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SEA BUCKTHORN – A VALUABLE CROP FROM AN ECONOMIC, ECOLOGICAL AND MEDICINAL VIEWPOINT

ABSTRACT

The paper presents an analysis of sea buckthorn (*Hippophae rhamnoides L.*) crop, aiming to highlight the benefits of this crop. Sea buckthorn is a species with multiple uses in various fields, such as food industry, pharmaceutical industry and cosmetics. This plant can also play an important role in restoring degraded soils. Global and European demand for this crop has increased, mainly in recent years.

Key words: sea buckthorn, processing, market.

JEL Classification: Q 11, Q 12

1. INTRODUCTION

Sea buckthorn is a shrub with high ecological plasticity. It grows spontaneously in Romania, starting from coastal sands to mountain areas. It meets environmental objectives, being a species that grows and develops on salty, acid or sandy soils, and it can be used for restoring degraded lands. It resists to frost, drought and wind.

It fits the plan of action for circular economy, having various uses; the production cycle ends with the valorisation of by-products resulting from processing. It also has a positive impact upon landscapes.

Sea buckthorn has been known for its medicinal properties for centuries. Due to its high nutritional value and wide spectrum of bio-active compounds, it participates in numerous healing processes and its popularity has increased.

2. STATE OF KNOWLEDGE

Soil plays a central role as habitat and genetic heritage, as it hosts 25% of the world's biodiversity.

Soil is a very fragile and non-renewable finite resource, and it takes 1,000 years to make 1 cm of soil. The main forms of soil damage are erosion, destruction,

degradation, salinisation etc. The human activities that contribute to soil destruction are: poor management, change of destination, unsustainable agricultural practices, abandonment, pollution, soil sealing etc. Sea buckthorn can play an important role in combating desertification, restoring degraded land and soils, because after the first 2 years after planting, the roots of this plant begin to form nodules that will capture nitrogen from the air and make it available to plants; this makes it possible to grow this crop in the absence of fertilisers. In addition, having few diseases and pests, it is a crop suitable for organic production.

The Common Agricultural Policy has three clear environmental objectives that can be found in the European Green Deal: addressing climate change, protecting natural resources, enhancing biodiversity. The CAP provides for the protection of biodiversity in many ways, including norms and measures that target maintaining landscape features. The landscape, with its symbolic power, can convey different messages depending on the sensitivity, culture and knowledge of each individual. The sea buckthorn plant is highly attractive due to the orange-yellow colour of ripe berries. Sea buckthorn berries reach maturity starting in mid-August and last until late autumn in our country, but can remain on branches over the winter. The orange colour symbolises energy, vitality and good health.

The destination of sea buckthorn berries is almost entirely industrial, for obtaining valuable medicinal products.

3. MATERIAL AND METHOD

The specialised literature on the importance of this crop, as well as various reports, and European and national regulations were consulted. Data on the active ingredients of sea buckthorn oil were also taken from various studies. In the absence of statistical data on sea buckthorn cultivation, certain data from specialised websites, as well as producers' statements were also taken into consideration.

4. RESULTS AND DISCUSSIONS

Considered one of the most valuable plants with therapeutic effect, sea buckthorn is used under various forms to relieve the symptoms of illness and prevent or even cure certain diseases and to boost immunity.

The medicinal and aromatic plants market in Romania is regulated by Law 499/2003, republished.

Production means the obtaining of medicinal and aromatic plants by cultivation or harvesting from spontaneous flora. Processing means conditioning of plants into teas, natural spices, as well as into materials for industrial manufacturing. Industrial manufacturing is the transformation of raw materials into products that are

marketed: medicines, cosmetic products, nutritional and dietary supplements, food additives, flavours.

These plants are found in the national catalogue and code of nomenclature of cultivated plants and wild flora or in the official Community catalogue or the catalogue of each EU member state.

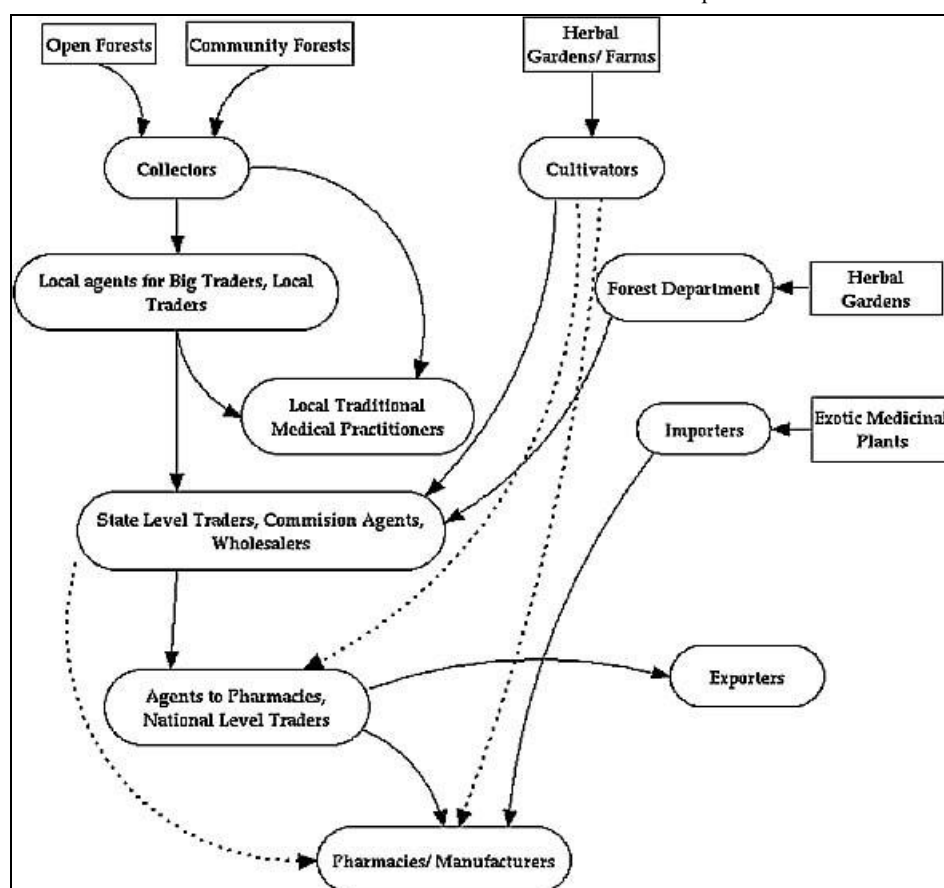
The central authority in charge in Romania is the Ministry of Agriculture and Rural Development, and the market surveillance of processed products is the responsibility of inspectors from the Ministry of Health.

Products must be certified to be placed on the market.

The report on the global sea buckthorn market that we studied provides general data, including information on important players, such as Seabuckwonders, Sibü, Badger Balm, Weleda, Natures Aid, Natura Health Products.

Box 1

Structure of the market for medicinal and aromatic plants



Source: Manmohan Yadav, Shekhar Misra, 2012.

According to this report, the world market size was valued at 1.4 billion USD in 2019 and it is estimated to reach 2.4 billion USD by the year 2027. Increasing disposable income of consumers and the increasing focus on a healthy lifestyle are the key factors leading to the growth of global sea buckthorn market. Market growth is determined by the increase of consumers' awareness of the health benefits of sea buckthorn products, coupled with the growing demand for natural food products. The European market has also developed, due to the increasingly large number of companies that produce and distribute sea buckthorn products in the region. This has facilitated consumers' access to these products.

The report makes an analysis of the market through Porter's Five Forces framework, using 5 main factors.

Box 2

The main market factors

1. **Competitive Rivalry:** The global buckthorn market is likely to experience high competition due to the presence of many large and small players that provide a wide range of products. Moreover, market players are likely to differentiate their products through price, product innovation, product quality etc. to increase their market share.
2. **Threat of New Entry:** The entry barriers for new players in the global sea buckthorn market are moderate due to the presence of a wide range of players and their strong presence. In addition, government regulations, including obtaining certifications and licenses for selling products, may restrict the entry of new players.
3. **Threat of Substitution:** The threat of substitution is high due to the availability of substitutes for sea buckthorn, including options such as coconut oil, almond oil, olive oil etc. Most end-use industries prefer substitutes due to their low cost.
4. **Bargaining Power of Suppliers:** Suppliers' bargaining power is moderate due to the presence of a large number of suppliers, which provide buyers with more options for purchasing sea buckthorn. In addition, the availability of sea buckthorn products from multiple suppliers has a restrictive effect upon suppliers' prices.
5. **Bargaining Power of Buyers:** Suppliers' bargaining power is moderate due to the large number of suppliers and buyers trading in the global sea buckthorn market. However, the availability of sea buckthorn substitutes gives buyers more options to choose from.

Source: <https://www.verifiedmarketreports.com/product/sea-buckthorn-market/>.

The report states that this species has limited genetic diversity. This lack of diversity implies that the species has a limited ability to adapt to changing environmental conditions, which can have a negative effect on its growth. In addition, the limited genetic diversity of sea buckthorn can also result in low yields and lack of resistance to pests and diseases.

From the statements of Romanian producers, it results that in our country there is no specialised literature on the cultivation of this plant, so that these must experiment on their own.

The information supplied by AGRIMEDIA consists of the following:

- there is valuable Romanian planting stock in the Primagra farm in Arad;
- sea buckthorn has a special ecological plasticity, but the sunny areas in the south provide uniform growth and ripening of plants;
- sea buckthorn does not have many pathogens, does not require spraying, fertilisation is done with the material chopped from the inter-row intervals, therefore organic certification is recommended;
- plantation maintenance is almost fully mechanised;
- berry twigs are harvested manually, then they are frozen and berries are shaken;
- the export of raw materials is quite difficult, the only option being processing into a wide range of food products;
- a production of 4–5 tonnes/hectare is sufficient in the case of manufacturing;
- the taste of selected varieties is better than that of berries from the wild flora;
- maintaining on the market is achieved by increasing the volume and less by increasing prices, even though the production is organic.

PRIMAGRA SRL, established in 2001, stands out as supplier of planting stock. In the year 2022, the net turnover of company totalled 2,939,085 RON, with a net profit of 137,027 RON. Compared to the previous year, turnover was down by 20%.

Table 1

Economic data of the company PRIMAGRA SRL

RON			
Year	Turnover	Net profit	Liabilities
2022	233,5444	215,463	4,033,758
2021	2,939,085	13,7024	3,995,472
2020	275,2580	1,748,259	3,582,311

Source: termene.ro

The company PALD Biofarm SRL stands out as producer that operates the Frootya brand. This production line includes raw sea buckthorn juice and combinations of sea buckthorn nectar with mango, ginger, orange, chokeberries and honey (forbes.ro). Frootya juice, 3 litres, with no preservatives, is sold online for 119 RON.

Table 2

Economic data of the company PALD Biofarm SRL

RON			
Year	Turnover	Net profit	Liabilities
2022	127,128	84,431	5,800,506
2021	465,605	78,795	3,995,472
2020	97,430	78,604	4,582,311

Source: termene.ro

CO₂ extracts are pure natural extracts from plants that best preserve plant properties.

Sea buckthorn contains a variety of bioactive substances, which are present not only in berries, but also in seeds and leaves. The different parts of the plant vary in their antioxidant composition, which has demonstrated a positive biological, physiological and medicinal effect of sea buckthorn. The greatest scientific interest is focused on ascorbic acid found in berries, juice and leaves; phytosterols etc. (Agnieszka J. and Anna D., 2021).

Table 3

Amino acids present in sea buckthorn

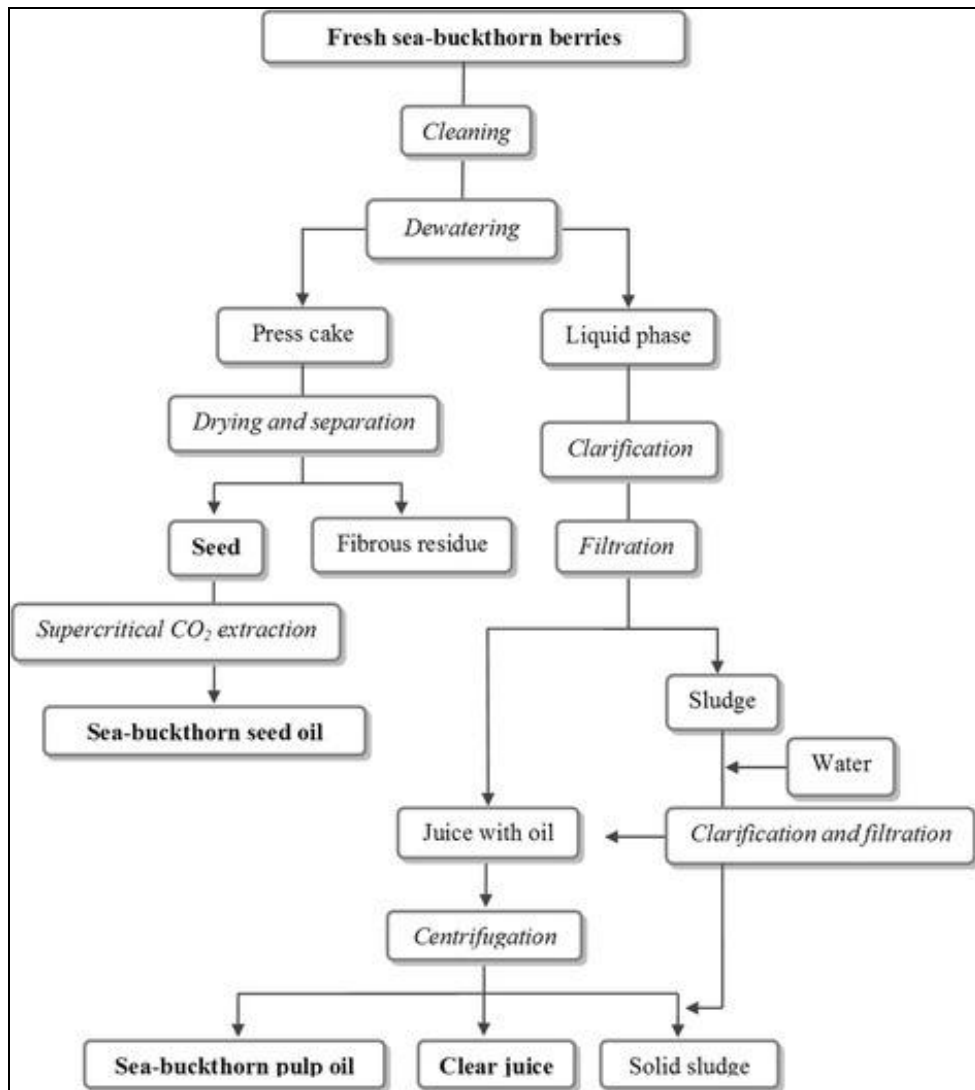
mg/100 g		
No.	Amino Acid	Content (mg/100 g)
1	Aspartic acid	426.6
2	Serine	28.1
3	Glutamine	19.4
4	Glycine	16.7
5	Alanine	21.2
6	Cysteine	3.3
7	Valine	21.8
8	Ammonia	41.8
9	Tyrosine	13.4
10	Isoleucine	17.4
11	Methionine	2.3
12	Proline	45.2
13	Phenylalanine	20.0
14	Histidine	13.7
15	Lysine	27.2
16	Threonine	36.8
17	Arginine	11.3

Source: Agnieszka Jaśniewska & Anna Diowks, 2021

The extensive use of sea buckthorn as traditional therapy for skin-related conditions has been also confirmed by scientific studies. Its full application in dermatology can be attributed to the presence of a variety of flavonoids, vitamins and unsaturated fatty acids (Swati Pundir *et al.*, 2021).

Box 3

Sea buckthorn processing stages



Source: Aleksandra Zielińska and Izabela Nowak, 2017.

5. CONCLUSIONS

There is a growing interest in the cultivation of sea buckthorn in recent years in various fields; sea buckthorn is also a crop that is integrated into circular economy, having a triple importance: from the economic and health point of view, in cosmetic industry and in terms of environmental protection.

There is potential for development of the market for various products obtained by processing and industrial manufacturing.

Research on sea buckthorn and the cultivation of this plant are boosted by the increase of global and European demand. The world market tends to concentrate. In Romania, there are valuable varieties created from the wild flora and several manufacturers have focused on obtaining juices with no preservatives.

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