Non-traditional resources from Black sea bottom and their possible use as complex raw material

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The deepsea organogenic-mineral (sapropelic, diatomic and coccolithophoridic) sediments (DSOMS) of the Black Sea are built mainly of nano-sized materials, which can fmd application in the modern nanotechnologies and new materials. The first experiments, conducted independently by Ukrainian and Bulgarian researchers, on the raw material applied as a natural organic fertilizer show sharp improvement of soil structure, alkalinity, increase moisture content, absorb the process of maturing and increases yields. The series of DSOMS experiments, performed by experts from the Institute of Agriculture under the Ukrainian Agricultural Academy of Sciences on soils from the Polesie and on black earth wooded steppe of lands contaminated with radionuclides (up to 15 Ku/km^2), show that the amount of the imported fertilizers may be reduced 17 times and their efficiency increased by 20-30%. The practically unlimited stocks, the low cost estimates for this raw material in its application in the sphere of new materials and use with nanotechnologies as well as the opportunities for application in agricultural technologies, ceramics, pharmacy, a food additives and other applications makes it a complex raw material for multiple purposes. Contacts will be established both with private companies and with the Organization for Black Sea Economic Cooperation (BSEC) to acquaint them with the obtained know-how and to create partnerships supporting the introduction of the new materials and technologies. The project implementation will contribute to the development of the Institute of Oceanology under the Bulgarian Academy of Sciences and the State Science Institution "Department of Marine Geology and Sedimentary Ore Formation" of the National Academy of Science of the Ukraine which will become a natural scientific centre in the sphere of new materials and marine resources.

The implementation of the project will allow the joint work on the evaluation of DSOMS deposits and the assessment of the opportunities to satisfy the needs of the industry of both countries with a multipurpose raw material to continue. This will lead to the renewal of the scientific and technical cooperation between the two countries in the sphere of research and utilization of Black Sea resources. it can be expected that the development and introduction of DSOMS into the agricultural sector will lead to enhancement of the competitiveness of the scientific and technical potential of the two countries and creation of new science-intensive technologies leading to the release of new materials and products on the world market which will contribute for the significant improvement of the quality of life.

The Black Sea DSOMS are currently in a peat stage of their development. Because of the anoxic environment in which the sediments deposit, they do not pass the stage of complete decay and in semi-decayed state they are conserved in the hydrogen sulfide zone. Considering the fact that the sapropelic, diatomic and coccolithophoridic layers penetrate within each other and represent a comparatively homogeneous mixture, they will be discussed as complex organogenic mineral raw material, in which the sapropels occupy about 80% of the total volume. DSOMS are valuable not only for their organic matter but also for their carbonate component and the amorphous silicates. The mineral and organic parts contain micro-components such as: calcium, magnesium, iron, aluminum, manganese and some others; more than 20 micro-elements, which are contained in concentrations exceeding many times those in soils, thus being an important stimulant for the plants growth.

DSOMS are used as a complex fertilizer or as a component together with other mineral stimulants - perlite, zeolite. The sediments excel them in agro-technical properties. Sediments can be used directly in the soil in natural state without additional processing of the raw material. Other important advantages are: - Unlimited supplies of raw material in the water area, which is located at depths of 200 to 2200 m. The content of

the organic matter increases with the increase of depth.
The possible exploitation of the raw material will not have negative consequences on the marine environment.
The industrial supplies are located at great depth within the hydrogen sulfide zone, in which life does not exist.
The exploitation will have an ecologically positive effect that will influence, though slowly, the level of the
hydrogen sulfide zone.
The dying flora and fauna of the Black Sea serve as an initial substance for DSOMS. As a result of the activities
of the anoxic bacteria, the dying flora and fauna pass the transformation process of animal and plant plankton and
benthos and form biolithic-mineral substance with peculiar physic-mechanical and biogeochemical properties. *Keywords: Deepsea organogenic-mineral sediments (DSOMS), sapropelic, diatomic, coccolithophoridic, H_2S, raw material, agro-ameliorant, biostimulants, natural bioproducts, bioagricultural technologies, new materials*

Karadeniz tabanında geleneksel-olmayan kaynaklar ve bu kaynakların karışık hammadde olarak kullanılma olasılığı

Karadeniz'in organik kökenli-mineral sedimanları (sapropelik, diyatomik ve kokolitoforik) (DSOMS), ağırlıklı olarak, modern nanoteknolojilerde ve yeni malzemelerde uygulama alanı bulunabilecek olan, nano-boyutlu gereçten yapılıdır. Ukraynalı ve Bulgar araştırıcılar tarafından doğal organik gübre olarak kullanılan hammaddeler konusunda ayrı ve bağımsız olarak yürütülen ilk deneyler, toprak yapısında ve alkalilikte ani iyileşmeler sağlamış, nem içeriğini artırmış, olgunlaşma sürecini özümle(t)miştir. Ukrayna Tarımsal Bilimler Akademisi bünyesindeki Tarım Enstitüsü uzmanları tarafından, radyonükleidlerle kirlenmiş (en çok 15 Ku/km^2) Belorus ve siyah topraklı ağaçlık step alanlarından alınan toprak örneklerinde yürütülen DSOMS deneyleri serisi, katılan gübre miktarının 17 kat azaldığını ve gübrelerin etkisinin % 20-30 arttığını gösterir. Bu hammaddelerin pratikte sınırsız kaynakları ve yeni malzemeler dünyasında uygulanmasında, nanoteknoloj iler ile kullanılmasında ve ayrıca tarım teknolojilerinde, seramik sanayinde, eczacılıkta, gıda katkı maddeleri olarak ve diğer uygulama alanlarındaki düşük maliyet tahminleri, bu hammaddeleri çoklu amaçlar için kullanılabilen çoklu-kullammlı hammaddelere dönüştürür. Bu hammaddeler konusunda bilgilendirmek, patent almak ve yeni malzemeler ve teknolojiler çalışmalarını destekleyen ortaklıklar oluşturmak için, hem özel firmalarla hem de Karadeniz Ekonomik İşbirliği Örgütü ile bağlantı kurulacaktır. Projenin yaşama geçirilmesi, Bulgaristan Bilimler Akademisi bünyesindeki Deniz Bilimleri Enstitüsü'nün ve yeni malzemeler ve denizel kaynaklar alanında doğal bilimsel merkez olacak olan, Ukrayna Ulusal Bilimler Akademisi bünyesindeki Devlet Bilim Kuruluşu, "Deniz Jeolojisi ve Sedimanter Cevher Oluşumu Departmanı"nm gelişmesine katkıda bulunacaktır.
Projenin gerçekleştirilmesi, DSOMS yataklarının değerlendirilmesi ve her iki ülke sanayilerinin çoklu-kullanımlı hammadde ihtiyaçlarının saptanması konusunda ortak çalışma zemini sağlayacaktır. Bu, Karadeniz kaynaklarının araştırılması ve kullanılması alanında iki ülke arasındaki bilimsel ve teknik işbirliğinin yenilenmesine ve sürmesine olanak tanıyacaktır.
DSOMS'un tarım sektöründe uygulanması ve geliştirilmesinin, iki ülkenin bilimsel ve teknik potansiyelinin rekabet gücünün artmasına ve yaşam kalitesini önemli ölçüde yükselten yeni ürün ve teknolojilerin dünya pazarına çıkmasını sağlayacak yeni bilim-yoğun teknolojilerin üretilmesi sonucunu doğurması beklenir.