Natural Consumer Products:  
*Our Recommendations for Successful Innovation*

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Introduction

Are you trying to keep pace with consumers’ sustained demand for natural personal care products? Is your team finding it challenging to compete in a crowded retail market? Are your products losing market share to small regional brands offering natural products? Have you tried to develop natural products but struggle to find natural active ingredients that match the performance of synthetic active ingredients?

The drive toward natural products has been widely recognized, and demand for natural products is growing. Natural active ingredients accounted for approximately 25% to 30% of the $3.5 billion global market for active ingredients in personal care products in 2016. This share may be 50% to 55% by 2023, according to a report by Frost and Sullivan.¹ This trend is not new; in 2012, the International Trade Centre predicted double-digit growth in natural personal care products in North America.² By 2017, Fast Company reported on research from Kline & Company predicting that the market for synthetic cosmetics would begin to contract while the market for natural products would grow. Kline & Company’s research found that in 2015, sales of natural skin care products grew 7% compared with an average of 2% of the overall beauty product market.³ Across industries and product types, from soup and cereal to deodorant and shampoo, smaller brands with a compelling story about natural ingredients are disrupting traditional brands.

Although social media and blogs fuel consumers’ desire for natural products, they do not always tell the whole story. Some bloggers like Vani Hari, the investigative force behind the Food Babe website, have been criticized for raising concerns about ingredient safety that are not always backed by science.⁴ However, for personal care product brands, developing more natural and sustainable products is essential, and those products need to be backed by sound science to ensure the brands’ integrity.

Developing new natural products often requires breakthrough innovation: new-to-the-world delivery formats, wholesale formulation redesign, or supply chain creation. This significant product or industry change requires risk taking, and organizations will face inherently difficult choices. The technology that enables

a new natural product may be a natural ingredient or a new process, packaging material, or something else entirely. Finding natural active ingredients presents unique challenges: sifting through the large number of purported “breakthrough” ingredients, vetting performance and efficacy, adapting a formulation, sourcing, and balancing scientific credibility with communicating benefits to consumers. Consumer product companies need expert help to tackle these challenges, and some of the world’s leading brands have turned to RTI International’s Innovation Advisors for help.

Background

RTI’s work on natural products began early in our history with the discovery of two oncology compounds: Taxol® and camptothecin™. In the 1970s, doctors had few tools to fight cancer. Research pioneered by RTI scientists isolated Taxol and camptothecin from the Pacific yew tree and the Chinese tree Camptotheca acuminate. Both extracts presented unique modes of action that killed or halted cancer cell growth. These compounds and first-generation analogs are now marketed by leading pharmaceutical companies for cancer treatment and have been credited with saving hundreds of thousands of lives.

Today, companies come to RTI’s Innovation Advisors to support their own research and development (R&D) efforts. In recent years, our team has led development of natural products for companies pursuing natural or sustainable innovations in cleaning, insect control, home fragrance, infection control, medical devices, packaging, snacks, and beverages. We have helped project teams evaluate their competitors’ technology and claims, sort through journal literature to discover new active ingredients, look across industries and geographies to uncover enabling solutions, and vet partners that can help actualize their innovations. We use a structured technology intelligence process, refined and proven through hundreds of engagements, and synthesize findings that keep the technology, business model, and user in perspective. Our work provides the unbiased, independent review of the landscape that our clients need to move forward confidently, launch new products, or improve their bottom line. We do this work because consumer product innovation grows businesses, helps economies and communities thrive, and improves lives, all of which fulfills RTI’s mission to improve the human condition.

5 Taxol (a word coined by the late Monroe E. Wall of RTI) is a trademark of Bristol-Myers Squibb Co. Camptothecin is a trademark of RTI International.

Natural Product Innovation: How to Succeed

We understand that successful innovation in natural products is challenging, and we have learned what it takes to be successful. We find and evaluate the natural ingredients, processes, packaging options, and other enabling technologies that our clients need to develop new natural products. For teams working to develop new natural products, we have five recommendations that will increase your chances of success:

1. Plan for broad searching in unconventional places; it is like finding a needle in a haystack.
2. Set the right evaluation criteria to prioritize the enabling technologies you find.
3. Do your homework on ingredients; evaluate their history and source.
4. Know your regulatory context and what natural means for you and your consumers.
5. Expect to make tradeoffs.

These recommendations are the synthesis of our experience in natural product innovation. Following the advice we lay out here will improve your decision making and increase your success rate. If your team can take on this work themselves, great, and we hope our recommendations help. If you find yourself needing more researchers or expertise along the way, our RTI Innovation Advisors are here to help.

1. **Plan for broad searching in unconventional places; it is like finding a needle in a haystack.**

With thousands of “natural” products on the market and even more studies, patents, and research activities that date back hundreds of years, no one company has bandwidth for all the searching and vetting required. Our team is equipped to help at any point in the process, whether by discovering new ingredients or processes, vetting your options, licensing technology, or identifying supply partners. We not only help clients evaluate the typical plant extracts, but we also get creative to bring our clients enabling technologies from unexpected sources. Three sources of innovation that we recommend to our clients are (1) other geographies; (2) nontraditional extracts, perhaps from other industries; and (3) bio-based, synthesized ingredients.

**Other geographies:** Natural ingredients have a regional bias. For one client working to develop natural insect repellent products, we leveraged our structured technology intelligence methodology and RTI’s global footprint to search for natural insect repellents being used in Asia. This led us to neem oil, which has been used in home remedies, personal care products, and pest repellents in India for many years but is not well known in North America. By searching in geographies outside of this client’s traditional focus, we helped...
them identify a natural ingredient with good efficacy as an insect repellent that would seem like a “new” and natural innovation to their North American consumers.

**Nontraditional extracts:** Natural ingredients come from many sources: flowering plants, animals, microbes, and so on. Plan to spend time looking outside your traditional industry and suppliers for solutions. Consider not just plant extracts, but also waste materials. One of our clients was approached by a known supplier offering a vegetable-based, volatile bacteriostatic compound for use as an ingredient in cleaning products. Our client was interested but needed to know what other similar options existed before moving forward. We scoured the landscape, evaluating similar bacteriostatic compounds being used in other applications such as food packaging, deodorants, and pesticides. We looked beyond plant extracts to emerging research on fungus- and bacteriophage-based approaches to controlling growth of harmful bacteria. In addition to our client’s known supplier, we identified a second supplier with an intellectual property portfolio tailored to our client’s application, a startup to consider for partnership or acquisition, and university efforts to monitor for breakthroughs.

**Bio-based, synthesized ingredients:** Finally, remember that “natural” ingredients are not necessarily naturally occurring. Synthetic ingredients produced from bio-based feedstocks can be a viable strategy for making products more natural. For example, AlgaWise uses microalgae to produce food-grade oils (and other things). Oil produced from algae is clearly a natural ingredient and a new, thoughtfully engineered one, although it is not a typical plant extract. Our team knows to look for these kinds of synthesized ingredients, in addition to traditional plant extracts; it is part of the value we bring to our clients. A search for only “natural oil alternatives” or “plant-based oils” might miss emerging solution providers like AlgaWise, but relying on our research team gives you confidence that the research has been rigorous and complete.

2. **Set the right evaluation criteria to prioritize the enabling technologies you find.**

Because of the breadth of research involved, developing natural products will require you to be methodical. Each time you find an ingredient, process, packaging material, or other technology that could enable your new natural product, capture information about it and consider its utility. Once you know your options, be ruthless in selecting the most promising ones. Use your criteria to prioritize.

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7 For more information, visit [http://algawise.com/](http://algawise.com/).
For one client looking for natural packaging options, part of our final report was a matrix evaluating 29 natural packaging materials against 16 weighted criteria. We also included 28 plastic compounders and 26 plastic-converting partners to help make the client’s new packaging a reality. Evaluation criteria vary by application, but for personal care companies looking to bring a product to market quickly, we recommend the following:

— For natural ingredients, efficacy data are a must have. The best products can be supported by published research that shows that the ingredients are effective.

— Registration status is important if your product category requires it. Consider screening out options that do not meet these requirements early, unless you can invest in registration.

— Consider whether the enabling technology will present a story that enhances your brand and resonates with consumers. If not, it could be deprioritized, or screened out entirely.

3. Do your homework on ingredients; evaluate their history and source.

When identifying natural ingredients, it is hard to discern signal from noise or fact from fiction. Consumer interest in natural products has blossomed, but unfortunately, so have home remedies, antiquated solutions, and misinformation on blogs.

An example can be seen in the homeopathic cold and flu aisle, in products using an active ingredient called *Anas barbariae*. The ingredient may sound like an innocuous herbal homeopathic remedy, but it is an extract of Muscovy duck liver and heart with a dubious scientific history. Joseph Roy, a French physician, discovered the “active” ingredient during the Spanish influenza pandemic from 1918 to 1920. Dr. Roy believed he had identified a round oscillating bacterium as the cause of Spanish influenza, and he claimed to find this same bacterium in patients with cancer, measles, tuberculosis, rheumatism, and eczema. He also believed he had identified this same bacterium in duck liver and heart and attempted to make a vaccine out of it, creating *Anas barbariae*. Modern medicine has not been able to verify Dr. Roy’s findings, and the company manufacturing the cold and flu remedy uses *Anas barbariae* in such a miniscule amount that the remedy is essentially a sugar pill. The company is facing two class action lawsuits in California and has received a warning letter from the U.S. Food and Drug Administration because the remedy had not been approved to treat H1N1 avian influenza. 

influenza. Despite the warnings, some homeopathic medicine blogs, such as the Healthy Kids Happy Kids website maintained by Dr. Elisa Song, still recommend Anas barbaraiae for pediatric flu treatment.

In another example, it was not the ingredient’s history but its sourcing that presented the challenge. Some ingredients may be rare, or sourcing them in large quantities may change ways of life for indigenous people; sometimes the change can be positive. Major brands like L’Oréal and BASF have helped set up women’s co-operatives for sourcing argan oil in Morocco, and these co-operatives provide employment and access to education and health care.

Other times, sourcing a natural ingredient can have a negative impact. For example, in 2010, a BBC documentary allegedly showed a company called Duta Palma clearing protected rainforests to grow palm trees. At the time of the documentary, Unilever was the world’s largest buyer of palm oil, using it in Dove brand soaps. Because Duta Palma supplied palm oil to a broker Unilever used, Unilever was impugned by association, despite its efforts to lead the way in sustainable sourcing of palm oil.

The bottom line is that considering the merits of new ingredients for natural products takes time and thoughtful research. “Natural” ingredients are not always safe or responsible. RTI Innovation Advisors have the experience and expertise to independently evaluate ingredients you are considering and help you choose the right path forward.

4. Know your regulatory context and what natural means for you and your consumers.

Claiming that a product is “natural” can mean many different things, and there is no agreed-on definition or governing standard. Does it mean that your active ingredients are plant derived? Must those ingredients be minimally processed extracts, or could they be more highly processed but bio-based? Must all the ingredients in your formulation be “natural”? Does it also mean that your ingredients are “safe” and nontoxic? Or that your packaging must be biodegradable?

In the end, what is most important is what consumers of your product care about and what they consider natural. Deciding what natural will mean for your product is an essential part of the framing process when kicking off a

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development initiative for a natural product. An R&D team cannot have this conversation in a vacuum. Marketing, sales, and perhaps even senior leadership need to be involved. When needed, we facilitate this discussion for our clients, relying on human-centered design techniques to drive alignment on the meaning of natural, and thereby the goals for the project.

As early as possible, we recommend that our clients consider the claims they want to make about their product. Is it important to be able to claim that a product is safe and nontoxic, and what is required to make that claim? Or is it more important to your consumers that you can claim your product to be bio-based? If so, what does that mean for your formulation?

Although some terms like organic are relatively well defined, regulatory bodies continue to consider and evolve their thinking about the term natural. In April 2016, the Federal Trade Commission (FTC) brought charges against five small companies that claimed that their shampoos, skin care products, and sunscreen were “all natural” when they contained synthetic ingredients including phenoxyethanol, dimethicone, and polyethylene. This was the first time that the FTC had acted on natural claims, and the guidelines and legal definitions around natural products are still unclear. This makes it difficult to discern what is appropriate to claim and when. With a lack of regulatory definitions, consumers are left to define for themselves what is natural and whether their expectations of natural personal care products are different from or the same as those related to foods, pet care products, or household cleaners.

5. Expect to make tradeoffs.

A significant part of R&D organizations’ internal work is vetting external technologies, then scientifically validating their efficacies using a variety of techniques. Vetting can require tough judgment calls that are not always 100% clear. These pressures are sometimes amplified as projects are green-lighted at breakneck speeds when they should be long-term endeavors. Other times, teams begin vetting and validating only to have a shift in priorities that alters their success criteria.

Cancer is said to have been cured 1,001 ways via natural active ingredients, but of course, these are in cellular models. Extracting ingredients that maintain activity outside of complex mixtures and can be formulated into viable products will continue to be a challenge. For one client, we were asked to identify antimicrobial active ingredients that were naturally derived or could be considered environmentally friendly. One of these ingredients was allicin, a compound found in garlic. Allicin has strong antimicrobial properties but limited

stability; it tends to break down into sulfur compounds known as thiosulfinates. Initially, it seemed like this made allicin impractical for our client’s application, but with further research, we found a company outside the United States that had developed technology to stabilize allicin for use in creams. This changed our client’s formulation challenge to an open innovation opportunity.

We recommend that our clients consider the tradeoffs they are willing to make and use them to vet solutions. If your product uses natural ingredients, would consumers accept a higher price or shorter shelf life? Would a slight decrease in performance be acceptable? Will you have to spend more in barrier packaging solutions to maintain shelf life? Our clients often want to develop natural products that perform just as well as, last longer than, and are cheaper than their current products, but this often is not practical. In our experience, natural products will not match all the performance characteristics of synthetics. Tradeoffs need to come from somewhere—processing, price, packaging, or somewhere else. And just as you consider what natural means for your products, be sure to involve a cross-functional team when discussing tradeoffs.

What Now?

The natural product trend is accelerating and will affect every consumer product. Are you ready? Does your team have the bandwidth and experience to find the enabling technologies that help you develop natural products and grow your market share? Or will you be disrupted by other players that find and start using new ingredients or processes first? Whether this is your first time developing natural products or you have done it 10 times over, our team is here to help you succeed.

Follow the recommendations we outlined previously, and you will find the ingredients, processes, or other enabling technologies that you need to develop new natural products.

1. Plan for broad searching including three unconventional sources of innovation: other geographies; nontraditional extracts; and bio-based, synthesized ingredients.
2. Set the right evaluation criteria to prioritize the enabling technologies you find.
3. Do your homework on ingredients; evaluate their history and source before adopting them. Just because something is on the market does not mean it is effective, safe, or responsible.
4. Know your regulatory context, and work in a cross-functional team to decide what natural means for you and your consumers.
5. Expect to make tradeoffs, and work in a cross-functional team again to determine what tradeoffs you are willing to make.
If you need help defining your natural product strategy, finding and vetting enabling technologies, or making your ideas a reality, we are the experts you need. Contact us to discuss how RTI Innovation Advisors can help you win with natural products in the personal care market.

About the Author

Cary Strickland leads the RTI Innovation Advisors consumer packaged goods work and brings to our clients his extensive experience helping product development teams find the right partners, assess technology options, or evaluate their competition for developed and emerging markets. In his client work, Mr. Strickland ensures excellence in secondary and primary research and uses structured frameworks for turning information into insights, knowledge, and actions. He has expertise in technology scouting, landscaping and evaluation, market opportunity analysis, technology-inspired ideation, and human-centered design. He has also managed projects in infrastructure and construction, industrial coatings and chemicals, food, and packaging; his international experience includes Japan, Saudi Arabia, and the Philippines. Before RTI, Mr. Strickland worked at MeadWestvaco’s Center for Packaging Innovation to develop renewable packaging materials and coatings for consumer, food, and health care products. He has an MEM in Engineering Management from Duke University and a BS in Chemical Engineering and a BS in Paper Science Engineering from North Carolina State University.

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About RTI Innovation Advisors

For more than 50 years, our multidisciplinary team has helped hundreds of organizations, federal agencies, and universities innovate. We have a deep understanding of the innovation challenges facing organizations across a broad range of industries—from consumer goods and services, to energy research, to agriculture. We amplify your innovation impact—bringing rigor and clarity to your process through our technical agility, innovation expertise, and smart partnership approach.

We focus on delivering insights, building your team’s capacity, and accelerating technologies from lab to market—no matter where you are in your innovation process. In the past 10 years alone, we have assessed more than 20,000 technologies, interviewed in excess of 16,000 experts, formed more than 200 strategic partnerships, and helped launch more than 100 products.

As a center within RTI International, an independent, nonprofit research institute dedicated to improving the human condition, when you work with us, you have access to RTI’s vast network and resources. Through RTI, we bring our clients support from international offices in Africa, Asia, Latin America and the Caribbean, the Middle East and North Africa, and across the United States; project experience in more than 140 countries; expertise in 250 disciplines; hundreds of industry specialists and researchers; and decades of combined experience.
RTI International

RTI International is an independent, nonprofit research institute dedicated to improving the human condition. Clients rely on RTI to answer questions that demand an objective and multidisciplinary approach—one that integrates expertise across the social and laboratory sciences, engineering, and international development.

RTI’s experts hold degrees in more than 250 scientific, technical, and professional disciplines across the social and laboratory sciences, engineering, and international development fields. Our staff of more than 5,000 works in more than 75 countries—tackling hundreds of projects each year to address complex social and scientific challenges on behalf of governments, businesses, foundations, universities, and other clients and partners. Its separate business operations—RTI Health Solutions, Syntegrity, and Attēgo—serve commercial clients across a wide range of industries around the world.

RTI has offices on four continents, with headquarters in Research Triangle Park, North Carolina, reflecting its roots in the area’s distinguished universities. Founded in 1958 with support from North Carolina government, education, and business leaders, it maintains close ties with North Carolina State University, Duke University, North Carolina Central University, and the University of North Carolina at Chapel Hill.