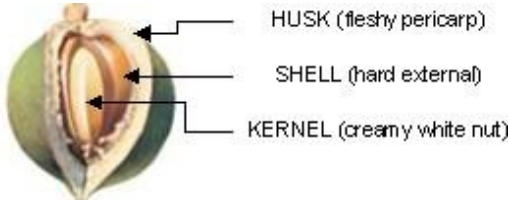




## MSM DNIS STANDARDS AND SPECIFICATIONS VER:6.0 (14 Jan 2025)

Raw material description and suggestions	
Item	Description
Macadamia Plant and Raw Macadamia Nut Description	<p><b>Botanical Overview and Varieties</b></p> <p>The macadamia tree, belonging to the Proteaceae family, is a tropical, broadleaf evergreen tree native to Australia. <b>Macadamia integrifolia</b> and <b>Macadamia tetraphylla</b> are the primary species cultivated for edible nuts. Each species is characterized by unique features and thrives in warm, subtropical climates, with Australia, South Africa, and Hawaii being major production regions.</p> <ul style="list-style-type: none"> <li>• <b>Macadamia integrifolia:</b> Known as the smooth-shell macadamia, this species produces round nuts with a high oil content, making it highly valued for both culinary and commercial applications. The tree grows up to 50 feet tall with an umbrella-like canopy, and it features shiny, oval leaves. Its new growth tends to be green, and the creamy white kernels are enclosed in a relatively thin, smooth shell.</li> <li>• <b>Macadamia tetraphylla:</b> Often called the rough-shell macadamia, this species produces oval-shaped nuts with a thicker, textured shell. The trees have a cone-shaped form and can tolerate slightly cooler climates than <i>M. integrifolia</i>. The leaves of <i>M. tetraphylla</i> are long and spiky, often with a pinkish tint on new growth. This species generally has a slightly lower oil content but higher natural sugars, enhancing its sweeter flavor profile.</li> </ul> <p>In addition to these species, hybrid varieties like ‘Beaumont’ (a cross of <i>M. integrifolia</i> and <i>M. tetraphylla</i>) are also commercially cultivated, offering various benefits such as increased yield and adaptability to different growing conditions.</p> <p>Some popular hybrid varieties include:</p> <ul style="list-style-type: none"> <li>• <b>Beaumont:</b> A well-known hybrid that combines the durability of <i>M. tetraphylla</i> with the higher oil content and milder flavor of <i>M. integrifolia</i>. Beaumont is particularly valued for its vigorous growth, high yields, and pinkish new leaf shoots, which are unique traits of <i>M. tetraphylla</i>.</li> <li>• <b>Renown and Nelmac II:</b> Other hybrids that blend characteristics from both species to produce trees that bear large, high-quality nuts, often with a good balance of sweetness and fat content, making them suitable for different market demands.</li> </ul> <p>Hybrid varieties have been selectively bred to address specific challenges within the industry, such as better performance in a range of climates, improved resistance to environmental stressors, and greater resilience against pests and diseases. This selective breeding approach has helped commercial producers cultivate trees that are both more productive and more adaptable than pure species, which is why hybrids dominate most macadamia orchards today.</p>

<p>Macadamia Plant and Raw Macadamia Nut Description</p>	<p><b>Raw Macadamia Nut in Shell (NIS)</b></p> <p>The macadamia fruit matures with a green, leathery husk that eventually splits, revealing the <b>nut in shell (NIS)</b>. This hard shell contains the edible <b>kernel</b> (nut), which is creamy white, smooth in texture, and highly prized for its rich flavor. Raw NIS can contain between 20% and 25% moisture initially, requiring drying to reduce moisture levels for storage and processing. Drying helps prevent spoilage and prepares the nuts for cracking and further processing.</p> <div style="text-align: center;">  </div> <p><b>Chemical Composition and Quality Factors</b></p> <ul style="list-style-type: none"> <li>• <b>Oil Content:</b> <i>M. integrifolia</i> generally contains higher oil content (76% - 80%), which contributes to its buttery texture. In contrast, <i>M. tetraphylla</i> tends to have slightly lower oil content, ranging from 74% to 76%, along with a distinct, sweet flavor due to its higher sugar content.</li> <li>• <b>Moisture and Storage:</b> Properly dried NIS should have a moisture content of around 1.5% to 2%, which enhances its storage life. For optimal shelf life, raw NIS should be stored in cool, dry conditions (ideally below 15°C) to maintain quality and prevent pest infestation.</li> </ul> <p><b>Plant Growth and Harvesting</b></p> <p>Macadamia trees are relatively low-maintenance once established, with young trees needing regular irrigation and protection from frost. They thrive in USDA Zones 9-11 and prefer well-drained soils and consistent sun exposure. The trees bloom with racemes of white or pinkish flowers, eventually leading to fruiting after pollination. Mature nuts naturally drop to the ground, where they can be collected, dehusked, and dried further.</p> <p>For further details on macadamia cultivation and product standards, you can consult resources from the Missouri Botanical Garden, Epic Gardening, and California Rare Fruit Growers, Inc., as well as commercial product standards from organizations like the World Macadamia Organisation.</p>
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<p>Composition of formulated ingredients, including additives and processing aids</p>	<p>This product should contain no added ingredients, no artificial additives, and no processing aids.</p> <p><b>Rationale:</b></p> <ul style="list-style-type: none"> <li>• <b>Purity Commitment:</b> Macadamia nuts are sold in their natural form, with no chemical additives or processing aids introduced during harvesting, drying, or packaging. This approach preserves the nuts' natural flavour and nutritional profile, meeting consumer demand for minimally processed products.</li> <li>• <b>Standards Compliance:</b> It is the intension that the NIS sold, as per this Product Standard, must be further processed and for that reason, it is the buyer's responsibility to ensure that the final product is compliant with all regulatory requirements with regard to food safety. All handling and processing methods comply with <b>Global Food Safety Initiative (GFSI)</b> standards, ensuring that the nuts are safe for consumption without the need for chemical processing aids. Additionally, most macadamia nuts meet <b>HACCP guidelines</b>, affirming that food safety risks are controlled through rigorous monitoring, without relying on external additives.</li> </ul> <p><b>Processing:</b></p> <p>Quality assessment methods, such as float tests—where nuts are submerged in water to identify unsound ones that float—and advanced techniques like X-ray inspection to detect internal defects, can be employed to ensure product integrity. The nuts undergo a drying process to reduce moisture content, enhancing shelf life and stability. Subsequently, nuts can be mechanically cracked using specialized equipment designed to efficiently crack the shells while minimizing damage to the kernels. The extracted kernels may then be packaged under clean and controlled conditions to maintain quality and safety standards.</p> <p><b>Potential Allergens:</b></p> <p>While macadamia nuts are a tree nut, they contain no gluten, dairy, or other common allergens unless exposed to these in a cross-contact environment, which MSM mitigates through strict disclosure protocols in line with applicable food safety and quality standards.</p>
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Origin	<p><b>Source</b></p> <p>Macadamia nuts are classified as tree nuts, harvested from the <b>Macadamia integrifolia</b> and <b>Macadamia tetraphylla</b> species, as well as several hybrid cultivars developed for improved yield and resilience. These evergreen trees produce nuts with a thick, durable shell that protects the edible kernel, known for its creamy, buttery texture and high oil content.</p> <p><b>Geographic Origin</b></p> <p>Native to the rainforests of Queensland, Australia, macadamia trees thrive in subtropical climates. Today, the main producers are <b>South Africa, Australia, Kenya, and Hawaii</b>, where these trees benefit from the ideal growing conditions. South Africa currently leads global production, attributed to favourable weather, large-scale orchards, and efficient harvesting practices. In Australia, new plantations are expanding in regions like Bundaberg and New South Wales, ensuring a steady growth in the global macadamia market.</p> <p>The nuts processed by MSM originate from these prime growing regions. Upon harvest, the nuts are transported in bulk to the processing facilities where they undergo dehusking and drying to maintain freshness and quality.</p> <p><b>Cultivars and Method of Production</b></p> <p>The macadamia kernels listed on the MSM platform are from a variety of cultivars. These cultivars have been selectively grafted onto robust rootstocks that enhance tree growth and nut quality. Grafted macadamia trees typically reach commercial maturity within 5 to 7 years, producing nuts that naturally fall when mature, a feature that reduces labour during harvest.</p> <p>Once harvested, nuts are immediately dehusked, revealing the <b>Nut in Shell (NIS)</b>, which undergoes a drying process to reduce moisture content from around 30% to an optimal 1.5-3%. This drying stage not only stabilizes the nuts for storage but also helps maintain kernel quality, making them suitable for cracking and processing. With minimal processing, the nuts retain their natural flavour and nutritional value, meeting consumer preferences for pure, whole foods.</p> <p><b>Cultivar Disclosure</b></p> <p>Where possible, MSM requires cultivar disclosure for DNIS offers. The country of origin is also an essential identifier, ensuring product traceability and compliance with quality standards.</p>
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Storage and Packaging	<p><b>Suggested Storage Requirements</b></p> <ul style="list-style-type: none"> <li>• <b>Temperature:</b> DNIS should be stored in a cool, dry area at temperatures ideally between 5°C and 15°C. For long-term storage, maintaining temperatures between 5°C and 15°C is crucial to prevent quality degradation and minimise the risk of rancidity in the kernels.</li> <li>• <b>Humidity:</b> NIS should be dried to less than 7.5% NIS moisture within 14 days following intake (by processor or other drying facility). Relative humidity should be kept below 70% to avoid moisture absorption by the shell, which can lead to mould growth, quality deterioration, or an increase in kernel moisture content.</li> <li>• <b>Ventilation:</b> Adequate airflow is essential to prevent condensation and reduce the risk of mould. DNIS should be stored in well-ventilated storage facilities that ensure consistent airflow around the product.</li> <li>• <b>Pest Control:</b> Storage areas should be regularly monitored and maintained to prevent infestations by insects or rodents. DNIS is particularly susceptible to pest damage, so airtight or well-sealed storage solutions are recommended.</li> <li>• <b>Duration:</b> DNIS held in ambient conditions should be processed within 90 days. DNIS can typically be stored for up to <b>12 months</b> under ideal/refrigerated conditions. For longer-term storage, temperature-controlled environments are recommended to maintain product quality and extend shelf life.</li> <li>• <b>Packaging:</b> DNIS is usually packed in bulk bags (e.g., woven polypropylene sacks) that allow for adequate ventilation while protecting the product from contamination. Proper packaging helps maintain optimal conditions during storage and transportation.</li> </ul> <p><b>Suggested Packaging Specifications</b></p> <p>Packaging specifications should include:</p> <ul style="list-style-type: none"> <li>• <b>Primary Packaging:</b> DNIS should be packed in durable, breathable bags (e.g., woven polypropylene sacks) that allow for proper air circulation and protection from external contaminants. Other approved or agreed-upon storage methods are also acceptable provided that they protect the DNIS from moisture and contamination. These bags typically hold bulk quantities and ensure the product remains in optimal condition during storage and transport.</li> <li>• <b>Secondary Packaging:</b> For shipment and storage, primary packaging may be stacked on pallets and secured for transportation. Pallets should be wrapped as necessary to prevent movement and to protect the product from contamination during transit.</li> <li>• <b>Labelling:</b> Packaging should include essential product information as specified in the next section.</li> </ul>
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### END PRODUCT SPECIFICATION:

Please note that the following specifications are based on the best practices available to MSM at the time of writing. For the most current and authoritative guidelines, please refer to the latest World Macadamia Organisation (WMO) specifications, which take precedence in case of any discrepancies. All MSM sellers agree to comply with MSM specifications AND WMO specifications.

Product Description	Dried macadamia nuts in shell (DNIS) sourced from Macadamia integrifolia and hybrid varieties. DNIS is dried to a specific moisture content and packed to preserve quality. The product is suitable for further processing e.g. cracking.
Moisture Content	At or below 2%
Method of Preservation	DNIS should be dried to reduce moisture content, maintaining kernel stability within the shell. Packaging should prevent moisture build-up and protect the product from contamination.
Primary Packaging	DNIS should be packed in durable, breathable bags (e.g., woven polypropylene sacks) that allow for proper air circulation and protection from external contaminants. Other approved or agreed-upon storage methods are also acceptable provided that they protect the DNIS from moisture and contamination. These bags typically hold bulk quantities and ensure the product remains in optimal condition during storage and transport.
Secondary Packaging	For shipment and storage, primary packaging may be stacked on pallets and secured for transportation. Pallets should be wrapped as necessary to prevent movement and to protect the product from contamination during transit.
Carton Markings	Each bag or other container should be labelled with essential product information, including: <ul style="list-style-type: none"><li>• Seller's Name, address and contact details</li><li>• Product name</li><li>• Size and grade</li><li>• Country of origin</li><li>• Net weight</li><li>• Lot or batch number for traceability</li><li>• Date code or best before date</li></ul>
Shelf life	DNIS has a recommended shelf life of up to 12 months from the date of packing, provided it is stored in the specified cool, dry conditions. Longer-term storage may require temperature-controlled environments.
Intended Use	These DNIS products are intended for further processing by industrial food companies, including cracking, or roasting. The product is not typically consumed without further processing.

<b>PHYSICAL SPECIFICATION:</b>	
Allergens	Macadamia nuts are classified as tree nuts and may cause allergic reactions in individuals with nut allergies. Although MSM requires sellers to disclose potential allergens, there is always a risk of cross-contact with other allergens, including peanuts, depending on the specific protocols of each facility.
Additives	DNIS listed on the MSM platform should be free from any additives. The nuts are minimally processed to preserve their natural quality, adhering to best practices for purity.
Appearance	DNIS should be free from excessive dust or dirt. The shell should be uniform in appearance, with natural colour variations ranging from light to dark brown. These variations are expected due to seasonal or varietal differences and do not affect product quality. The shell should be intact with no visible kernel. Superficial cracks or slight superficial damage are not considered defects. The shell should be clean and free from any foreign material including husk.
Flavour	The kernel inside the DNIS should be rich and creamy, characteristic of fresh macadamias, without rancid or off flavours.
Texture	The shell should be firm and intact, protecting the kernel inside. The kernel, once cracked, should be plump and crunchy, reflecting its freshness and proper processing.
Sound Kernel Recovery (SKR)	Sound kernel is defined as fully mature kernel that may contain minor defects such as minor discolouration and minor shrivelled kernel. To be specified by users upon listing. $SKR\% = (\text{sound kernel weight} / \text{NIS weight}) * 100$
Unsound Kernel Recovery (USKR)	Unsound kernel is defined as kernel that contains major levels of discolouration, discoloured crest, shrivelled kernel, pitted centre or the presence of insect damage, mould and/or Internal discolouration. To be specified by users upon listing. $USKR\% = (\text{reject kernel weight} / \text{NIS weight}) * 100$
Chemical Properties	Moisture Content: Should be maintained below 2% to extend shelf life. Flash Point: Approximately 346°C Boiling Point: Estimated at 260°C Specific Gravity: Typically 0.926 Water Solubility: Insoluble
Loose or Broken Shells	Typical specification is maximum 1% by weight.
Pests	The product should be free from any living or dead insects or rodents.

<b>NUTRITIONAL ANALYSIS:</b>		
<u>Chemical Composition per 100g:</u>		
<b>Proximates:</b>		
Water	1.36	g
Energy kcal	718	kcal
Energy kJ	3004	kJ
Protein (N x 5.3)	7.91	g
Total lipid (fat)	75.77	g
Ash	1.14	g
Carbohydrate, by difference	13.82	g
Fiber, total dietary	8.6	g
Sugars, total	4.57	g
Sucrose	4.43	g
Glucose	0.07	g
Fructose	0.07	g
Starch	1.05	g
<b>Minerals:</b>		
Calcium	85	mg
Iron	3.69	mg
Magnesium	130	mg
Phosphorus	188	mg
Potassium	368	mg
Sodium	5	mg
Zinc	1.30	mg
Copper	0.756	mg
Manganese	4.131	mg
<b>Lipids:</b>		
Fatty acids, total saturated	12.061	g
12:0	0.076	g
14:0	0.659	g
16:0	6.036	g
17:0	0.124	g
18:0	2.329	g
20:0	1.940	g
22:0	0.616	g
24:0	0.281	g
Fatty acids, total monounsaturated	58.877	g
16:1	12.981	g
18:1	43.755	g
20:1	1.890	g

22:1	0.233	g
24:1	0.018	g
Fatty acids, total polyunsaturated	1.502	g
18:2	1.296	g
18:3	0.206	g
Cholesterol	0	mg
<b>Caloric Factors:</b>		
Protein	3.47	kcal/g
Fat	8.37	kcal/g
Carbohydrate	4.07	kcal/g
<b>Varietal differences and crop conditions can cause variations to the above</b>		
<b>Source: USDA National Nutrient for Standard Reference, Release 25, 2012</b>		

Macadamias are naturally cholesterol-free, with a rich profile of unsaturated fats that contribute to the nut's health benefits, such as anti-inflammatory properties.

Varietal differences and growing conditions may result in slight variations in these values. This nutritional profile aligns with data from sources such as the USDA and World Macadamia Organisation, underscoring macadamias' high-energy, low-carbohydrate content, and their significant concentration of healthy monounsaturated fats, particularly oleic acid, making them a favourable addition to a balanced diet.

These values reflect an updated and reliable analysis that provides the foundation for nutritional labelling and dietary considerations for macadamia kernels on the MSM platform

<b>DNIS Definitions and Sizing Criteria</b>	
Premium Grade DNIS	<p>Size: Consistent, uniform sizes according to specified standards.</p> <p>Quality: Free from significant defects (e.g., cracks, insect damage, mould).</p> <p>Usage: Suitable for further processing or direct sale as whole nuts in shell.</p> <p>Market: Typically sold to high-end markets where appearance and quality are paramount.</p>
Commercial Grade DNIS	<p>Size: Size may vary, with a percentage of nuts outside the specified range.</p> <p>Quality: Minor defects allowed (e.g., slight surface blemishes or immaturity), but free from mould, rancidity, or significant damage.</p> <p>Usage: Suitable for industrial processing, cracking, roasting, or further refinement. Often used for products where shell appearance is less critical.</p> <p>Market: Sold to manufacturers or for further processing.</p>
Industrial or Reject Grade DNIS	<p>Size: Size variation may be significant, and uniformity is less stringent.</p> <p>Quality: May contain a higher percentage of defects, such as cracked shells, insect damage, or discolouration. Some nuts may be immature.</p> <p>Usage: Not suitable for human consumption without further processing. Typically used for oil extraction or other non-consumer purposes.</p> <p>Market: Sold for industrial purposes where quality appearance is not essential.</p>
Sizing Methodology	<p>Unless otherwise specified, the size of DNIS is determined using round sieve measurements. Each product should pass over a smaller round sieve (measured in mm) and through a larger round sieve to ensure size consistency. A sizing tolerance of 10% is permitted, allowing for slight deviations in nut size above or below the specified range.</p> <p>Alternative sizing methods may be employed, provided they deliver results comparable to the round sieve process. These methods should maintain the integrity of the size specifications, ensuring consistency and accuracy across all products.</p>

<b>SIZE SPECIFICATIONS</b>	
25mm+	25mm or higher
22-25mm	Between 22mm and 25mm
22mm+	22mm or higher
20-22mm	Between 20mm and 22mm
20mm+	20mm or higher
18-20mm	Between 18mm and 20mm
18mm+	18mm or higher
<18mm	18mm or lower

<b>INTENDED USE</b>	
Product use and preparation	The product is intended to be cracked, and then further processed by baking, roasting, pasteurizing, or other heat treatments before consumption. Buyers are responsible for implementing the necessary processing controls for any identified hazards, such as microbial risks, and must ensure that the product is safe for consumption after processing.
Customer target group	This product is designed for use by all value-adding customers, particularly those in the food processing and value-adding sectors, where further processing, such as cracking and roasting, is required before it reaches end consumers.
High-risk groups	Consumers with nut allergies are at a higher risk due to the product being a tree nut. Appropriate allergen labelling and handling precautions should be followed to mitigate the risk for these consumers.

<b>Dietary Requirements</b>	
Coeliac	No gluten in the product, no gluten in production line. MSM cannot guarantee against cross-contamination during post-shipment handling.
Vegetarian	No animal products in the product, no animal products in the production line. MSM cannot guarantee against cross-contamination during post-shipment handling.
Vegan	No animal products in the product, no animal products in the production line. MSM cannot guarantee against cross-contamination during post-shipment handling.
Lactose Intolerant	No dairy products in the product, no dairy products in the production line. MSM cannot guarantee against cross-contamination during post-shipment handling.

## Referee Samples

To maintain quality standards and support dispute resolution, MSM requires the submission of referee samples from sellers, as follows:

### Sample Collection Requirements

- **Quantity:** Sellers must provide a 2-kilogram sample for every 4 metric tons in the consignment that rightfully represents the entire consignment.

### Purpose of Referee Samples

- **Quality and Safety Verification:** The samples serve as a standard reference in disputes, allowing for objective verification against MSM's specifications.
- **Dispute Resolution:** MSM may request these samples for third-party analysis by a qualified institution if a quality or food safety dispute arises between the parties.

### Sampling Method

- **Sample Size:** Collect a test sample of at least 2 kilograms for every 4MT or delivered batch of DNIS, whichever is smaller.
- **Sub-Samples:** This 2-kilogram test sample should comprise a minimum of 20 sub-samples, taken representatively throughout the lot to ensure it accurately reflects the entire batch.
- **Lot Size:** The above is the minimum sampling for any lot of DNIS. Any lot size greater than 4MT should be "divided" into 4MT or smaller lots for sampling purposes.
- **Sampling Point:** Samples must represent each size delivered and should be collected at the point of packing.

### Agrichemical residue testing

All macadamia NIS imported must conform to the buyer's country's maximum residue levels (MRLs) for agricultural chemicals. Taking this into account:

- Sellers must provide an acceptable MRL test with their first batch for every harvest season.
- Buyers must ensure that the product MRLs are in line with what is expected by the importing country's governing bodies.

### Additional Certification

Different countries have different requirements pertaining to the import and export of macadamia DNIS and/or kernel. Since these can only be determined once both the buyer and seller countries are known, MSM cannot explicitly state what is required. The platform will provide the functionality to upload and filter according to these certifications as it does for PPECB, Kosher, Halal, Organic and other certifications – but the onus rests on the buyer and seller to ensure that all the required certifications and registration are in place for successful export(seller) and import(buyer) of the product.

## Disclaimer on Acceptance Criteria

MSM requires all products listed on its platform to conform to the standards outlined in this specification document. Sellers are responsible for ensuring their products consistently meet the specified physical, chemical, microbiological, and packaging parameters. Non-compliance with these standards may result in the rejection of individual product batches or, in cases of repeated non-conformance, the removal of the seller from the platform.

Acceptance criteria include, but are not limited to:

1. **Adherence to Product Specifications:** Sellers must ensure products conform to the physical, sensory, and compositional characteristics defined in these specifications. Deviations from specified parameters will be deemed non-compliant.
2. **Accuracy of Declared Weight:** Products must meet the specified net weight. Any significant discrepancies may lead to product rejection.
3. **Packaging Integrity:** All products should be securely packaged to maintain quality. Defective packaging, which could compromise product safety or quality, will result in batch rejection.

By listing products on the MSM platform, sellers agree to comply with these requirements. MSM reserves the right to reject products or suspend sellers from the platform if they fail to meet these standards, to ensure that only quality-assured products are available to buyers.