PRODUCT NAME	CATEGORY	STATUS
Zander Humus / Saprozem	Fertilizer	NOP allowed

Inputs Service Manager
Arnaud FABRE

Issue date, in L'Isle Jourdain: 26/06/2017
Expiry date: 30/06/2018

This document belongs to Ecocert. It has to be returned on request.
Only the original is valid, until the expiry date of the attestation or the termination of the attestation contract.

Ecocert SA – Capital 442 400€ – Lieudit Lamothe Ouest – 32600 L'Isle Jourdain – France
Tél. +33 (0)5 62 07 34 24 – Fax : +33 (0)5 62 07 11 67 – www.ecocert.com

ECOCERT
TVA Intracommunautaire n° FR 18380 725 002 00014
CREDIT MUTUEL 2200 17639640 41 – SIREN 380 725 002 RCS AUCH – APE 7120B

LICENSES AND CERTIFICATES

CONFIRMACION DE COMPATIBILIDAD

para el uso de insumos en la agricultura ecológica

Extendido para: Ukrainian Organics LLC.
O. Boychenka street, 7,
Office 49, Kiev, 02192,
Ukraine.

No. del documento: A-2016-00590/2016-05681-05682/0239

Este documento confirma que el producto comercial

SAPROZEM

producido y comercializado por la empresa mencionada arriba ha llegado al siguiente resultado:

El producto final es compatible con la producción agrícola orgánica para su uso como fertilizante de cultivos, según los requerimientos de los reglamentos

- **(CE) nº 889/2008, Anexo I (Unión Europea) "Uso limitado a la horticultura (cultivo de hortalizas, floricultura, arboricultura, viveros)".**
- **USDA/NOP-Final rule (EEUU) §205.105(b).**

Cabe destacar que - debido a la falta de una interpretación uniforme para el término "equivalencia" - cada autoridad estatal tiene el derecho de aplicar criterios propios, aún cuando Kiwa BCS Öko-Garantie GmbH; Nuremberg, Alemania está atestando la compatibilidad del producto con los requerimientos del reglamento (CE) nº 834/2007 y (CE) nº 889/2008.

La revisión y evaluación del proceso de producción fue realizada por Kiwa BCS Öko-Garantie GmbH, en sus oficinas de San José de Costa Rica. Kiwa BCS es un ente acreditado por la Unión Europea para la inspección y certificación de productos ecológicos, además es supervisada por 16 autoridades alemanas, también es acreditada por la autoridad USDA para certificar según el reglamento NOP-final Rule y está registrada como "Empresa Extranjera de Certificación" por el Ministerio de Agricultura, Pesca y Silvicultura de Japón para certificar según el reglamento orgánico para productos agrícolas (JAS/MAFF).

La presente confirmación no constituye una garantía sobre la calidad ni sobre la eficacia del producto en agricultura. Kiwa BCS no será responsable por cualquier cambio en ingredientes o en la información contenida en la etiqueta que no haya sido informado correcta y oportunamente por el registrante/fabricante del producto, quien debe asumir toda la responsabilidad por daños e inconvenientes. Este documento solamente confirma que el uso del producto, con base en la composición presentada por el registrante y de acuerdo a los criterios aplicados, puede ser considerado como equivalente a los requerimientos de los reglamentos arriba mencionados.

Es obligación de la empresa responsable por la venta del producto efectuar los respectivos trámites legales para el registro oficial del mismo. Éste documento no reemplaza el registro del producto ante las autoridades de los países donde se le va a comercializar.

Nuremberg, 21 de agosto de 2016 — Validez del Documento: **30 de setiembre de 2017**

KIWA BCS OKO-GARANTIE GMBH

por Dr. Roland Hüttl
Gerente General

KIWA BCS Öko-Garantie GmbH

Marientorgraben 3-5, 90402 Nuremberg, Alemania / Tel.: +49 (0)911 42 43 9-0, Fax: +49 (0)911 42 43 9 71

---

1. Goods consigned from (Exporter's business name, address, country)
ORGANIC INVEST LLC
O.Boychenka str., building 7, office 49, Kyiv 02192
Ukraine

Reference № SA93000G 763 — 0588211

CERTIFICATE OF ORIGIN

2. Goods consigned to (Consignee's name, address, country)
ABDULRAHMAN M ALHAKBANI
AGRICULTURAL ESTABLISHMENT
P.O. box 6108, Hail Street. Office #17, Surooh Business Centre,
Jeddah, 21442
Saudi Arabia

Issued in UKRAINE (country)

3. Means of transport and route (as far as known)
By truck, by sea from Ukraine toSaudi Arabia

4. For official use

5. Item number	6. Marks and numbers of packages	7. Number and kind of packages; description of goods	8. Gross weight or other quantity	9. Number and date of invoices
1	20 places	"SAPROZEM" sapropel organic fertilizer - 23 000 kg	Gross weight 23165 kg	№ 07-1/11-18 dtd 07.11.2018

10. Certification
It is hereby certified, on the basis of control carried out, that the declaration by the exporter is correct.
The Kyiv Chamber of Commerce & Industry
Kyiv, B.Khmelnitskogo Str., 55
E.V.Kravchenko
Kyiv 01.03.2019
Place and date, signature and stamp of certifying authority

11. Declaration by the exporter
The undersigned hereby declares that the above details and statements are correct; that all the goods were produced in
UKRAINE (country)
exported to **SAUDI ARABIA** (importing country)
V.P.Keba
Kyiv 01.03.2019
Place and date, signature of authorised signatory

ТОВ «Бізнес», зам. 18-377, 2018 р., IV кв.

LICENSES AND CERTIFICATES

الجمهورية اللبنانية

وزارة الزراعة

4/359

افادة تسجيل سماد

تفيد مصلحة البستنة والمحاصيل الحقلية في مديرية الثروة الزراعية ان المادة:

"SAPROZEM" sapropel organic fertilizer

المصنعة من الشركة: "UKRAINIAN ORGANICS"LLC ،

بلد المنشأ: اوكرانيا،

هي اسمدة شبه عضوية وفقاً للمادة الثالثة من القرار رقم 791 تاريخ 2011/8/29 وتندرج تحت البند 3.1،

وذلك بناء للطلب رقم 4/359 تاريخ 2016/1/18، المقدم من: شركة فيدال باور ش.م.م،

وقد تم تسجيلها وفقاً للقرار رقم 1/507 تاريخ 2012/6/8 والقرار رقم 1/1102 تاريخ 2014/12/22،
ويشترط لاستيرادها ان تستوفي الشروط الواردة في القرار رقم: 1/1042 تاريخ:2013/11/7 ،

اعطيت هذه الافادة بتاريخ **26** كانون الثاني **2016** وهي صالحة لمدة خمس سنوات من تاريخه.

بيروت في 2016/1/26

رئيس مصلحة البستنة والمحاصيل الحقلية بالتكليف
م. منى سبليني

مدير الثروة الزراعية بالتكليف
م. محمد ابو زيد

وزارة البلدية والبيئة
MINISTRY OF MUNICIPALITY AND ENVIRONMENT

شهادة لمن يهمه الامر

مطابقة جودة منتج مستورد

تهديكم إدارة البحوث الزراعية أطيب تحياتها . وبالإشارة إلى الموضوع اعلاه . نحيط سيادتكم علما بان الشركة الاولى للزراعة ترغب في استيراد وتداول محسن التربة أوكراني المنشأ (سابوزيم مسحوق و سابروبل سائل) محسن تربة عضوي مطور . وقد قامت إدارتنا الموقرة بتقييم وتحليل وفحص المنتج بمختبر خارجي للتأكد من مطابقته لشروط تداول واستيراد الاسمدة العضوية ومحسنات التربة طبقا لقانون الاسمدة ومحسنات التربة ٢٠٠٦م بصنف كمحسن تربة حسب المواصفات القطرية . ونرى التوصية بالسماح بتداول المنتج بدولة قطر وذلك بعد اجتيازه كافة الفحوصات و التجارب والاختبارات المختبرية.

وتفضلوا بقبول فائق الاحترام والتقدير

28/1/2019

مسئول التقييم و الفحوصات	رئيس قسم البحوث النباتية	مدير ادارة البحوث الزراعية
د. السيد محي الدين فرج	محمد سالم البكري	حمد ساكت الشمري
خبير مختبرات		

ص.ب: ٧٦٣٤ الدوحة – قطر | هاتف: ٤٤٢٠٧٧٧٧ (٩٧٤+) | فاكس: ٤٤٢٠٧٠٠٠ (٩٧٤+)
P.O. Box : 7634 Doha -Qatar | T. (+974) 44207777 | F. (+974) 44207000 Call Center : 998

LICENSES AND CERTIFICATES

CONFIRMACION DE COMPATIBILIDAD

para el uso de insumos en la agricultura ecológica

Extendido para — Ukrainian Organics LLC.
O. Boychenka street, 7,
Office 49, Kiev, 02192,
Ukraine.

No. del documento: A-2016-00590/2016-05681-05682/0239

Este documento confirma que el producto comercial

SAPROZEM

producido y comercializado por la empresa mencionada arriba ha llegado al siguiente resultado:

El producto final es compatible con la producción agrícola orgánica para su uso como fertilizante de cultivos, según los requerimientos de los reglamentos

- **(CE) nº 889/2008, Anexo I (Unión Europea) "Uso limitado a la horticultura (cultivo de hortalizas, floricultura, arboricultura, viveros)".**
- **USDA/NOP-Final rule (EEUU) §205.105(b).**

Cabe destacar que - debido a la falta de una interpretación uniforme para el término "equivalencia" - cada autoridad estatal tiene el derecho de aplicar criterios propios, aún cuando Kiwa BCS Öko-Garantie GmbH; Nuremberg, Alemania está atestando la compatibilidad del producto con los requerimientos del reglamento (CE) nº 834/2007 y (CE) nº 889/2008.

La revisión y evaluación del proceso de producción fue realizada por Kiwa BCS Öko-Garantie GmbH, en sus oficinas de San José de Costa Rica. Kiwa BCS es un ente acreditado por la Unión Europea para la inspección y certificación de productos ecológicos, además es supervisada por 16 autoridades alemanas, también es acreditada por la autoridad USDA para certificar según el reglamento NOP-final Rule y está registrada como "Empresa Extranjera de Certificación" por el Ministerio de Agricultura, Pesca y Silvicultura de Japón para certificar según el reglamento orgánico para productos agrícolas (JAS/MAFF).

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Es obligación de la empresa responsable por la venta del producto efectuar los respectivos trámites lega para el registro oficial del mismo. Éste documento no reemplaza el registro del producto ante las autorida de los países donde se le va a comercializar.

Nuremberg, 21 de agosto de 2016 — Validez del Documento: **30 de setiembre de 20**

KIWA BCS OKO-GARANTIE GMBH

por Dr. Roland Hüttl
Gerente General

KIWA BCS Öko-Garantie GmbH

Marientorgraben 3-5, 90402 Nuremberg, Alemania / Tel.: +49 (0)911 42 43 9-0, Fax: +49 (0)911 42 43 9 7

---

1. Goods consigned from (Exporter's business name, address, country)
ORGANIC INVEST LLC
O.Boychenka str., building 7, office 49, Kyiv 02192
Ukraine

Reference № **SA93000G 763** 0588211

CERTIFICATE OF ORIGIN

2. Goods consigned to (Consignee's name, address, country)
ABDULRAHMAN M ALHAKBANI
AGRICULTURAL ESTABLISHMENT
P.O. box 6108, Hail Street. Office #17, Surooh Business Centre,
Jeddah, 21442
Saudi Arabia

Issued in **UKRAINE** (country)

3. Means of transport and route (as far as known)
By truck, by sea from Ukraine toSaudi Arabia

4. For official use

5. Item number	6. Marks and numbers of packages	7. Number and kind of packages; description of goods	8. Gross weight or other quantity	9. Number and date of invoices
1	20 places	"SAPROZEM" sapropel organic fertilizer - 23 000 kg	Gross weight 23165 kg	№ 07-1/11-18 dtd 07.11.2018

10. Certification
It is hereby certified, on the basis of control carried out, that the declaration by the exporter is correct
The Kyiv Chamber of Commerce & Industry
Kyiv, B.Khmelnitskogo Str., 55
E.V.Kravchenko
Kyiv 01.03.2019
Place and date, signature and stamp of certifying authority

11. Declaration by the exporter
The undersigned hereby declares that the above details and statements are correct; that all the goods were produced in
UKRAINE (country)
exported to **SAUDI ARABIA** (importing country)
V.P.Keba
Kyiv 01.03.2019
Place and date, signature of authorised signatory

ТОВ «Поступ», зам. 18-377, 2018 р., IV кв.

LICENSES AND CERTIFICATES

CONFIRMATION OF COMPATIBILITY

for the use of inputs in organic agriculture

Issued to: **Ukrainian Organics LLC.**
16b Anna Akhmatovoy str.,
of. 222, Kyiv, 02068, Ukraine

Document No. **A-2016-00590/2019-02066-02067/0775**

This document confirms that the commercial product

Sapropeat (trademark SaproLife™)

produced and distributed by the company above mentioned have reached the following result:

The final product is compatible with organic production for use as crop fertilizer, according to the requirements of

- **(EC) n° 889/2008, Annex I (European Union) "Use limited to horticulture (market gardening, floriculture, arboriculture, nursery)"**
- **USDA/NOP-Final rule (USA) §205.105(b)**

It is underlined that - due to the absence of a uniform interpretation of the term "equivalency" - every state authority has got the right to apply own criteria in this respect, although Kiwa BCS Öko-Garantie GmbH confirms the compatibility of the products with the requirements of EU Regulation (EC) nº 834/2007 and (EC) nº 889/2008.

The inspection and evaluation of the production process was carried out by kiwa BCS Öko-Garantie, at its offices in San José, Costa Rica. Kiwa BCS is an EU-accredited inspection and certification body, supervised by 16 German state authorities. In addition Kiwa BCS is accredited by the US authority USDA to certify according to the NOP-final Rule and as a Registered Foreign Certification Company by the Japanese Ministry for Agriculture, Fishery and Forestry to certify according to the Japanese Agricultural Standard for Organic Agricultural Products (JAS/MAFF).

This confirmation does not constitute any guarantee, neither of product quality nor of the efficiency of this product in agriculture. Kiwa BCS will not be responsible for any change of ingredients or in the labeling information which has not been properly and correctly announced by the producer of the input, who has to cover the full liability for all damages and disadvantages. This document only confirms that the use of this product in its presented character and composition, according to the criteria applied, can be considered as equivalent to the requirements in the above mentioned regulations.

It remains the obligation of the distributing company to carry out the respective legal steps for the official registration of this product. It is expressly stated that the official registration of the product in each country where it is sold, cannot be replaced by this confirmation.

Nuremberg, October 31st, 2019 — Validity of document, **until October 31st, 2020**

KIWA BCS OKO-GARANTIE GMBH

for Prof. Dr. Roland Hüttl
General Manager

Inputs list

KIWA BCS Öko-Garantie GmbH

Marientorgraben 3-5, 90402 Nuremberg, Germany / Phone: +49 (0)911 42 43 9-0, Fax: +49 (0)911 42 43 9 71

AGQ Labs & Technological Services

ENAC ENSAYOS Nº 208 - LE1522/ LE 1523

Los parámetros marcados con (*) no están amparados por la Acreditación de ENAC

INFORME DE ENSAYO

Nº de Referencia:	FT-13/00519	Registrada en:	AGQ España	Cliente:	AGRIZAN ESPAÑA S.L.
Análisis:	FT-1870	Centro Análisis:	AGQ España		
Tipo Muestra:	FERTILIZANTES ORGANICOS	Fecha Toma Muestra:	08/05/2013	Domicilio:	PAGO LOS CORTUJELOS SIN VINUELA 29712
Lugar de Muestreo:		Fecha Recepción:	09/05/2013		
Punto de Muestreo:		Fecha Inicio:	10/05/2013	Cod Cliente:	103979
Muestreado por:	Cliente	Fecha Fin:	30/05/2013	Contrato:	PRESEI3-01449
				Cliente tercero:	
Descripción:	AGRIZAN HUMATE EXTRACT				

RESULTADOS ANALITICOS

Parámetro	Resultado	Unidades	Val. de Ref.	PNT	Técnica	Insert
Azufre	0,07	%	-	PEC-009	Espect.ICP-OES	-
Calcio	7,14	%	-	PEC-009	Espect.ICP-OES	-
Magnesio	0,17	%	-	PEC-009	Espect.ICP-OES	-
Potasio	19,5	%	-	PEC-009	Espect.ICP-OES	-
Sodio	1368	mg/Kg	-	PEC-009	Espect.ICP-OES	-
Materias Orgánicas						
* Ácidos Fúlvicos	11,3	%	-	PE-391	Volumetría	-
* Ácidos Húmicos	11,3	%	-	PE-391	Volumetría	-
Materia Orgánica Total	40,2	%	-	PEC-012	Gravimetría	-
Características Básicas						
pH (Extracto 1:10)	112,9)		-	PEC-001	Electrometría	-
Metales Pesados						
* Aluminio Total	3,3	mg/Kg	-	PE-325	Espect.ICP-MS	-
* Boro	67,3	mg/Kg	-	PEC-009	Espect.ICP-OES	-
* Cobre	0,02	mg/Kg	-	PEC-009	Espect.ICP-OES	-
* Estroncio Total	< 0,10	mg/Kg	-	PE-325	Espect.ICP-MS	-
* Hierro	136095)	mg/Kg	-	PEC-009	Espect.ICP-OES	-
* Manganeso	54,0	mg/Kg	-	PEC-009	Espect.ICP-OES	-
* Molibdeno	< 2,50	mg/Kg	-	PEC-009	Espect.ICP-OES	-
* Níquel Total	9,9	mg/Kg	-	PE-325	Espect.ICP-MS	-
* Plomo Total	6,9	mg/Kg	-	PE-325	Espect.ICP-MS	-
* Zinc	43,0	mg/Kg	-	PEC-009	Espect.ICP-OES	-
Formas Nitrogenadas y Fosforadas						
Fósforo	0,13	%	-	PEC-009	Espect.ICP-OES	-
Nitrógeno Dumas	2,31	%	-	PEC-034	Anal. Elemental	-

Autorizaciones - Homologaciones

Labs & Technological Services AGQ S.L. www.agq.com.es

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LICENSES AND CERTIFICATES

UNITED ARAB EMIRATES
MINISTRY OF CLIMATE CHANGE
& ENVIRONMENT

الإمارات العربية المتحدة
وزارة التغير المناخي
والبيئة

Organic fertilizer
Certificate of Analysis
شهادة فحص عينات سماد عضوي

Receiving Date تاريخ الاستلام	28/8/2016	Reporting Date تاريخ اصدار الشهادة	30/8/2016
Analysis Date تاريخ التحليل	28/8/2016	Sample Ref. No	DFC 135
		LIMS No.	201664921

Client Name	اسم العميل	AL KOBRAA FLOWERS AND PLANET TRADING LLC
Country of Origin	بلد المنشأ	Ukraine
Production date	تاريخ الانتاج	
Expiry Date	تاريخ الانتهاء	
Sample Name	اسم العينة	Organic Fertilizer
Brand	الصنف	CANPOZEM (sapropeat organic fertilizer)
Sample Source	مصدر العينة	مركز دبي للزهور
Batch No.	رقم التشغيلة	
Weight	الوزن	
Reason for Analysis		تسجيل

LAB NO	EC1:5 ms/cm	pH 1:5	T-N w/w%	P2O5 w/w%	K2O w/w%	NaCl w/w%	Na w/w%	Organic matter w/w%	* Moisture %	* C/N	Fe ppm	Mn ppm	Zn ppm	Cu ppm	B ppm
	SOP 10	SOP 01	SOP 23	SOP 15	SOP03	SOP04	SOP04	SOP 18	SOP 18	SOP23S OP18	SOP 22	SOP 22	SOP 22	SOP 22	SOP 22
F 383	0.71	4.54	1.10	-	-	0.03	0.01	75.68	67.82	40:1	-	-	-	-	-
	Ni ppm	Cd ppm	Cr ppm	Pb ppm	Co ppm	Hg ppm	As ppm	Se ppm	Mo ppm	S-SO3 w/w%	T-N W/V%	CaO w/v%		P2O5 w/v%	K2O w/v%
	SOP 22	SOP 22	SOP 22	SOP 22	SOP22	SOP22	SOP22	SOP 22	SOP 22	SOP 22	SOP 23	SOP 02		SOP 16	SOP 03
	-	-	-	-	-	-	-	-	-	-	-	-		-	-

Comments
* Out of Specifications
- Nematode Results : Not Observed Nematode
According to the Specification the sample is Not Accepted

Analyzed by — Zohuir Al-Balawna
Checked by — Nizar Al Haj Ali
Aisha M. Al Amiri
Head, Sharjah Central Laboratory
Technical Manager

QMS-LD-PPM-F-12 Rev.1

P.O.Box:926 Sharjah -United Arab Emirates - Tel:06 5672968 - Fax:06 5668557

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Laboratory is not Responsible for the Samples After Five Working Days of The Issuance of The Result

State coat of arms of Ukraine

NATIONAL ACADEMY OF AGRARIAN SCIENCES OF UKRAINE
INSTITUTE OF FOOD RESOURCES
4-A M.Raskovoyi Str., 02660, Kyiv city, Ukraine, tel./fax: 044 517 05 10;
e-mail: dir.ipr@ukr.net

APPROVED
Head of Division of
Food-Related Research and Quality Control,
Candidate of Biological Sciences
/signed/ Y.F. Zhukova
August 25, 2021

[official seal of Institute of Food Resources of the National Academy of Agrarian Sciences of Ukraine]

TEST PROTOCOL No. 328-1/16AK

Total No.of pages – 2

Division of Food-Related Research and Quality Control accredited with Ukraine's National Accreditation Agency based on DSTU ISO/IEC 17025:2006

Accreditation Certificate No. 2H1199 dated February 12, 2018

Kyiv city, 2021

LICENSES AND CERTIFICATES

Test Protocol No. 328-1/16AK
page 2/2

Purpose of test	Determination of amino acids content
Object(s) to be tested	**328-1/16AK** – '*Saprozem*' organic fertilizer based on the '*Sapropel*' fertilizer
Test ordered by customer	**"ORGANIC INVEST" LLC,** 7 Oleksandra Boichenka Str., Apt. 49, Kyiv city, 02192 Contract No. 43/16/1 dated August 23, 2021
Sample Taking Report	Samples have been taken and delivered by the Customer's authorized representative
Test date	August 22 – 25, 2021
Equipment used	Amino acid analyzer Biotronik LC 2000
Test results	Test results are shown in the Table 1

TEST RESULTS
328-1/16AK – *SAPROPEL* dehydrated
amino acids content, in g per 100 g

Table 1

Item assessed, measurement unit	Standard requirement	Test results	Uncertainty, U (k=2, P=0,95)	Norm applied to testing procedure
2	3	4	5	6
aspartic acid		0,305	±0,01	DSTU ISO 13903:2009
threonine		0,189	±0,05	
serine		0,175	±0,01	
glutamic acid		0,259	±0,02	
proline		0,113	±0,02	
glycine		0,203	±0,01	
alanine		0,210	±0,01	
cystine		-	-	
valine		0,200	±0,03	
methionine		0,015	±0,01	
isoleucine		0,119	±0,01	
leucine		0,151	±0,05	
tyrosine		0,074	±0,02	
phenylalanine		0,124	±0,01	
histidine		0,014	±0,01	
lysine		0,129	±0,03	
tryptophan		0,119	±0,02	
arginine		0,115	±0,01	
Total		**2,514**		

Prepared by /signed/ F.K. Lystopad
Tel.:(044) 517-05-10

*) determination of amino acids content lies beyond accreditation

The test results apply only to the tested samples. The official reproduction, duplication and distribution of this Test Protocol shall be subject to the approval of Division of Food-Related Research and Quality Control of the Institute of Food Resources of the National Academy of Agrarian Sciences of Ukraine.

ТОВ «Мовний центр та бюро перекладів «ОС» наступним засвідчує, що даний документ є достовірним та точним перекладом з української мови англійською, який було виконано Богдан Оксаною Валеріївною, яка має відповідну кваліфікацію перекладача англійської мови.

підпис перекладача
translator's signature

LLC "Language Centre and Translation Bureau "OS" does hereby certify that this document is a true and correct translation from Ukrainian into English made by Oksana Bogdan, being competent in both Ukrainian and English to render such translation.

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ORGANIC INVEST LLC
T.:+38 050 388 89 08, E-mail: v.keba@organic-invest.com.ua
Oleksandra Boychenka str. 7, of. 49, 02192, Kyiv, Ukrainehttp://ukrorganicres.com/

CERTIFICATE OF QUALITY

I. PRODUCT: SAPROPEL dehydrated
II. **Sapropel dehydrated – mineral fossil substance**. Sapropel - centuries-old bottom deposits of freshwater reservoirs, which were formed from dead aquatic vegetation, the remains of living organisms, plankton, as well as particles of soil distillation, containing a large amount of organic substances, humus: ligninogumus complex, carbohydrates, bitumen and others in colloidal state.
III. Location: Synove Lake, Starovyzhevskiy districte, Volyn region, Ukraine.

Name of substances, unit of measurement	*Test Results*	*Test Methods*
1. pH, Units of pH	**7,30**	*GOST 227979-88*
2. Moisture, %	**84.2**	*DSTU-ISO/TR 11465-2001*
3. Dry substance,%	**15,8**	*DSTU-ISO/TR 11465-2001*
4. Ash, %	**21,50**	*DSTU 7942:2015*
5. Organic matter, %	**78,30**	*DSTU 7942:2015*
6. Organic Carbon%	**40,60**	*DSTU 8454:2015*
Macro- and microelements:		
7. Mass fraction of Nitrogen, N,%	**2,50**	*DSTU 7911:2015*
8. Mass fraction of Phosphorus, P_2O_5,%	**0,08**	*DSTU EN 15956:2015*
9. Mass fraction of Potassium, K_2O,%	**0,05**	*RM.UL.5.4-90*
10. Mass fraction of Calcium , Ca, %	**0,71**	*RM.UL.5.4-100*
11. Mass fraction of Magnesium, Mg, %	**0,045**	*RM.UL.5.4-100*
12. Mass fraction of Ferum, Fe, %	**0,91**	*RM.UL.5.4-100*
13. Mass fraction of Natrium, Na, %	**0,035**	*RM.UL.5.4-100*
14. Mass fraction of Zink, Zn, %	**0,009**	*RM.UL.5.4-100*
15. Mass fraction of Lead, Pb, %	**0,0014**	*RM.UL.5.4-100*
16. Aminoacids, %	**7,03**	*DSTU ISO 13903:2009*
17. Humic acids, %	**10,02**	*DSTU 7083:2009*

Date: 03.09.2020.

General director
«Organic Invest LLC» **/Keba A.P./**

LICENSES AND CERTIFICATES

Organic Invest LLC

MATERIAL SAFETY DATA SHEET — 16 Sections

SECTION 1 — CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identifier SAPROLIFE – organic soil former		[WHMIS Classification] D2	
Product Use IN AGRICULTURE, HORTICULTURE, FORESTRY, SOIL REMEDIATION AND SOIL IMPROVER AND ORGANIC SOIL OPTIMIZER			
Manufacturer's Name Volynsaprophos Ltd.		Supplier's Name Organic Invest LLC	
Street Address 38, Nezalezhnosti str.		Street Address 9, Priozerna str.	
City Shkroby	Province Volyn, Ukraine	City Kyiv	Province Kyiv, Ukraine
Postal Code 44432	Emergency Telephone +380 50 310 54 45	Postal Code 02192	Emergency Telephone +380 50 388 89 08
Date MSDS Prepared 20 FEBRUARY 2020	MSDS Prepared By KEBA Volodymyr	Phone Number +380 50 388 89 08/	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredients *(specific)*	%	CAS Number	LD_{50} of Ingredient *(specify species and route*	LC_{50} of Ingredient *(specify species)*
HUMIC ACID	13-15	1415-93-6	N/A	N/A
FULVIC ACID	0.25-0.5	479-66-3	N/A	N/A
HUMATES, VITAMINES, AMINO ACIDS	>1	N/A	N/A	N/A
SAPROPEL	75	64083-34-7	N/A	N/A
PEAT	25	none		

SECTION 3 — HAZARDS IDENTIFICATION

SECTION 4 — FIRST AID MEASURES

Skin Contact HARMLESS. NO HAZARDS IDENTIFIED.
Eye Contact HARMLESS. NO HAZARDS IDENTIFIED.
Inhalation HARMLESS. NO HAZARDS IDENTIFIED.
Ingestion HARMLESS. NO HAZARDS IDENTIFIED.

Product Identifier– 2 –

SECTION 5 — FIRE FIGHTING MEASURES

Flammable YES	If yes, under which conditions? ONLY WHEN MOISTURE CONTENT IS LESS THAN 15%. BURNS SLOWLY IF IGNITED.	
Means of Extinction EASILY EXTINGUISHED WITH WATER		
Flashpoint (° C) and Method 600 DEGREES CELSIUS	Upper Flammable Limit (% by volume) 85%	Lower Flammable Limit (% by volume) 30%
Autoignition Temperature (°C) N/A	Explosion Data — Sensitivity to Impact N/A	Explosion Data — Sensitivity to Static Discharge N/A
Hazardous Combustion Products TARRY SMOKE IN CONFINED PLACE		
[NFPA]		

SECTION 6 — ACCIDENTAL RELEASE MEASURES

Leak and Spill Procedures NONE

SECTION 7 — HANDLING AND STORAGE

Handling Procedures and Equipment

STORE IN AIRTIGHT POLYPROPYLENE BAGS OR BIG BAGS

Storage Requirements

AMBIENT TEMPERATURE: 8-20 DEGREES CELSIUS. STORE OUT OF DIRECT SUNLIGHT. KEEP STORAGE AREA LOCKED.

SECTION 8 — EXPOSURE CONTROL / PERSONAL PROTECTION

Exposure Limits ❒ ACGIH TLV ❒ OSHA PEL ❒ Other *(specify)*

Specific Engineering Controls *(such as ventilation, enclosed process)*

NIL

Personal Protective Equipment ❒ Gloves ❒ Respirator ❒ Eye ❒ Footwear ❒ Clothing ❒ Other

If checked, please specify type

N/A

LICENSES AND CERTIFICATES

Product Identifier– 3 –

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

Physical State BROWN-BLACK FRIABLE MATERIAL	Odour and Appearance NONE OR SLIGHTLY SWEET SMELL	Odour Threshold (ppm) 50
Specific Gravity 0.70 KG/LITRE	Vapour Density (air = 1) N/A	Vapour Pressure (mmHg) N/A
Evaporation Rate NIL	Boiling Point (° C) N/A	Freezing Point (° C) 0
Ph 6-7	Coefficient of Water/Oil Distribution N/A	[Solubility in Water] INSOLUBLE

SECTION 10 — STABILITY AND REACTIVITY

Chemical Stability ST ABLE	If no, under which conditions?
Incompatibility with Other Substances ❒ Yes ❒ No	If yes, which ones? INSOLUBLE IN OILS. VIABILITY REDUCED IN STRONG ACIDS.

Reactivity, and under what conditions?

N/A

Hazardous Decomposition Products

N/A

SECTION 11 — TOXICOLOGICAL INFORMATION

Effects of Acute Exposure

NIL

Effects of chronic exposure

NIL

Irritancy of Product XI MILD IRRITATION NIL

Skin sensitization NONE	Respiratory sensitization NONE
Carcinogenicity-IARC NONE	Carcinogenicity - ACGIH NONE
Reproductive toxicity NONE	Teratogenicity NONE
Embrotoxicity NONE	Mutagenicity NONE

Name of synergistic products/effects

Product Identifier– 4 –

SECTION 12 — ECOLOGICAL INFORMATION

[Aquatic Toxicity]

NON TOXIC

SECTION 13 — DISPOSAL CONSIDERATIONS

Waste Disposal

NON HAZARDOUS

SECTION 14 — TRANSPORT INFORMATION

Special Shipping Information

NON HAZARDOUS	PIN
TDG	[DOT]
[IMO]	[ICAO]

SECTION 15 — REGULATORY INFORMATION

[WHMIS Classification] NONE	[OSHA] NONE
[SERA] NONE	[TSCA] NONE

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by CPR.

SECTION 16 — OTHER INFORMATION

STORE IN COOL DARK PLACE.

USE ONLY FOR AGRICULTURAL / HORTICULTURAL PURPOSES AS WELL AS SOIL AND WATER REMEDIATION.

ABOUT COMPANY

Company SaproInvest B.V. was established in 2022.

Our mission is to supply products based on Sapropel in the Netherlands.

The Company has two founders:

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Saproinvest B.V.

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