



VALUE-ADDED **TURMERIC** TECHNOLOGY



Unlike any other turmeric.



PURTURMERIC™
organic turmeric extract by *AFS*

&



CLEANSTREAM™
microbeadlet curcumin extract by *AFS*

MARKET ON TURMERIC “THE GOLDEN TICKET”

Consumers are craving more complex flavors, new experiences, and more transparent labels. As a golden-yellow spice native to India, organic turmeric meets this demand. Derived from the rhizome of *Curcuma longa*, a member of the ginger family, turmeric provides numerous health benefits with its active compounds called curcuminoids. Because of its beautiful golden-yellow color and distinctive flavor, the number of turmeric-infused products is rapidly increasing across all segments of the natural foods industry.



“ALMOST 20% OF US ADULTS AGED 55 AND OVER ARE NOW TAKING TURMERIC AND CURCUMIN SUPPLEMENTS” ([2018 CRN Annual Survey](#)).



“TOP TRENDING EARTHY FLAVOR SEARCHES BY MARKET” ([Google Beverage Trends](#)). Since 2011, the demand for beverages flavored with earthy flavors have grown year-over-year.



**Turmeric is
Instagram-
Worthy**

“FOOD MUST BE AS DOCUMENTABLE AS IT IS DELICIOUS” ([MINTEL](#)). Turmeric has sharable, bright, vibrant colors that are visually stimulating.



Traditional Uses of Turmeric ^{1,2}

- Food Color
- Spice Base (Curry / Golden Milk)
- Germicide / Bactericide
- Digestive Health / Liver Health
- Beauty / Skin Health
- Joint Health / Muscle Soreness
- Healthy Glucose Management
- Eye Health / Oral Health
- Immune Health
- Healthy Reproduction

Bioactive Components

Through multiple studies, the active components of turmeric have been identified as the curcuminoids: curcumin, demethoxycurcumin, and bisdemethoxycurcumin³. Turmeric also contains a number of other non-curcuminoid compounds that are actively being investigated for their bioactivity. These compounds include tumerone, elemene, tumerin, furanodiene, cyclocurcumin, calebin A, bisacurone, and germacrone. While these compounds are worth studying further for their potential health benefits, their identification is essential for validating the authenticity of the turmeric product.

Health and Wellness



As human studies on the health benefits of turmeric's curcuminoids mature, they are finding that turmeric may play a vital role in:

- Reduction of Normal Post-Exercise Joint Related Inflammation
- Maintenance of Normal Healthy Blood Glucose and Triglyceride Levels
- Measures of Normal Heart Health

In randomized, double-blind, placebo-controlled trials, *Chuengsamarn et al.* demonstrated the positive effects of curcuminoids for a significant reduction in pulse wave velocity (a measure of arterial stiffness) along with a significant decrease in markers of inflammation (increase in serum adiponectin and decrease in leptin). The study also demonstrated significant decreases in insulin resistance, triglyceride, and uric acid levels⁵.

Further support for triglyceride control comes from *Mohammadi et al.* in a 2013 randomized cross-over study. Subjects showed a significant decrease in blood triglyceride levels when given 1g/day curcuminoids for a 30-day period⁶.

A 2016 study by *Kwon* indicated that moderate consumption of curry correlated with a significant decrease in blood glucose and triglyceride levels for older males and younger, overweight females with high blood glucose and triglyceride levels⁴.

The work in *Panahi et al.* implicitly demonstrated that treatments containing curcuminoids, given to individuals with metabolic dysfunction, can lead to positive changes in cardiovascular health, inflammation, and oxidative state. Curcuminoids co-administered with piperine showed a significant decrease in levels of C-reactive protein (used as a measure of systemic inflammation), serum malondialdehyde (a measure lipid oxidation) and a corresponding increase in the activity of the anti-oxidant enzyme superoxide dismutase⁷.

Sports and Fitness

In their consensus statement on dietary supplements and high-performance athletes, the International Olympic Committee has listed curcumin as a possible supplement to aid in recovery due to its anti-inflammatory properties¹². Turmeric's anti-inflammatory properties have encouraged many sports-related studies to investigate its ability to enhance recovery and reduce muscle damage following exercise. Preliminary data suggests oral supplementation with turmeric can decrease muscle inflammation and decrease muscle related pain, as well as reduce the overall stress perceived by the athlete⁸⁻¹¹.



Food Preservation

As a known antifungal and antibacterial, turmeric can play a vital role in ensuring the safety of our food concerning microbial contamination. *Gul and Bakht* demonstrated the ability of turmeric extract to inhibit microbial growth. Meals that were treated with a turmeric extract and autoclaved for five minutes were able to resist microbial growth as well as non-treated meals autoclaved for 15 minutes. Furthermore, the studies demonstrated the effectiveness of the extracts on inhibiting the growth of microbes, including; *Escherichia Coli*, *Staphylococcus Aureus*, and *Salmonella Typhi*¹³.

Don't Sleep on Soluble Turmeric



Unlike any other turmeric.

PurTurmeric™ standardized organic turmeric powder delivers brilliant golden-orange color and on-trend flavor for your beverage projects. The dry application mixes easily with high solubility and consistency for effortless formulation in liquids, effervescent tablets, and drink mixes. Work smarter, not harder, with this functional flavor for your beverages – contact AFS for a sample.

PURTURMERIC™

organic turmeric extract by **AFS**



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PURTURMERIC™

organic turmeric extract by **AFS**

Water Soluble Turmeric

PurTurmeric™ standardized organic turmeric powder delivers brilliant golden-orange color and on-trend flavor for your beverage projects. The dry powdered application mixes easily with high solubility and consistency for effortless formulation in liquids, effervescent tablets, and powdered drink mixes. Work smarter, not harder, with this functional flavor for your beverages.




Benefits of PurTurmeric:

- Standardized 5% Curcuminoids
- Organic Certified
- Non-GMO Project Verified
- Highly Water-Soluble
- Shelf Stable
- Full Spectrum Turmeric

Work Smarter, Not Harder

Turmeric contains hydrophobic molecules, so when it comes to beverage formulation, typical turmeric ingredients, like juice concentrates and pressed turmeric, will fall out of solution. This leaves behind sedimentation, texture, or other undesired sensory profiles. AFS takes the challenge out of working with turmeric in beverages, stick packs, and effervescent tablets. Organic PurTurmeric™ cuts cost with its formulation and handling benefits. High solubility and standardization of active curcuminoid content streamline formulation and processing, reducing total overhead cost and making for a consistent product every time. PurTurmeric™ is also a shelf-stable, dry ingredient, which reduces costs in shipping and storage while mitigating waste due to processing and spoilage.

Formulation Benefits:

	<p>1. Highly Water Soluble</p> <p>PurTurmeric™ is produced utilizing specialized extraction methods that isolates active curcuminoids and delivers pure, fresh flavor without sediment that will fall out of solution.</p>
	<p>2. Saves Time & Cost in Formulation</p> <p>PurTurmeric™ is standardized to $\geq 5\%$ Curcuminoid content to ensure consistency between batches and simplify scalability. Manufacturers can achieve a consistent product flavor profile and accurate nutritional content in each serving of PurTurmeric™.</p>
	<p>3. Shelf-Stable Lasting 2 Years</p> <p>Shipping dry freight can save manufacturers up to 12X when compared to the rate of shipping frozen or refrigerated products. PurTurmeric™ is a dry powdered extract that is shelf-stable with a two-year shelf life.</p>

“Organic PurTurmeric is perfect for beverages, stick packs, or effervescent tablets.”





CLEANSTREAM™

microbeadlet curcumin extract by *AFS*

Clean & Efficient Curcumin

CleanStream™ Curcumin, an innovative, superior quality curcumin ingredient, presents a free-flowing beadlet technology providing an exceptionally cleaner curcumin production.

Benefits of CleanStream™ Curcumin:




- 95% Active Curcuminoids
- Features Easy-Clean Beadlets
- More Efficient Flow in Processing
- No Dust
- Prevents Staining Equipment
- 100% Organic / Non-GMO

Reducing Downtime Saves Money!

Working with traditional curcumin ingredients can be a manufacturer's nightmare because turmeric causes caking in production lines and stains equipment. In fact, due to the drastically lengthier cleanup times, some companies refuse to take on turmeric projects altogether. Production runs involving traditional turmeric extracts can incur post-production clean times that are 5 to 6 times longer than when running other turmeric ingredients.



Formulation Benefits:

	<p>1. 6X Faster Clean Up Time</p> <p>CleanStream™ Curcumin features a beadlet technology that does not adhere to machinery, resulting in post-production clean up that is significantly reduced.</p>
	<p>2. 95% More Efficient Flow</p> <p>CleanStream™ Curcumin beadlets prevent caking in lines for a free-flowing production that saves manufacturers time and money.</p>
	<p>3. Excellent Compressibility</p> <p>CleanStream™ Curcumin can improve the ability to blend and compress curcumin into various supplement applications such as tablets or capsules.</p>

“CleanStream™ Curcumin lowers total overhead costs and maximizes equipment use.”



The Battle Against Adulteration

Trust and transparency are essential to the future success of turmeric and curcumin-based products. As a proud member of the American Botanical Council (ABC) and their continued efforts to educate the industry, AFS has taken numerous steps supported by ABC's experts to ensure high quality turmeric in the marketplace. To certify 100% turmeric in AFS' curcumin extracts, the company has developed a multistep approach which incorporates both USP¹⁴ and AOAC¹⁵ validated methods for specific compound identification. In addition, AFS then conducts isotope testing to ensure no synthetic substances have been introduced in the raw material.



Sustainable and Ethical Sourcing

It is difficult to ignore the planet. Consumers are becoming more aware that, in many cases, where raw materials are sourced, global living conditions are poor, and the earth is easily taken advantage of. Applied Food Sciences recognizes this problem and has taken serious steps by creating their Responsible Sourcing Initiative that includes **sustainable growing practices, social and environmental responsibility, and full traceability.**

About the Company

Applied Food Sciences brings inspiration and innovation to ingredients for companies in the natural products industry. Quality is transparent from seed to label through organic farming, ethical sourcing, and sustainability. AFS cares about every stakeholder from rural farmers to the largest companies in the world.

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