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BEST PRACTICES

AWARDS

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2020 BEST PRACTICES AWARD

PHARM  CTIVE
BIOTECH PRODUCTS

**2020 NORTH AMERICAN
SAFFRON-BASED COGNITIVE HEALTH INGREDIENTS
NEW PRODUCT INNOVATION AWARD**

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Background and Company Performance

Industry Challenges

According to the Anxiety and Depression Association of America (ADAA), anxiety disorders are the most common mental illness in the United States, affecting more than 40 million adults aged 18 and older every year.¹ Even though antidepressant drugs are a global multibillion dollar industry, the demand for natural or alternative remedies, especially in the United States, has increased quite dramatically, primarily due to the range of side effects and the poor tolerability profile of antidepressant drugs. Companies and research institutes are studying several natural compounds for their possible role in treating mood disorders. Frost & Sullivan notes that botanical extracts that can improve mental health by treating one or more underlying symptoms with no adverse effects and can be recommended for all ages will likely gain higher market penetration.

Crocus sativus L., commonly known as saffron, is a spice that has been extensively studied for its pharmacological effects, such as anticonvulsant, antidepressant, anti-inflammatory, and learning and memory improvement properties. A number of clinical studies have shown that the saffron extract is effective against mild-to-moderate depression and sleep disorders among adults. A gap, however, remains in the scientific investigation of such an extract among adolescents, who are more prone to anxiety, stress, and sleep disorders. According to a study titled Achieving Resilience during COVID-19 conducted by the University of Oxford, out of the total 500 participants between the ages of 13 and 18, more than one-third reported high levels of loneliness, which is predicted to be a possible indicator of depression and anxiety in the future.² The current pandemic, however, is clearly accelerating the need to investigate the effectiveness of plant extracts in treating depression among teenagers. Saffron extract, backed by scientific evidence among teenagers, will likely garner higher traction from supplement manufacturers.

Frost & Sullivan points out that another major challenge with saffron extract is that the spice is highly susceptible to counterfeiting; it remains the most expensive spice by weight. In addition, saffron is available in different grades and strengths, and the quality depends on a number of factors, such as picking technique and the age of the saffron, making it more prone to adulteration. Ingredient manufacturers, therefore, that can maintain strict quality control procedures and offer adulteration detection measures are expected to gain higher market penetration. Moreover, Frost & Sullivan analysts believe that stricter control over the entire supply chain could offer a potential competitive edge in the market.

Clinical studies postulate that primary metabolites responsible for the bioactive property of saffron include crocetin, crocin, and safranal. Crocin and safranal have been shown to have anticonvulsant, antidepressant, anti-inflammatory, antitumor, and learning and memory improvement properties; therefore, offering extracts that can provide a higher

¹ ADAA; "[Facts and Statistics](#)"

² euronews; Dr. Maria Loades; March 6, 2020; "[Lockdown loneliness is going to have a worse long-term impact on teenagers' mental health/View](#)"

concentration of these bioactives in lower dosage formats will remain a key differentiator in the industry. Furthermore, formulations standardized to overcome the stability and absorption issues of highly volatile saffron compounds are expected to witness a higher adoption rate in the supplement space.

New Product Attributes and Customer Impact

Well Positioned to Match Customer Needs (Match to Needs and Positioning)

Founded in 2009 by a group of entrepreneurs, Pharmactive Biotech Products, S.L. (Pharmactive) is privately owned and headquartered in Spain. The company offers a range of differentiated, premium, natural, and science-backed ingredients for a number of industries, including nutraceutical, pharmaceutical, and veterinary. The company's portfolio is segmented into the following two categories: Premium Branded Ingredients (innovative and high-quality branded ingredients developed by the company) and DELTA+® (stocked ingredients with the Pharmactive Quality Seal).

With more than 10% of its sales invested in research and development (R&D) activities, Pharmactive partners with universities and research organizations internationally to boost its R&D capabilities and generate new opportunities for customers.

Pharmactive is among the first few European companies that have launched extracts based on Mediterranean Saffron native to Spain under its brand Affron®. In late 2019, the company launched Affron in the US market at the SupplySide West event. The all-natural and non-GMO Spanish saffron extract has been shown to have the lowest dosage threshold of 28 milligrams (mg) per day, with rapid one-hour absorption and increased bioavailability. Based on Frost & Sullivan's own research, most competing saffron extracts used to improve cognitive functions, such as mood or anxiety, have a dosage of 30 to 60 mg per day, thereby making Affron the lowest dosage extract in the US market.

Additionally, Pharmactive boasts that its extract has been standardized to 3.5% Lepticrosalides™, a complex mix of bioactive compounds, such as crocin, safranal, crocetin, and picrocrocin, which are primarily responsible for the bioactive and organoleptic properties of Affron. Frost & Sullivan research indicates that most competing saffron extracts claim a lower concentration of these bioactives when quantified using the scientifically approved, standard high-performance liquid chromatography (HPLC) technique. In addition, Pharmactive is using HPLC-Diode Array Detector (HPLC-DAD), which is the most accurate chromatographic separation technique, recommended as the gold standard by White Book Saffron in Europe.

Table 1: Comparative Benchmark between Competing Extracts

Competing Products	Safranal (UV/HPLC)	Crocin (UV/HPLC)	Other Bioactive (UV/HPLC)	Application	Daily Dose (mg)
Affron (Patented)	0.03-1% (HPLC-DAD)	≥3.5% (HPLC-DAD)	-	Mood-Anxiety-Depression and Sleep	28
SAFR'INSIDE™ (Patented)	≥2% (UV) ≥0.2% (U-HPLC)	≥3% (U-HPLC)	≥12% (But this pool of ingredients does not mean higher bioactivity or functionality)	Mood-Stress	30
				Sleep	60
Saffr'Activ® (Patent Pending)	≥2% (UV)	3% (HPLC & UV)	-	Sleep	30

According to Frost & Sullivan analysts, in contrast to HPLC, the ultraviolet-visible spectrophotometry (UV-Vis) technique overestimates the concentration of crocetin and safranal; as such, HPLC remains the preferred choice for determining the content and classification of saffron. Pharmactive strictly uses the HPLC-DAD technique to estimate the content - unlike other competitors that use U-HPLC, UV-Vis, or a combination of both, thus overestimating the concentration of the bioactive.

Additionally, the low-dosage threshold, higher product stability, rapid one-hour absorption, and higher concentration of compounds are achieved because of Pharmactive's patented AFF ON Cool-Tech extraction process, which concentrates and preserves the bioactives with lower-energy use and with zero chemicals. As the demand for organic, non-GMO, all-natural, and sustainable ingredients expands in the nutraceutical industry, Frost & Sullivan considers Pharmactive's Affron product to be well positioned to cater to changing customer requirements.

Pharmactive has a granted Spanish patent ([ES2573542B1](#)) that protects the unique mix of high-concentration compounds and the application in improving the mood disorder related to depression. Furthermore, Pharmactive has filed a World Intellectual Property Organization (WIPO) application and is waiting for a grant in a number of geographies, including the United States, which will secure its competitive global position.

In the last few years, demand for evidence-based ingredients has shifted dramatically; therefore, ingredients backed by comprehensive clinical and pharmacokinetic studies are

expected to gain wider consumer adoption. Pharmactive has conducted six clinical studies to back its claim of improved mood, anxiety, occasional stress, and sleep. Furthermore, the company's extract is the only one that has been studied among adolescents and has shown significant improvement in anxiety and depression symptoms over a period of eight weeks, without any severe side effects.

In addition, Pharmactive's Affron has been tested among adults taking pharmaceutical antidepressants, but continue to suffer from mild-to-moderate depression. Study results indicate that after eight weeks of supplementation with Affron, depression symptoms were decreased by 41%, compared to the placebo group (21% reduction). Moreover, the extract was well tolerated and even reduced some of the side effects of antidepressants. Over 70% of the participants in the study reported that they would like to continue taking Affron on a daily basis. With consumers increasingly looking for natural alternatives to antidepressants due to their associated side effects, Frost & Sullivan expects extracts that can help alleviate depression symptoms with significant efficacy and reduce some of the adverse effects of antidepressants to gain wider consumer penetration.

Based on its comparative analysis of the clinical studies on different saffron extracts, Frost & Sullivan finds that most other competitors have not conducted their own trials and are quoting studies conducted by other researchers, suggesting the same is applicable for their extract - without providing evidence of equivalence between their extracts and the ones being used in the studies. In contrast, Pharmactive has conducted and published six trials using Affron, with two focusing on improving sleeplessness; three on improving mood, stress, tension, and associated anxiety; and one on adolescents. Frost & Sullivan, therefore, considers the comprehensiveness and robustness of Pharmactive's clinical trials to be key differentiators and best practices in the industry.

Reliability and Quality

Raw material quality and supply chain sustainability are key attributes in the nutraceutical industry, and the saffron industry is highly prone to counterfeiting and adulteration. To overcome such challenges, Pharmactive maintains 100% control over its entire supply chain, including saffron planting, harvesting, extracting, identifying, and distributing. The company owns saffron fields in Castilla-La Mancha, Spain; the arid plains offer ideal Mediterranean conditions for cultivating the highest-quality Spanish saffron. To assure the quality and prevent potential adulteration, Pharmactive works closely with farmers to ensure the flowers are picked exactly at the right time (i.e., between dawn and midday) to keep the delicate stigmas from wilting.

Furthermore, the company has its own extraction plant and has established a range of quality control procedures, including active compound quantification, adulteration detection measures (e.g., DNA certification), and microbiological and contamination analysis to ensure higher-quality formulations.

Frost & Sullivan analysis shows that most competitors source saffron locally or internationally from farm cooperatives or third-party suppliers and do not have complete control over planting and harvesting activities, making Pharmactive nicely stand out in terms of its commitment to meet high-quality standards.

Furthermore, Pharmactive has developed a green extraction process that does not use harmful solvents, synthetics, or additives of any kind - yet still achieves long-lasting stability of at least 36 months. In contrast, some competitors use encapsulation techniques to protect the volatile extract, suggesting the use of additional solvents and excipients. Moreover, certain encapsulation systems do not offer the required protection to the volatile saffron compounds, thus impacting the stability of the overall product. Based on Frost & Sullivan research, Pharmactive offers a more reliable and novel technology platform that caters to the growing demand for clean-label ingredients and sustainable manufacturing processes.

In addition, Pharmactive has received a range of certifications and approvals, including Play Sure Doping Free, DNA certification from TRU-ID, approved health claim from Food for Specified Health Uses (FOSHU) in Japan, Health Canada, halal, and kosher.

Enhancing Customer Satisfaction by Focusing on the Customer Purchase and Service Experience

Pharmactive actively works with customers and offers formulation advisory and finished products that can be in any form, including capsules, tablets, and gummies, or can be taken as an instant drink or in other food formats. Frost & Sullivan considers the approach of guiding customers across the entire value chain, from raw materials to possible finished end products, along with laboratory testing, as a best industry practice that can aid in higher customer penetration.

Furthermore, Pharmactive conducts webinars and attends events to share the science and knowledge behind its product line. The company has a policy of maintaining transparency with customers regarding quality standards, production processes, and supply chain, achieved by giving tours of the plantation fields and manufacturing plant. Moreover, Pharmactive is actively involved in gathering direct customer and end-user feedback. Per the testimonies of end consumers who struggled with anxiety, Affron improved their quality of life, and they reported feeling happier after taking the extract, which showed absolutely no side effects, as shown in the clinical studies.

Pharmactive has received positive feedback from supplement manufacturers, and its product has been well received in the US market. Pharmactive indicates that it is registering positive year-over-year (YOY) growth in sales, attributed to regional expansion, such as in the United States and Asia. Finally, based on The Silicon Review in 2020, Pharmactive entered the list of the top 50 most innovative companies based on its range of premium ingredients.

Conclusion

Anxiety and depression are the most prevalent mental illnesses in the United States. Presently, no pharmacological treatment has been established for low moods, and prescription medications are often deemed inappropriate or ineffective. Demand has increased for evidence-based natural compounds that can effectively treat mood disorders without any severe side effects.

Pharmactive has developed a novel saffron extract called Affron that has proved effective in relieving stress and improving mood and sleep quality. With rapid one-hour absorption, this highly concentrated saffron extract is the first in the US market with the lowest dosage threshold of 28 mg per day. The product is backed by strong clinical evidence, with additional effectiveness studied among adolescents. Furthermore, Frost & Sullivan recognizes how the company is highly committed to preventing ingredient adulteration, has a truly integrated supply chain, and provides customers with high-quality products.

With its strong overall performance, Pharmactive Biotech Products has earned the 2020 Frost & Sullivan New Product Innovation Award.

Significance of New Product Innovation

Ultimately, growth in any organization depends on continually introducing new products to the market and successfully commercializing those products. For these dual goals to occur, a company must be best in class in three key areas: understanding demand, nurturing the brand, and differentiating from the competition.



Understanding New Product Innovation

Innovation is about finding a productive outlet for creativity, for consistently translating ideas into high-quality products that have a profound impact on the customer.

Key Benchmarking Criteria

For the New Product Innovation Award, Frost & Sullivan analysts independently evaluated 2 key factors (New Product Attributes and Customer Impact) according to the criteria identified below.

Criterion 1: Match to Needs

Requirement: Customer needs directly influence and inspire the product's design and positioning.

Criterion 2: Reliability

Requirement: The product consistently meets or exceeds customer expectations for consistent performance during its entire life cycle.

Criterion 3: Quality

Requirement: Product offers best-in-class quality, with a full complement of features and functionalities.

Criterion 4: Positioning

Requirement: The product serves a unique, unmet need that competitors cannot easily replicate.

Criterion 5: Design

Requirement: The product features an innovative design, enhancing both visual appeal and ease of use.

Customer Impact

Criterion 1: Price/Performance Value

Requirement: Products or services offer the best value for the price, compared to similar offerings in the market.

Criterion 2: Customer Purchase Experience

Requirement: Customers feel they are buying the optimal solution that addresses both their unique needs and their unique constraints.

Criterion 3: Customer Ownership Experience

Requirement: Customers are proud to own the company's product or service and have a positive experience throughout the life of the product or service.

Criterion 4: Customer Service Experience

Requirement: Customer service is accessible, fast, stress-free, and of high quality.

Criterion 5: Brand Equity

Requirement: Customers have a positive view of the brand and exhibit high brand loyalty.

Best Practices Recognition: 10 Steps to Researching, Identifying, and Recognizing Best Practices

Frost & Sullivan analysts follow a 10-step process to evaluate Award candidates and assess their fit with select best practices criteria. The reputation and integrity of the Awards are based on close adherence to this process.

STEP	OBJECTIVE	KEY ACTIVITIES	OUTPUT
1 Monitor, target, and screen	Identify Award recipient candidates from around the world	<ul style="list-style-type: none"> Conduct in-depth industry research Identify emerging industries Scan multiple regions 	Pipeline of candidates that potentially meet all best practices criteria
2 Perform 360-degree research	Perform comprehensive, 360-degree research on all candidates in the pipeline	<ul style="list-style-type: none"> Interview thought leaders and industry practitioners Assess candidates' fit with best practices criteria Rank all candidates 	Matrix positioning of all candidates' performance relative to one another
3 Invite thought leadership in best practices	Perform in-depth examination of all candidates	<ul style="list-style-type: none"> Confirm best practices criteria Examine eligibility of all candidates Identify any information gaps 	Detailed profiles of all ranked candidates
4 Initiate research director review	Conduct an unbiased evaluation of all candidate profiles	<ul style="list-style-type: none"> Brainstorm ranking options Invite multiple perspectives on candidates' performance Update candidate profiles 	Final prioritization of all eligible candidates and companion best practices positioning paper
5 Assemble panel of industry experts	Present findings to an expert panel of industry thought leaders	<ul style="list-style-type: none"> Share findings Strengthen cases for candidate eligibility Prioritize candidates 	Refined list of prioritized Award candidates
6 Conduct global industry review	Build consensus on Award candidates' eligibility	<ul style="list-style-type: none"> Hold global team meeting to review all candidates Pressure-test fit with criteria Confirm inclusion of all eligible candidates 	Final list of eligible Award candidates, representing success stories worldwide
7 Perform quality check	Develop official Award consideration materials	<ul style="list-style-type: none"> Perform final performance benchmarking activities Write nominations Perform quality review 	High-quality, accurate, and creative presentation of nominees' successes
8 Reconnect with panel of industry experts	Finalize the selection of the best practices Award recipient	<ul style="list-style-type: none"> Review analysis with panel Build consensus Select recipient 	Decision on which company performs best against all best practices criteria
9 Communicate recognition	Inform Award recipient of recognition	<ul style="list-style-type: none"> Announce Award to the CEO Inspire the organization for continued success Celebrate the recipient's performance 	Announcement of Award and plan for how recipient can use the Award to enhance the brand
10 Take strategic action	Upon licensing, company is able to share Award news with stakeholders and customers	<ul style="list-style-type: none"> Coordinate media outreach Design a marketing plan Assess Award's role in strategic planning 	Widespread awareness of recipient's Award status among investors, media personnel, and employees

The Intersection between 360-Degree Research and Best Practices Awards

Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of the research process. It offers a 360-degree view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often companies make important growth decisions based on a narrow understanding of their environment, resulting in errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry participants and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS



About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, helps clients accelerate growth and achieve best-in-class positions in growth, innovation, and leadership. The company's Growth Partnership Service provides the CEO and the CEO's growth team with disciplined research and best practices models to drive the generation, evaluation, and implementation of powerful growth strategies. Frost & Sullivan leverages nearly 60 years of experience in partnering with Global 1000 companies, emerging businesses, and the investment community from 45 offices on 6 continents. To join Frost & Sullivan's Growth Partnership, visit <http://www.frost.com>.