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DISCUSSION PAPER - DEVELOPMENT OF A CODEX STANDARD FOR SEABUCKTHORN OIL

(Submitted by Mongolia and China)

1. Background

Seabuckthorn (*Hippophae rhamnoides* L.) is a cold and drought-resistant shrub thriving in extreme climates (+40°C to -40°C), widely distributed across temperate Eurasia, including Mongolia, China, Russia, and Europe (Enescu, 2014). Cultivated on 2.58 million hectares across 55 countries, with China (2.141 million hectares, 88%) and Mongolia (7,000 hectares cultivated, 14,300 hectares natural) as leading producers. In China, seabuckthorn serves dual medicinal and edible purposes, supporting rural economies and environmental restoration (Mei et al., 2023). Other countries or regions include Siberia, and Eurasian temperate regions (e.g., France, Russia, India, UK, Denmark, Netherlands, Germany, Poland, Finland, Norway),

Seabuckthorn oil, is extracted from berry pulp (rich in omega-7 and carotenoids) and seeds (high in omega-3 and -6) of seabuckthorn (*hippophae rhamnoides*). The oil contains bioactive compounds, including fatty acids, vitamins (A, C, E, K), carotenoids, polyphenols, and phytosterols, offering anti-inflammatory, cardiovascular, and skin-regenerative benefits (Jaśniewska & Diowks, 2021; Olas, 2021). Traditionally used in Mongolian and Chinese medicine for centuries, however, there is a rising global demand for its use in functional foods, and dietary supplements, as well as cosmetics, and pharmaceuticals (Gao et al., 2017).

The absence of a Codex standard for Seabuckthorn oil results in quality inconsistencies, adulteration with lower-cost oils (e.g., sunflower, palm), and related trade barriers due to the lack of a specific HS code (1515.90.00 in Mongolia), thus undermining consumer trust and market growth.

The proposed Codex standard aims to ensure consumer safety, product authenticity, and fair trade. A standard will harmonize quality and safety criteria, boost consumer confidence, and facilitate market access for producers in developing countries. Developing a standard for Seabuckthorn oil will be consistent with the Codex Strategic Plan 2020–2025 Goals 1 (food safety) and 2 (fair trade) and Sustainable Development Goals (SDGs) 2, 3, 5, 10, 13, and 15.

Seabuckthorn oil is derived from the berries of *Hippophae rhamnoides*, either from the pulp or the seeds, and is intended for edible use. Unlike conventional vegetable oils regulated under the Codex Standard for Named Vegetable Oils (CXS 210-1999), which typically originates from oil-rich seeds, seabuckthorn oil exhibits a distinctive composition due to its berry-based origin. It contains a high concentration of omega fatty acids, especially omega-7, alongside carotenoids and other bioactive compounds that are increasingly recognized for their nutraceutical benefits. These unique properties, combined with the oil's application in functional food and dietary products, necessitate a dedicated Codex standard to ensure product integrity, prevent adulteration, and provide clear specifications aligned with food safety and international trade needs.

The overall objective of this work would be the development of an international Codex standard for seabuckthorn oil (derived from *Hippophae rhamnoides* berry pulp and seeds), aiming to enhance the safe production and trade of this commodity, thereby ensuring food safety, facilitating trade, and boosting its international market access. The focus will be to identify and define the distinct characteristics of seabuckthorn oil, including its unique fatty acid profile (omega-3, -6, -7, and -9), high antioxidant content, and vitamin-rich composition, to standardize production and processing conditions among major producers and consumers worldwide

The scope of the standard applies to seabuckthorn oil intended for human consumption, including both pulp oil and seed oil, presented in packaged form for direct consumer use or as an ingredient in food, dietary supplements. The standard will encompass essential quality and safety conditions, testing methods, and labeling requirements to protect consumer health and ensure fair trade practices, addressing issues such as adulteration with lower-cost oils and inconsistent regulatory frameworks.

2. Seabuckthorn Oil: Definitions:

The proposed standard defines the following types of seabuckthorn oil:

- **Seabuckthorn Pulp Oil:** Derived from the berry pulp, where the oil is separated from the juice using centrifugal force (e.g., separator or centrifuge). It is characterized by a high concentration of omega-7 fatty acids and carotenoids.
- **Seabuckthorn Seed Oil**, obtained from dried seabuckthorn seeds using either:
 - CO₂ extraction, utilizing liquefied carbon dioxide to extract the oil, or
 - High-pressure pressing (hot or cold methods). It is noted for its high content of omega-3 and omega-6 fatty acids.

3. Overview of the Distinct Characteristics of Seabuckthorn Oil

Seabuckthorn oil, valued for centuries in Mongolian and Chinese medicine, offers anti-inflammatory, antibacterial, antioxidant, and tissue-regenerative properties, driven by its bioactive components (Gao et al., 2017; Olas, 2021). Its composition varies by fruit part, extraction method (e.g., centrifugation, CO₂ extraction), cultivar, and environmental factors (Mei et al., 2023; Avdai & Chimed-Ochir, 1990).

Fatty Acids: A balanced profile of omega-3, -6, -7 fatty acids, with omega-7 (palmitoleic acid) being rare among plant oils, supporting metabolism and cardiovascular health. Pulp oil contains palmitoleic acid (C16:1, 20–35%), oleic acid (C18:1, 15–28%), and palmitic acid (C16:0, 6–11%); seed oil is rich in linoleic acid (C18:2, 30–40%) and alpha-linolenic acid (C18:3, 23–32%), with minor stearic acid (C18:0, 0.1–4%) (Yang & Kallio, 2002; Marsiñach & Cuenca, 2019). These support cardiovascular health, metabolism, and skin regeneration.

Vitamins: Vitamin E (cell protection, reducing oxidative stress), Vitamin C (immune support, tissue regeneration), and Vitamin K (blood clotting, bone health). Pulp oil has vitamin C (200–1,500 mg/100 g), vitamin E (≥140 mg/100 g), and trace vitamin K; seed oil has lower vitamin C but similar vitamin E, enhancing immune function and oxidative stability (Chauhan & Chauhan, 2022).

Carotenoids and Antioxidants: Beta-carotene, lycopene, and polyphenols reduce inflammation, protect against cellular damage, and enhance food aesthetics due to the oil's vibrant color. Pulp oil is high in beta-carotene (20–100 mg/100 g) and lycopene; seed oil contains phytosterols (≥600 mg/100 g), reducing inflammation and oxidative stress (Jaśniewska & Diowks, 2021).

Minerals: Potassium, calcium, magnesium, iron, and phosphorus support metabolic and cellular functions, includes potassium (10–20 mg/100 g), calcium (5–15 mg/100 g), magnesium (3–10 mg/100 g), iron (0.5–2 mg/100 g), and phosphorus (5–15 mg/100 g), supporting metabolic functions (Koskovac et al., 2017)

Phenolic Compounds and Flavonoids: These bioactive compounds provide antibacterial and antiviral properties, supporting food preservation and health applications (Wang et al., 2022).

Amino Acids: Trace amounts (e.g., proline, glutamine) support tissue repair and collagen synthesis, ideal for cosmetics (Geçotek et al., 2018).

The oil's bioactive composition drives its high demand, but its premium value increases the risk of adulteration, necessitating an international standard to ensure quality, safety, and fair trade.

4. Conditions of Production and International Trade

Seabuckthorn berries, with approximately 10% oil content and high-water content, require prompt processing (freezing or drying) to prevent spoilage. Pulp oil is extracted via centrifugation, and seed oil via supercritical CO₂ extraction or high-pressure pressing, preserving bioactives (Avdai & Chimed-Ochir, 1990; Gangerel et al., 2023; Zhang et al., 2022). The remaining pulp is used for beverages, enhancing resource efficiency. Mongolian research has optimized extraction and quality control via spectrometry (Huuhenhuu & Chimed-Ochir, 1986; Gangerel et al., 2022–2024).

Seabuckthorn oil's rich composition, including vitamin C (ascorbic acid), carotenoids, and polyphenols, drives demand among consumers seeking natural, health-focused products. Its antioxidant, anti-inflammatory, and antibacterial properties make it ideal for functional foods, dietary supplements, and cosmetics (Jaśniewska & Diowks, 2021). Applications include:

- **Health Supplements:** Nutrient-rich oil for functional foods, high in vitamin E and unsaturated fatty acids.

China produces 1,200–1,500 tons of seed oil and 400–600 tons of pulp oil annually; Mongolia produces 50–80 tons of pulp oil and 20–30 tons of seed oil (International Seabuckthorn Association, 2023). Mongolia's exports (2020–June 2025, HS 1515.90.00) total 8,113.47 kg across 172 transactions (Table 1), with 1,672.18 kg exported in 2020 to China (1,398.50 kg), Japan (265.27 kg), Germany (7.50 kg), South Korea (0.90 kg),

and the USA (0.01 kg) (Table 2). China's domestic market grows at ~10% annually, driven by health trends and Belt and Road Initiative exports.

Table 1. Mongolia Seabuckthorn Oil Export Summary (2020–2025)

Year	Pulp Oil (kg)	Seed Oil (kg)	General Seabuckthorn Oil (kg)	Total Net Weight (kg)	Transactions
2020	1,498.31	165.46	8.41	1,672.18	28
2021	1,260.27	315.96	44.20	1,620.43	26
2022	1,297.21	594.01	49.50	1,940.72	33
2023	1,016.50	394.94	40.87	1,452.31	26
2024	1,006.27	1.34	45.00	1,052.61	33
2025	232.16	33.90	109.16	375.22	26
Total	6,310.72	1,505.61	297.14	8,113.47	172

Source: The Mongolian Customs General Administration (HS 1515.90.00, "Other fixed vegetable fats and oils"). Data for 2025 covers January to June only.

Table 2. Mongolia Seabuckthorn Oil Export by Country (2020)

Country/Region	Pulp Oil (kg)	Seed Oil (kg)	General Seabuckthorn Oil (kg)	Total Net Weight (kg)	Transactions
Taiwan, Province of China	1,398.50	0.00	0.00	1,398.50	5
Japan	99.81	165.46	0.00	265.27	6
Germany	0.00	0.00	7.50	7.50	9
South Korea	0.00	0.00	0.90	0.90	5
United States	0.00	0.00	0.01	0.01	3
Total	1,498.31	165.46	8.41	1,672.18	28

Source: Mongolian Customs General Administration (2020, HS 1515.90.00).

Applications focus on functional foods and dietary supplements, leveraging the oil's nutrient-rich profile (Chauhan & Chauhan, 2022). The broad HS code (1515.90.00) obscures trade data, complicating customs processes and market analysis, as seen in limited data from WTO Comtrade Plus and TradeMap. A specific HS code and Codex standard are critical for transparency and market growth.

However, the lack of definite HS (1515.90.00) code obscures trade data, highlighting the need for a specific HS code and international standard to enhance trade transparency and market access. Mongolia is committed to collaborating with stakeholders to compile comprehensive trade statistics.

5. International Regulatory Framework

Mongolia is member of WTO and CAC for more than 30 years and adopts Codex Alimentarius standards as national standards, including Code of practices, Guidelines and Maximum Residue Limits (MRLs), as a member of above-mentioned international organizations, Mongolia is willing to develop an internationally recognized standard for its national specific product, the seabuckthorn oil, however, the seabuckthorn oil is nationally regulated under MNS 0783:2016 (technical requirements) and MNS 2692:2016 (testing methods).

No Codex standard exists for seabuckthorn oil, including in CXS 210 (Named Vegetable Oils) or CXS 19 (Standard for Edible Fats and Oils Not Covered by Individual Standards). Given seabuckthorn oil's distinct nutraceutical properties and risks of adulteration, a dedicated international standard is essential. Variations in national regulations create trade barriers, underscoring the need to promote Mongolia's national specialty product on the global stage.

Table 3. Summary of National and Regional Standards for Seabuckthorn Oil

Country/Region	Standard	Scope	Key Requirements
China	Draft National Standard for Seabuckthorn Seed Oil	Seed oil for food use	Specifies fatty acid profiles, vitamin E (≥ 140 mg/100 g), phytosterols (≥ 600 mg/100 g); complies with GB 2716; testing via GB/T 5526, GB 5009.168
Inner Mongolia (China)	DB15/T 2824-2022	Technical regulation for Seabuckthorn oil processing in Aohan	Defines quality parameters; aligns with GB 2716; includes safety and labeling
Russia	GOST 30623-1998	Vegetable oils, blended fat products. Falsification and detection method.	The standard includes seabuckthorn pulp oil fatty acid composition, and adulteration detection;
Mongolia	MNS 0783:2016 (Technical Requirements)	Pulp and seed oil for food	Covers production, quality control (e.g., spectrometry), and safety;
Poland	None	General food safety	Covered by EU 2015/2283 (novel foods); no specific seabuckthorn standard
Germany	None	General food safety	Subject to EU regulations (LMHV, LFGB); no specific standard
England	None	General food safety	Complies with UK REACH, SI regulations; no specific standard

Source: Project document; WTO/TBT National Notification and Enquiry Points and CCPs.

A Codex standard will harmonize quality, safety, and labeling requirements, ensuring:

- Quality and composition: Defined fatty acid profiles, and quality criteria.
- Safety: Maximum residue limits for contaminants (CXS 193-1995).
- Trade Facilitation: Unified standards for fair market access.
- Sustainability: Support for SDGs through sustainable harvesting, reducing poverty, hunger, and environmental degradation.

Table 4. Comparative study of Seabuckthorn Oil standards

Parameters	Pulp oil				Seed oil		
	GOST 30623-2018	DB15/T 2824-2022	Seabuckthorn Seed Oil Draft Standard for Comments	Draft of Codex Standard	DB15/T 2824-2022	Seabuckthorn Seed Oil Draft Standard for Comments	Draft of Codex Standard
C6:0							
C8:0							
C10:0							
C12:0							
C14:0	0,3			0.1-0.5			≤ 0.3
C16:0	33,5	28.0-40.0	25,0 – 35,0	25.0-40.0	6.0-11.0	6.0-11.0	6.0-12.0
C16:1	38,6	22.0-38.0	28,0 – 35,0	22.0-40.0	0.3-2.0	0.3-2.0	0.3-5.0
C17:0							
C17:1							
C18:0	0,6	≤ 2.0		0.5-2.0	0.1-4.0	0.1-4.0	0.1-6.0
C18:1	22,6	17.0-29.0		8.0-29.0	15.0-28.0	15.0-28.0	14.0-28.0
C18:2	3,2	5.0-13.0		2.0-13.0	30.0-40.0	30.0-40.0	30.0-40.0

Parameters	Pulp oil				Seed oil		
	GOST 30623-2018	DB15/T 2824-2022	Seabuckthorn Seed Oil Draft Standard for Comments	Draft of Codex Standard	DB15/T 2824-2022	Seabuckthorn Seed Oil Draft Standard for Comments	Draft of Codex Standard
C18:3	1,0	≤5		0.5-5.0	23.0-32.0	23.0-32.0	23.0-35.0
C18:4	HO						
C20:0	0.1			0.1-0.5			0.1-0.5
C20:1	0.1						0.1-0.5
C20:2	-						
C22:0	HO						
C22:1	-						
C22:2	-						
C24:0	HO						
C24:1	-						
α-Tocopherol		≥600			≥700		
Sum of Vitamin E, mg/100 g				130-200		140	150-450
ω-3 Fatty Acid, g/100 g				0.5-1.1			25.0-35.0
ω-6 Fatty Acid, g/100 g				9.0-15.0			30.0-40.0
Total Carotene, μg/100 g				(3.5-5.5)*10 ⁴			(1-3)*10 ³
Vitamin K1, μg/100 g				70-250			500-1600
Refractive index, ND 20 °C		1.45-1.48		1.45-1.48	1.47-1.48	1.47-1.48	1.47-1.48
Specific gravity, x °C/water at 20 °C		0.91-0.935		0.91-0.935	0.991-0.921	0.91-0.94	0.91-0.94
Acid value, mg KOH/g		≥3		≤10.0	≥3		≤10.0
Peroxide value, meq/kg		0.2-0.25		≤10.0	0.2-0.25		≤10.0
Iodine value, g/100 g		140-190		140-190	140-180	140-180	140-180
Saponification value, mg KOH/g		150-185		170-210	135-168		135-200
Unsaponifiable matter, %		0.10-0.15		0.1-0.15	0.1-0.15		0.1-0.15
Matter volatile at 105 °C,		0.15-0.25			0.2-0.25	≤0.2	

Parameters	Pulp oil				Seed oil		
	GOST 30623-2018	DB15/T 2824-2022	Seabuckthorn Seed Oil Draft Standard for Comments	Draft of Codex Standard	DB15/T 2824-2022	Seabuckthorn Seed Oil Draft Standard for Comments	Draft of Codex Standard
Total sterols (mg/kg)						≥600	

6. Rationale for developing an international standard for seabuckthorn oil

The growing demand for health supplements, driven by seabuckthorn oil's nutritional profile (omega fatty acids, vitamins, antioxidants), necessitates a stand-alone Codex standard, justified because:

- **Berry-Based Origin:** Unlike *CXS 210-1999* oils, seabuckthorn oil derives from berries, with unique nutraceutical properties (e.g., omega-7, carotenoids).
- **Adulteration Risks:** The high market value of seabuckthorn oil, driven by its bioactive compounds, increases the risk of dilution with lower-cost oils (e.g., sunflower, palm), compromising quality and consumer safety. Defined quality parameters, such as fatty acid profiles and phytosterol content, are essential to prevent fraud and ensure consistency.
- **Market Growth:** The seabuckthorn oil is increasingly available and traded on global e-commerce platforms (e.g., Amazon, eBay), reflecting rising consumer demand for its health benefits in functional foods. This expanding online market underscores the need for individual standard of seabuckthorn oil, to ensure product authenticity and protect consumer health.
- **Consumer Safety:** Standardized quality parameters and contaminant limits, aligned with Codex standards (e.g., *CXS 193-1995*), ensure the safety and nutritional integrity of seabuckthorn oil, protecting consumers and preserving its health-promoting properties.

An individual Codex standard will enhance consumer safety, reduce adulteration, facilitate fair trade, and support rural, small-scale producers in developing countries, aligning with Codex Strategic Plan 2020–2025 Goals 1 (food safety) and 2 (fair trade) and Sustainable Development Goals (SDGs) 2, 3, 5, 10, 13, and 15.

9. Conclusion and Recommendations

The unique berry-based origin and nutraceutical properties of seabuckthorn oil, coupled with its growing global demand through e-commerce platforms, necessitate standardized quality parameters and contaminant limits to combat adulteration, ensure consumer safety, and promote fair trade practices. The absence of a harmonized international standard creates trade barriers and risks to consumer trust, particularly in expanding markets for functional foods. An individual standard will safeguard consumer health, support small-scale producers in developing countries, and facilitate transparent trade, aligning with Codex Strategic Plan 2020–2025 Goals 1 (food safety) and 2 (fair trade) and Sustainable Development Goals (SDGs) 2, 3, 5, 10, 13, and 15.

CCFO29 is invited to consider this discussion paper and the project document in Appendix I and agree to recommend to the Codex Alimentarius Commission to approve new work for the elaboration of a Standard for seabuckthorn oil.

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- *Mongolian statistics site*: <https://1212.mn/>
- *Mongolian Food law and Food safety Law* <https://legalinfo.mn/mn>

APPENDIX I**PROPOSAL FOR NEW WORK - DEVELOPMENT OF A CODEX STANDARD FOR SEABUCKTHORN OIL
PROJECT DOCUMENT**

(Submitted by Mongolia and China)

1. Purpose and scope of the standard

The purpose and scope of this new work is to establish requirements for seabuckthorn oil derived from *Hippophae rhamnoides*, ensuring consumer health protection and facilitating international trade in the growing seabuckthorn oil industry. The scope encompasses oils extracted from the berry pulp and seeds:

- **Seabuckthorn Pulp Oil:** Derived from berry pulp, rich in omega-7 fatty acids and carotenoids, supporting immune and skin health.
- **Seabuckthorn Seed Oil:** Obtained from seeds, high in omega-3 and omega-6 fatty acids, promoting cardiovascular health.

The standard applies to seabuckthorn oil from *Hippophae rhamnoides* intended for direct human consumption, as food ingredients, or for use in functional foods, ensuring compliance with Codex safety and trade standards. It addresses composition, quality criteria (e.g., fatty acid profiles, vitamin content, purity), food safety (e.g., contaminant limits, hygiene), and labeling (e.g., origin, composition, nutritional information) requirements to safeguard consumer health and uphold fair practices in the food trade .

Seabuckthorn oil is extracted from berries and seeds, offering a unique composition of omega-3, -6, -7, and -9 fatty acids, vitamins (E, C, K, A), antioxidants, and phytosterols. These properties drive global demand in functional foods, dietary supplements, cosmetics, and pharmaceuticals across East Asia, Europe, and North America. The absence of an international standard results in quality inconsistencies, counterfeit products, and trade barriers.

2. Relevance and timeliness

Given the increasing production, trade, and consumption of seabuckthorn oil, driven by its nutritional and health benefits, it is critical to develop a Codex standard to ensure safety, quality, and hygiene. This standard will serve as a universally recognized reference, established through consensus among member countries, to facilitate fair trade and protect consumer health.

Seabuckthorn oil, derived from the berry pulp and seeds of *Hippophae rhamnoides*, is a high-value product distinguished by its unique composition of omega-3, -6, -7 fatty acids, vitamins (E, C, K), antioxidants, and phytosterols. Unlike vegetable oils covered by existing Codex standards (e.g., CXS 210-1999), seabuckthorn oil's berry-based origin and nutraceutical properties make it prone to adulteration and informal trade. The absence of an international standard leads to quality inconsistencies, counterfeit products, and trade barriers, particularly in key markets such as East Asia, Europe, and North America. The International Seabuckthorn Association (2023) reports cultivation across 2.58 million hectares in 55 countries, with China (88%) and Mongolia as leading producers, underscoring the global significance of this commodity.

While Codex standards for edible oils (e.g., CXS 19-1981, CXS 210-1999) exist, these do not address the unique characteristics of berry-derived oils like seabuckthorn oil. This does not preclude the development of an individual standard to meet eligibility criteria for this product. Should interest arise for standards on other berry-derived oils, they could be considered in the future, consistent with Codex's approach to ensuring harmonized standards development.

3. Main aspects to be covered

The proposed new work to establish a Codex standard for seabuckthorn oil will include the following sections that are based on the format for Codex Commodity Standards as well as the structure of the existing Codex standards for fats and oils:

- **Scope:** Defines the applicability of the standard of seabuckthorn oil derived from *Hippophae rhamnoides* for direct human consumption, as food ingredients, or in functional foods.
- **Description of the product:** Specifies the botanical origin (*Hippophae rhamnoides*) and extraction methods for pulp and seed oils.
- **Essential composition and quality Factors:** Includes fatty acid profiles, bioactive compounds (e.g., vitamins, carotenoids, phytosterols), purity, oxidative stability, sensory properties, and physico-chemical characteristics.
- **Essential manufacturing characteristics:** Outlines recognized extraction methods (e.g., centrifugal separation, CO₂ extraction, high-pressure pressing) to ensure consistent quality.

- Food additives, Contaminants, and hygiene requirements: Specifies permissible Codex-approved additives (CXS 192-1995), limits for contaminants such as heavy metals and pesticides (CXS 193-1995), and compliance with hygiene principles (CXC 1-1969).
- Labelling: Mandates clear identification of oil type (pulp or seed), origin, production method, and nutritional information, in line with CXS 1-1985.
- Methods of sampling and analysis: Adopts Codex-recognized methods (CXS 234-1999) for consistent quality and safety assessments.

The standard will align with relevant Codex texts, including CXS 19-1981, CXS 210-1999, and CXS 1-1985,

4. Assessment against the criteria for the establishment of work priorities

The following general criteria, as outlined in the *Codex Procedural Manual* (28th Edition, 2023), apply to the proposed Codex standard for seabuckthorn oil.

General Criteria

The following general criteria apply to Seabuckthorn Oil. A Codex Standard for Seabuckthorn oil will:

- *Facilitate trade and promote sub-sector development:* The standard will harmonize quality and safety requirements for seabuckthorn oil, a high-value product cultivated across 2.58 million hectares in 55 countries, primarily in China (88%) and Mongolia (International Seabuckthorn Association, 2023). This will reduce trade barriers and support the growth of the seabuckthorn oil industry in global markets, including East Asia, Europe, and North America.
- *Ensure consumer protection:* By establishing requirements for fatty acid profiles, bioactive compounds (e.g., vitamins, carotenoids, phytosterols), purity, and contaminants, the standard will safeguard consumer health, ensure food safety, and promote fair practices in the food trade, addressing issues like adulteration and counterfeit products.
- *Enhance production and processing practices:* The standard will define recognized extraction methods (e.g., centrifugal separation for pulp oil, CO₂ extraction or high-pressure pressing for seed oil) to ensure consistent quality and safety in production, collection, and processing of seabuckthorn oil.
- *Support marketing and value chain management:* Clear labelling and quality standards will enhance marketing strategies, enabling better coordination among producers, industries, and consumers in the seabuckthorn oil value chain.
- *Promote research and development:* The standard will encourage innovation in preservation technologies and value-added products, leveraging seabuckthorn oil's unique composition of omega-3, -6, -7, and -9 fatty acids, vitamins (E, C, K), and antioxidants.
- *Reduce waste and improve production conditions:* Standardized production and quality criteria will optimize resource use, minimize waste, and improve sustainable production practices, particularly in developing countries like Mongolia and China.
- *Contribute to Sustainable Development Goals (SDGs):* The standard will advance SDGs related to zero hunger (SDG 2), poverty reduction (SDG 1), gender equality (SDG 5) through empowerment of women in agricultural production, and sustainable land use (SDG 15) by promoting environmentally responsible seabuckthorn cultivation.

Criteria applicable to commodities

(a) Volume of production and consumption in individual countries and volume and pattern of trade between countries

Growing consumer focus on health has increased demand for seabuckthorn oil, particularly in markets like China's Belt and Road Initiative, the EU, and North America, as evidenced by e-commerce platforms like Amazon. However, unclear origin, vitamin content, production methods, and hygiene standards pose risks of consumer confusion and adulteration. Limited international trade data underscores the need for Mongolia to collaborate with stakeholders to compile comprehensive production and trade statistics.

Data from the Mongolian Customs General Administration (2020–June 2025) under HS code 1515.90.00 demonstrates Mongolia's consistent trade activity, with total exports of 8,113.47 kg across 172 transactions. These exports include pulp oil (6,310.72 kg), seed oil (1,505.61 kg), and *general seabuckthorn oil* in retail sizes (297.14 kg), reflecting diverse industrial and consumer uses. Pulp oil dominates bulk exports, often in large containers (e.g., 5L to 10L), while retail-sized products (e.g., 50ml, 100ml) indicate consumer demand. (see table 1 and table 2 for Mongolian export data)

Table 1. Mongolia Seabuckthorn Oil Export Summary (2020–2025)

Year	Pulp Oil (kg)	Seed Oil (kg)	General Seabuckthorn Oil (kg)	Total Net Weight (kg)	Transactions
2020	1,498.31	165.46	8.41	1,672.18	28
2021	1,260.27	315.96	44.20	1,620.43	26
2022	1,297.21	594.01	49.50	1,940.72	33
2023	1,016.50	394.94	40.87	1,452.31	26
2024	1,006.27	1.34	45.00	1,052.61	33
2025	232.16	33.90	109.16	375.22	26
Total	6,310.72	1,505.61	297.14	8,113.47	172

Notes: Data sourced from the Mongolian Customs General Administration, including only transactions under HS 1515.90.00 ("Other fixed vegetable fats and oils"). Data for 2025 covers January to June only.

Table 2. Mongolia Seabuckthorn Oil Export by Country (2020)

Country/Region	Pulp Oil (kg)	Seed Oil (kg)	General Seabuckthorn Oil (kg)	Total Net Weight (kg)	Transactions
Taiwan, Province of China	1,398.50	0.00	0.00	1,398.50	5
Japan	99.81	165.46	0.00	265.27	6
Germany	0.00	0.00	7.50	7.50	9
South Korea	0.00	0.00	0.90	0.90	5
United States	0.00	0.00	0.01	0.01	3
Total	1,498.31	165.46	8.41	1,672.18	28

Notes: The above table summarizes seabuckthorn oil exports from Mongolia in 2020 under HS code 1515.90.00, based on data from the Mongolian Customs General Administration. It details export volumes by key destination countries and product types (Pulp Oil, Seed Oil, General Seabuckthorn Oil), highlighting trade activity and the need for a specific HS code to enhance trade transparency and support a Codex standard.

The use of HS codes (1515.90.00) for seabuckthorn oil underscores the need for a specific HS code to improve trade tracking and transparency. A Codex standard would facilitate and harmonize trade practices and support the growing international market for seabuckthorn oil.

(b) Diversification of national legislation and apparent resultants or potential impediments to international trade

The absence of an international standard for seabuckthorn oil results in varied national regulations, creating potential barriers to international trade. For instance, China is developing a draft national standard for seabuckthorn seed oil, and Inner Mongolia has a regional standard (DB15/T 2824-2022). Mongolia regulates seabuckthorn oil under its national standard (MNS 0783), governed by the Mongolian Food Law and Food Safety Law, which adopt Codex Alimentarius standards as national standards to ensure safety, quality, and labeling compliance. However, differences in composition, quality criteria, terminology, and regulatory frameworks across countries lead to inconsistencies that hinder mutual recognition of products.

Further complicating trade, the international Harmonized System (HS) code for seabuckthorn oil is either undefined or inadequately specific. Mongolia uses HS code 151590.00 ("Other fixed vegetable fats and oils"), a broad category that does not distinctly identify seabuckthorn oil. This lack of a specific HS code, combined with limited disaggregated trade data in international databases such as the World Trade Organization's Comtrade Plus (<https://comtradeplus.un.org>), Trade Map (<https://www.trademap.org>), and FAOSTAT, obscures global trade volumes and patterns, impeding market analysis and customs processes.

Variations in processing methods (e.g., CO₂ extraction, mechanical pressing), chemical composition, quality requirements, contaminants increase the risk of fraudulent products, such as those adulterated with lower-cost oils or water. These inconsistencies pose significant trade barriers, undermine consumer trust, and necessitate a harmonized Codex standard to facilitate fair and transparent international trade. This new work will provide

a sound basis for internationally harmonized conditions for trade of Seabuckthorn Oil and reduce the risk of trade impediments.

Imports and exports are already taking place between many countries, especially in e-commerce and high demand is growing for this commodity, due to its unique composition. Therefore, establishing an international standard based on Codex criteria will enhance production and remove technical barriers to trade.

(c) International or regional market potential

The global market for seabuckthorn oil is growing, fueled by rising consumer interest in natural, nutrient-rich products for functional foods, driven by its rich profile of omega-3, omega-6, omega-7, and omega-9 fatty acids, as well as vitamins (e.g., vitamin C, vitamin E, A and K) and antioxidants. Mongolia's export data (2020–2025) reflects consistent trade activity, with 8,113.47 kg exported to international markets including China, Japan, Germany, South Korea and the United States.

E-commerce platforms amplify this potential, with seabuckthorn oil products (e.g., capsules, bottled oils) widely offered globally. However, inconsistent quality and labeling standards risk market fragmentation and consumer health risk and confusion. A Codex standard would promote market expansion by ensuring product consistency, boosting consumer trust, and facilitating entry into emerging health-focused markets.

(d) Amenability of the commodity to standardization

Seabuckthorn oil possesses unique compositional attributes, including high levels of bioactive compounds such as vitamins, fatty acids, which contribute to its recognized nutraceutical properties. As a high-value commodity, it is often subject to informal trading, increasing its vulnerability to adulteration, such as dilution with lower-cost oils.

Due to its distinctive characteristics, seabuckthorn oil commands a premium price, often significantly higher than common edible oils. This price disparity creates an incentive for fraudulent practices, such as blending with cheaper oils, which undermines product integrity and consumer trust.

Standardizing key characteristics of seabuckthorn oil, including its physico-chemical properties and bioactive compound content, can effectively prevent adulteration. Additionally, adapting Codex horizontal standards—such as those for packaging, labeling, and quality control—to seabuckthorn oil will provide clear guidance on production, processing, and commercialization conditions. These measures will establish better-controlled trade practices and ensure product authenticity.

Given that many seabuckthorn oil's attributes, such as its nutritional profile and quality parameters, can be consistently defined and measured, the commodity is highly amenable to standardization.

(e) Coverage of the main consumer protection and trade issues by existing or proposed general standards.

The Codex Alimentarius Commission has developed standards for most edible oils and fats, but no specific standard exists for seabuckthorn oil, despite its growing importance and demand as a food and nutraceutical product. Existing standards, such as *Edible Fats and Oils not Covered by Individual Standards* (CXS 19-1981), *Standard for Named Animal Fats* (CXS 211-1999), *Standard for Named Vegetable Oils* (CXS 210-1999), *Standard for Fish Oils* (CXS 329-2017), and *Standard for Olive Oils and Olive Pomace Oils* (CXS 33-1981), do not address the unique characteristics of seabuckthorn oil. Therefore, a dedicated Codex standard is required.

Seabuckthorn oil products are widely available on major e-commerce platforms such as Amazon and eBay, as well as other global online marketplaces, reflecting strong consumer demand driven by the oil's health and nutraceutical benefits.

These products originate not only from key producing countries like China, Mongolia but also from other nations involved in seabuckthorn cultivation and processing. However, the absence of an international standard increases the risk of adulteration, including adulteration with lower-cost oils, mislabeling of origin, composition, or bioactive compound content, and inconsistent hygiene standards. Such practices can mislead consumers, undermine trust, and pose health risks due to potential contaminants or substandard quality. The lack of standardized labeling and quality criteria exacerbates these issues, as consumers cannot reliably verify product authenticity or nutritional claims.

Seabuckthorn oil is recognized for its nutritional benefits, including high levels of essential fatty acids and antioxidants, which support cardiovascular health, skin health, and immune function. However, variations in processing methods and quality control can introduce safety risks, such as contamination with heavy metals, pesticides, or microbial agents. Mongolia's national standard (MNS 0783) and China's draft standards set safety limits for contaminants, but global inconsistencies necessitate a unified approach. A Codex standard would establish clear safety parameters, including maximum residue limits for contaminants and standardized testing protocols, ensuring consumer safety and nutritional integrity across markets.

The proposed Codex standard will reference and integrate relevant Codex standards to establish comprehensive quality and safety requirements. It will provide clear guidance for producers, traders, and consumers, ensuring consistency in production, processing, and labeling. By setting internationally agreed technical specifications, the standard will enhance consumer protection, facilitate fair trade practices, and reduce the risk of fraudulent products, thereby contributing to global harmonization and market integrity for seabuckthorn oil.

(f) Coverage of consumer protection and trade issues by general and specific standards.

To ensure consumer protection and promote fair trade practices in the seabuckthorn oil industry, a comprehensive standard encompassing three key levels of production and processing is essential:

1. Raw Material Level: Standards for primary processing of seabuckthorn berries, including technical requirements, physico-chemical properties, safety criteria, harvesting, transportation, and storage conditions.
2. Intermediate Processing Level: Standards for oil extraction technologies (e.g., CO₂ extraction, mechanical pressing, centrifugal force), primary purification, filtration, sedimentation, clarification processes, solvent use, internal quality control, and storage conditions.
3. Final Product Level: Standards for oil composition, bioactive compound content, packaging, labeling, and shelf-life requirements.

Currently, no specific standards for seabuckthorn oil exist from Codex, ISO, or FAO. Regional and national standards (e.g., EU, USA, China, Russia, Mongolia) lack the uniformity required for global application, highlighting the need for a Codex standard. This standard will ensure product quality, provide consumer information, and facilitate trade regulation and inspection.

The absence of a Codex standard for seabuckthorn oil contributes to consumer protection challenges, particularly in e-commerce markets. Fraudulent practices, such as adulteration with cheaper oils (e.g., palm oil, sunflower oil) or mislabeling of product origins, are prevalent due to inconsistent quality controls. For example, online marketplaces offer seabuckthorn oil products with varying claims about purity and composition, often lacking third-party verification. Mongolia's export data highlights frequent retail-sized exports (e.g., 50ml, 100ml bottles), underscoring consumer demand but also the risk of adulteration.

A Codex standard would address these issues by defining clear quality criteria, including fatty acid profiles, purity standards, and labeling requirements. This would reduce adulteration, protect consumers, and enhance trust in seabuckthorn oil products. Additionally, harmonized standards would streamline trade by reducing disputes over product specifications and ensuring compliance with international regulations.

(g) Number of commodities which would need separate standards indicating whether raw, semi-processed or processed.

Seabuckthorn oil encompasses various types (pulp oil, seed oil, and its processing methods). We propose a comprehensive, inclusive, adaptable Codex standard covering all major types of seabuckthorn oil relevant to global trade.

(h) Work already undertaken by other international organizations in this field.

No globally recognized international standard for seabuckthorn oil exists. No evidence of similar standardization efforts by other international organizations has been identified. Specific to countries: China is developing a draft national standard for seed oil, and Inner Mongolia has a regional standard. Poland, Germany, and England have reported no specific standards.

Seabuckthorn Oil Standards Comparison Across Countries

The following table summarizes the standards, production, and regulatory information for seabuckthorn oil based on data from China, Mongolia, Poland, England, and Germany. That Mongolia have collected to date.

Seabuckthorn Oil standards across countries

Country/Region	Standard	Scope	Key Requirements
China	Draft National Standard for Seabuckthorn Seed Oil	Seed oil for food use	Specifies fatty acid profiles, vitamin E (≥ 140 mg/100 g), phytosterols (≥ 600 mg/100 g); complies with GB 2716; testing via GB/T 5526, GB 5009.168
Inner Mongolia (China)	DB15/T 2824-2022	Technical regulation for Seabuckthorn oil processing in Aohan	Defines quality parameters; aligns with GB 2716; includes safety and labeling
Russia	GOST 30623-1998	Vegetable oils, blended fat products. Falsification and detection method.	The standard includes seabuckthorn pulp oil fatty acid composition, and adulteration detection;
Mongolia	MNS 0783:2016 (Technical Requirements)	Pulp and seed oil for food	Covers production, quality control (e.g., spectrometry), and safety;
Poland	None	General food safety	Covered by EU 2015/2283 (novel foods); no specific seabuckthorn standard
Germany	None	General food safety	Subject to EU regulations (LMHV, LFGB); no specific standard
England	None	General food safety	Complies with UK REACH, SI regulations; no specific standard

Note to the table: The information presented in the table on seabuckthorn oil standards across China, Mongolia, Poland, England, and Germany has been collected through official enquiries made to the respective World Trade Organization/Technical Barriers to Trade (WTO/TBT) National Notification and Enquiry Points, as well as relevant national standardization bodies.

5. Relevance to Codex strategic objectives

The standardization of seabuckthorn oil aligns with the Codex Alimentarius Strategic Plan 2026-2031:

Strategic Goal 1, Respond to Members' needs for protecting consumer health and ensuring fair practices in the food trade in an evolving global landscape.

This proposed standard strengthens consumer protection and fair trade by defining the essential quality and safety parameters for seabuckthorn oil, including composition, purity, and contaminant limits. These criteria ensure authenticity and prevent **fraudulent substitution** with lower-cost oils that could mislead consumers and damage confidence in the product. By harmonizing specifications among producing and importing countries, the standard will facilitate transparent, science-based trade and support the safe global expansion of this commodity.

Strategic Goal 3: Strengthen relationships with relevant international organizations to address global challenges

The proposed work supports Codex's aim to maintain constructive relationships with relevant organizations in addressing global challenges. Although the International Seabuckthorn Association is not a Codex member or observer, it has shown strong interest in the standardization process. Mongolia and China will ensure that any publicly available scientific information from ISA and other research networks is considered transparently and in accordance with Codex procedures. This exchange of knowledge will help identify information gaps, strengthen the scientific basis of the work, and promote a coordinated understanding of seabuckthorn oil's nutritional and trade significance.

Strategic Goal 4: Maximize the impact of Codex by increasing the visibility and use of standards

Establishing a dedicated Codex standard for seabuckthorn oil will broaden the reach of Codex texts to a new, high-value product category. It will encourage countries to integrate Codex guidance into their national regulations, promote consistency in labeling and inspection systems, and support fair market access. By serving as the global reference for quality and safety, this standard will strengthen the visibility of Codex as the leading international authority safeguarding consumer health and ensuring fair practices in the food trade

Overall contribution to the Codex mandate and global goals SDGs

The development of a Codex standard for seabuckthorn oil supports the achievement of the Sustainable Development Goals. Seabuckthorn naturally grows in rural and climate-vulnerable regions and plays an important role in reducing land degradation and desertification while contributing to food production and income generation. By establishing an international standard, Codex promotes sustainable production, fair market access, and climate resilience, advancing global goals on poverty reduction, food security, and environmental sustainability.

6. Information on the relationship between the proposal and other existing Codex documents

While the Codex Alimentarius Commission has developed standards for widely used oils, no specific standard exists for berry-derived oils like seabuckthorn. The new standard will align with:

- *General Principles of Food Hygiene* (CXC 1-1969)
- *General Standard for the Labelling of Prepackaged Foods* (CXS 1-1985)
- *General Standard for Contaminants and Toxins in Food and Feed* (CXS 193-1995)
- *Recommended Methods of Analysis and Sampling* (CXS 234-1999)
- *Principles and Guidelines for the Establishment of Microbiological Criteria* (CXG 21-1997)

7. Identification of any requirement for and availability of expert scientific advice.

No specific requirement for expert scientific advice is anticipated at this stage

8. Identification of any need for technical input to the standard from external bodies so that this can be planned for the proposed timeline for completion of the new work.

Technical input may be required from inter-governmental organizations and non-governmental organizations, such as the International Seabuckthorn Association (ISA), which could have expertise in seabuckthorn oil production and trade.

9. Proposed timeline for completion of work

The development of this standard is expected to be two sessions of the Committee on Fats and Oils (CCFO).