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## Comprehensive Guide to Drumstick (*Moringa oleifera*) Utilization

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**M**oringa: The Miracle Tree That Keeps on Giving: In the world of superfoods, one tree stands tall – quite literally – as nature's gift to humanity. The drumstick tree, scientifically known as *Moringa oleifera*, isn't just another plant; it's a complete nutrition and wellness package wrapped in green.

**Table 1: Nutritional Composition of Different Drumstick Parts**

| Plant Part     | Protein (g/100g) | Vitamin C (mg/100g) | Calcium (mg/100g) | Iron (mg/100g) | Key Benefits         |
|----------------|------------------|---------------------|-------------------|----------------|----------------------|
| Leaves (Fresh) | 6.7              | 220                 | 440               | 0.85           | High antioxidants    |
| Pods           | 2.5              | 120                 | 30                | 0.2            | Low calorie          |
| Seeds          | 38.4             | 4.5                 | 635               | 28.2           | Protein rich         |
| Flowers        | 3.6              | 100                 | 204               | 5.3            | Anti-inflammatory    |
| Root           | 1.7              | 11                  | 350               | 5.5            | Medicinal properties |

**Table 2: Medicinal Applications and Health Benefits**

| Plant Part | Traditional Medicine Use | Modern Applications | Research-Backed Benefits |
|------------|--------------------------|---------------------|--------------------------|
| Root       | Anti-inflammatory        | Arthritis treatment | Pain relief              |
| Bark       | Anti-diabetic            | Blood sugar control | Glucose regulation       |
| Leaves     | Anti-microbial           | Immune booster      | Infection prevention     |
| Seeds      | Water purification       | Natural coagulant   | Heavy metal removal      |
| Flowers    | Anti-anxiety             | Stress relief       | Mood enhancement         |

**Table 3: Commercial Products and Value Addition**

| Product Type  | Raw Material Used | Processing Method       | Market Value |
|---------------|-------------------|-------------------------|--------------|
| Leaf Powder   | Fresh leaves      | Shade drying & grinding | High         |
| Essential Oil | Seeds             | Cold pressing           | Very High    |
| Tea           | Leaves & flowers  | Drying & blending       | Medium       |
| Cosmetics     | Seeds & leaves    | Oil extraction          | High         |
| Animal Feed   | Leaves & stems    | Crushing & drying       | Medium       |

**Table 4: Agricultural and Industrial Applications**

| Application     | Plant Part Used | Process              | Benefits             |
|-----------------|-----------------|----------------------|----------------------|
| Biofertilizer   | Leaves & stems  | Composting           | Soil enrichment      |
| Water Treatment | Seeds           | Powder processing    | Natural purification |
| Green Manure    | Whole plant     | Direct incorporation | Soil fertility       |
| Biopesticide    | Leaves & seeds  | Extract preparation  | Pest control         |
| Wind Barrier    | Whole tree      | Live fencing         | Field protection     |

**Table 5: Storage and Processing Requirements**

| Plant Part          | Storage Method        | Shelf Life  | Processing Requirements    |
|---------------------|-----------------------|-------------|----------------------------|
| <b>Fresh Leaves</b> | Refrigeration         | 3-4 days    | Minimal                    |
| <b>Dried Leaves</b> | Airtight containers   | 6-12 months | Drying, grinding           |
| <b>Pods</b>         | Cool, dry place       | 1-2 weeks   | Cleaning, sorting          |
| <b>Seeds</b>        | Moisture-free storage | 1-2 years   | Dehusking, drying          |
| <b>Root Powder</b>  | Airtight containers   | 1 year      | Cleaning, drying, grinding |

**A Tree of Life:** From its roots reaching deep into the earth to its crown touching the sky, every part of the drumstick tree serves a purpose. This remarkable plant has earned its nickname "The Miracle Tree" through centuries of use in traditional medicine and modern nutrition.

**Leaves of Gold:** The leaves are perhaps the most precious part of this tree. Packed with more vitamin C than oranges, more calcium than milk, and more iron than spinach, moringa leaves are nature's multivitamin. Whether fresh in salads or dried into powder, these leaves are transforming nutrition programs worldwide.

**Pods of Plenty:** The long, slender pods – which give the tree its common name 'drumstick' – are a culinary delight. Popular in curries and soups, these pods offer a unique taste while delivering essential nutrients. Young pods are tender and delicious, while mature pods yield valuable seeds.

**Seeds of Change:** Moringa seeds are tiny powerhouses of possibility. Beyond their nutritional value, they're natural water purifiers, with one crushed seed capable of purifying several liters of water. The oil pressed from these seeds, often called "Ben oil," is prized in cosmetics and cooking.

**Roots of Tradition:** The roots, though less commonly used, hold their own secrets. Traditional medicine systems have long valued moringa roots for their medicinal properties, particularly in treating inflammatory conditions.

**Modern Applications:** Today's industries are discovering new uses for this versatile tree. From natural cosmetics to sustainable water treatment solutions, moringa is proving its worth in the modern world. Farmers are integrating it into sustainable agriculture practices, while food processors are creating innovative moringa-based products.

**Growing Your Own Miracle:** The best part? Moringa is remarkably easy to grow. It thrives in tropical and subtropical climates, grows quickly, and requires minimal care. A single tree in your backyard can provide a year-round supply of nutritious leaves and pods.

**The Future is Green:** As the world seeks sustainable solutions for nutrition, health, and environmental challenges, the drumstick tree offers hope. Its ability to grow in poor soils, resist drought, and provide multiple useful products makes it a valuable resource for communities worldwide.

**Final Thoughts:** From root to crown, the drumstick tree demonstrates nature's efficiency in packaging multiple benefits in a single species. As we continue to discover new uses for this remarkable tree, one thing becomes clear: the miracle tree's greatest miracle might be its ability to keep surprising us with new benefits and applications.

Remember, whether you're a farmer, a health enthusiast, or simply someone interested in sustainable living, the drumstick tree has something to offer. It's not just a tree; it's a testament to nature's ingenuity and bounty.