


**DEVELOPMENT OF NEW PRODUCTS –
ALTERNATIVE FOR ENTREPRENEURSHIP****Lucila Jazmin Virgen Ceceña^{1*}, Edith Candelaria Mancillas Chávez²,
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Abstract: In processing companies, one of the problems they face is the final use of the waste generated by raw materials. For this reason, finding processing options for its use which at the same time generate income is an alternative for the management of new businesses. In Mexico, 33% of entrepreneurs seek to solve problems in the market or society, diversifying their source of income and expanding their creativity. The objective of this research is to develop new products from the industrial waste of shrimp and mango peels. The collection of information focused on the review of literature reports and reports from sources such as the Agro-Food and Fisheries Information Service (SIAP), the National Institute of Statistics and Geography (INEGI), the Council for Economic Development of Sinaloa (CODESIN), the Ministry of Economy, among others; contemplating the development of new products and entrepreneurship as an object of study. According to the diagnosis made by CODESIN, the areas with the greatest opportunity in the short term (1 to 3 years) to develop new products or, therefore, businesses in the bioeconomy area are processed foods, biofertilizers, and nutraceuticals. In conclusion, the development of a new product, such as shrimp and mango sauce, is an option for engineering and design, representing an area of opportunity for the operation of new businesses.


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Introduction

Innovation-based ventures consist of generating different and useful proposals for the market that become the main drivers for generating change processes that improve productivity, break paradigms, and generate growth through the creation of new companies that produce new jobs and activate the flow of the country's capital.

The development of new products in companies is influenced by the purchase decision and the competition that is generated. Furthermore, it is considered a crucial process for the survival of businesses, especially small businesses.

Shrimp waste (shell and head) is an important source of protein, lipids, minerals, chitin, and pigments. These components can be implemented in different areas, mainly in the food and pharmaceutical industry, as they can be substitutes for chemicals that are harmful to health. In addition, the reuse of these products is sought, adding them high value.

The peels of different mango varieties contain high-quality pectin (Sudhakar & Maini, 2000; Schieber et al., 2004), 4.8% crude protein, 29% soluble dietary fiber, and 27% insoluble dietary fiber (García 2003), and a significant concentration of polyphenols and antioxidant compounds (Schieber et al., 2003; Ajila et al., 2007; Ajila et al., 2008).

The objective of this research is to develop new products for entrepreneurs from the industrial waste of shrimp and mango peels.

Literature review

Development of new products

The development of new products in companies is influenced by the purchase decision and the competition that is generated. Furthermore, it is considered a crucial process for the survival of businesses, especially small businesses. For this reason, Ferris (2016) proposes that public and interpersonal relations with other companies or with high-level executives allow opening that gap between what is current and what will be presented as something innovative in the near future. On the other hand, it suggests not overestimating the competition since with a clear focus and business direction, companies can be better than they think. Therefore, for the author, physical or virtual social networks allow contact with important people who have achieved success, and apparently, it appears as one of the first steps to validate with the approval of external experts the development of new products.

For an innovation to have real value, it must necessarily be related to marketing; in other words, an essential element of innovation is its successful commercial application (Lafuente, 2010).

Regardless of its production process, administrative procedure, organizational change, or the result of new goods and services on the market, in its different versions, innovation is important for economic and social dynamics. Today, innovation is not an exclusive topic of the economic or business field, the benefits derived from it impact the quality of life of people and require placing it as a priority issue in any government agenda (Rojo et al., 2018).

For Jerome McCarthy, marketing is the completion of those activities that are intended to meet the goals of an organization, by anticipating the requirements of the consumer or client and by channeling a flow of merchandise suitable for the needs and services that the producer provides to the customer, consumer, or client (Sierra, 2012).

From marketing, development starts from research and tries to settle all the issues that imply the failure of the product in its launch or commercialization. According to studies surveyed by Philip Kotler, the proportion of failures among industrial products reaches 30% (Berggren & Nacher, 2000).

Ulrich and Eppinger (2004) also analyze the design process from the perspective of marketing and agree on its properties: mediating interactions between company and customers, facilitating the identification of product opportunities, defining market segments, identifying needs, and supervising the results, prices, launches, and promotion of the product.

Marketing acts on the administration of the company's merchandise in order to make the results of the processes involved more profitable; where, in turn, it must consider changes in consumer interests, technological advances, and proposals from the competition, among other factors (Sierra, 2012).

Faced with these variants, companies count among their best renewal options, with the possibility of launching new products. They can be acquired in two ways: through the acquisition (of a company, patent or license to produce a product); or through the development of new products (Sierra, 2012).

Entrepreneurship

For Hernandez et al. (2018), entrepreneurship is not only taking into account the contributions it makes to the community as a determining factor for economic development and social and structural change, but also as a driving force that stimulates the acquisition of knowledge, change technology, competitiveness, and innovation. The same author mentions that the entrepreneurial sense becomes a requirement strongly felt by institutions committed to the need for an effective combination of public policies and private investments (both in terms of profits and non-profit organizations), capable of relaunching a new “entrepreneurial society”.

Innovation-based ventures consist in generating different and useful proposals for the market that become the main drivers for generating change processes that improve productivity, break paradigms, and generate growth through the creation of new companies producing new jobs, and activating the flow of the country's capital.

In Mexico, 33% of entrepreneurs seek to solve a problem in the market or society by diversifying their source of income and expanding their creativity, as well as

being an important element in the development of the economy, which ultimately serves as new opportunities to activate the Mexican economy (Jamexico, 2020).

Therefore, it seems necessary to implement measures to promote the creation of new companies in order to develop new opportunities offered by technological, market and socioeconomic changes and thus succeed in replacing companies that are no longer efficient and productive (Herruzo-Gómez et al., 2019).

In this sense, business models can enhance this entrepreneurial culture. There are many definitions of business models where the authors agree that it is the way to negotiate with the client in order to generate income.

According to Osterwalder and Pigneur (2010), a business model is the reason for which an organization creates, captures, and delivers value both in the economic and social context and is considered a fundamental part of the strategy (Determining factors of innovation).

On the other hand, Ricart (2009) mentions that a business model consists of the set of choices made by the company and the set of consequences that derive from the said choices.

Use of shrimp and mango waste

There is a wide variety of crustaceans, and, among these, shrimp stands out as the most important from an economic point of view, due to its wide distribution along the coasts and its use in various dishes in Mexico. However, it has been reported that around 48-60% of the total shrimp weight corresponds to the inedible fraction, which comprises the exoskeleton, head, and tail. Generally, these parts are considered and managed as waste; however, they have significant amounts of proteins, lipids, chitin, and carotenoids, such as astaxanthin (Pattanaik et al., 2020), for which shrimp waste can be a source of high value-added compounds (Mao et al., 2017). However, in Mexico, its industrial exploitation is still in its infancy. An example of this wastage is that of the 75,000 tons that were produced in 2021, only 22,500 tons are shells, which are not used at all and end up being discarded when they can have different uses, not only for food for people but also for food for animals. One of the main problems of the seafood processing industries is the final disposal of the waste generated from the various types of crustaceans. Therefore, finding an application for this waste that, in addition to resolving the final disposal of by-products, generates economic income is one of the best options for the shrimp industry. In general, the yield of by-products, when the shrimp is in shell-on-tail form, oscillates between 35 and 45% of the total weight of the shrimp. Furthermore, the use of this material contributes to solving the environmental problem generated by the slow degradation of this waste (Velasco et al., 2019).

In Mexico, agricultural waste (peels, bones, bagasse, damaged fruits and vegetables or fruits and vegetables with maturity and quality problems) represents an environmental problem since there are no adequate policies for their management, and most of the time they are thrown into landfills. They represent contamination problems due to the lack of adequate management of these wastes, mainly the shell (which constitutes 7 to 24% depending on the cultivar) and the seed and pulp

residues (Sumaya et al., 2012; Flores et al., 2013; Barreto et al., 2017). In the case of mango, it has been pointed out that the peels of different varieties contain high-quality pectin (Sudhakar & Maini, 2000; Schieber et al., 2004) as well as dietary fiber with an excellent balance between soluble and insoluble fiber (Larrauri et al., 1996).

This waste is generated in large volumes (32-50%) and only a minimal part is reused in the production of low value-added animal feed (Sumaya et al., 2012). Additionally, there are losses of fresh fruit (30-50%) associated with post-harvest handling and problems in its commercialization (Jiménez et al., 2022).

Research methodology

The study is of a qualitative nature, which Barrantes (2014) points out is also called naturalist-humanist or interpretive, whose interest “focuses on the study of the meanings of human actions and social life”. It implies an approximation to reality based on the study of situations in the same contexts where they operate, studying people and companies. As Taylor and Bogdan (1984) indicate, it is about resorting to a research methodology that allows one to understand the complex world of lived experience from the point of view of those who live it. It has a descriptive scope, considering that it refers to a level of depth that implies having a good base of prior knowledge about the topic and phenomenon of study since it seeks to carry out phenomenological or constructivist narrative research, which describes the subjective representations that emerge in a human group on a certain phenomenon, specifying characteristics and profiles of people, groups, companies, communities, or any other phenomenon that is subjected to analysis (Hernández, 2018). The collection of information focused on the review of literature reports and reports from sources such as the Agro-Food and Fisheries Information Service (SIAP), the National Institute of Statistics and Geography (INEGI), the Council for Economic Development of Sinaloa (CODESIN), the Ministry of Economy, among others; contemplating the development of new products and entrepreneurship as an object of study, since documentary techniques consist of the identification, collection, and analysis of documents related to the fact or context studied. Furthermore, the analysis of a formula for sauce preparation was carried out considering raw materials obtained from shrimp and mango waste. In this case, the information was obtained through written, graphic, and published works from reliable sources.

Results

The creation of a company constitutes an engine of growth and development that allows the transformation of unstable economic scenarios into competitive ones. However, not all business plans become successful and position themselves in a sustained manner in the market, a situation that implies that the entrepreneur introduces innovative strategies supported by the development of new products and new companies, aimed at generating a source of employment and offering an added value.

Given the new scenarios that the labor market is going through, the modality of entrepreneurship is spreading increasingly through the creation of small companies for regional economic development. For this reason, the number of people who seek to start an organization through a business model that allows them to self-employ and generate jobs is increasing, adding to the economic growth and development of the entity where the business initiative is developed.

The development of food products based on shrimp and mango waste represents an opportunity for the creation of new companies to process and market them at the regional, state and national level. Furthermore, the commercialization of these products can economically benefit farmers and fish farmers, since what they consider waste and that has no economic value would be used to process the sauce, generating income from the sale of this waste. On the other hand, they can be of great help to the environment by reducing the pollution currently generated by the final disposal of shrimp and mango waste.

In 2022, in Mexico, the production reached 2,164,435.86, of which Sinaloa contributed 407,247.11 tons (SIAP, 2022). Considering that mango waste (peel and seed/stone) represents around 40%, we can calculate that in Sinaloa the waste from this fruit amounted to 162,898.84 tons that did not have an industrial use. On the other hand, of the 7,943.1 tons of shrimp from the high seas that were obtained during the 2020-21 capture season, approximately 4,765.86 tons were generated, considered waste (shell and head) that were not used and only generated contamination from bad odors caused by its decomposition in garbage cans.

Therefore, it is proposed to develop a sauce made with shrimp and mango waste to help reduce the pollution generated by non-used waste.

The Business Demographics Study (EDN) 2021 estimated that in Mexico from May 2019 to July 2021 1.2 million micro, small and medium-sized enterprises were born and 1.6 million closed their doors permanently.

In 2020, 31.9% of the establishments in Quintana Roo closed permanently and in 2021 this figure rose to 46.6%; this state was the one with the highest proportion of permanently closed establishments.

32.4% of the micro, small and medium establishments that died during this period were informal, while 23.0% were formal. The Study on the Demography of Businesses (EDN), INEGI (2022) reported that from the effects of the COVID-19 pandemic, micro-, small- and medium-sized establishments (MSMEs) represented 99.8% of the total of the country's business. The MSME segment usually presents greater changes than large companies with respect to income, employed personnel, location, closings, and openings, among other aspects. In addition to this natural behavior, the health emergency caused by COVID-19 affected the way in which businesses produce and offer their products or services.

Regarding Sinaloa, CODESIN (2021) mentions that it has six research centers, 13 million tons of active biomass (agricultural, aquaculture, fishing, and livestock), and 6.6 million tons of residual biomass to generate higher-value bioproducts. According to the diagnosis made by CODESIN, the areas with the greatest opportunity

to develop new products in the short term (1 to 3 years) or businesses, in the bioeconomy area, are processed foods, biofertilizers, and nutraceuticals. In the longer term, these areas include bioenergetics, bioplastics, and the genetic improvement of plants and animals.

On the other hand, in 2022, the Ministry of Economy through the “Equipa Sinaloa” program delivered 2,249 pieces of productive equipment to small businesses throughout the state with an investment of 5,741,964.98 pesos, which favors the generation of employment since for each equipment a new businessman and businesswoman is born.

Conclusions

Creative strategies for the management and stabilization of mango and shrimp waste from their industrialization, new products with high added value can be developed; which can translate into business opportunities.

By creating new businesses, entrepreneurs create employment opportunities for individuals, boost the competitiveness and productivity of businesses, create new industries that can be growth engines for the future, help improve national income, and introduce product innovation into the market.

The creation of companies through the development of new projects will provide significant results from the socioeconomic, scientific, and environmental points of view. The use of shrimp and mango shell residues can promote the generation of jobs, the use of residues for industrial purposes, the contribution to environmental conservation, the solution to environmental problems that arise with the organic decomposition of waste, and the reconversion of waste into an innovative product that can be given a high added value.

References

- Barrantes, E. R. (2014). Investigación, un camino al conocimiento un enfoque cualitativo y cuantitativo. EUNED.
- Barreto, G. E., Púa, A. L., De Alba, D. D., & Pión, M. M. (2017). Extracción y caracterización de pectina de mango de azúcar (*Mangifera indica* L.). *Temas Agrarios*, 22(1), 79-86.
DOI: 10.21897/rta.v22i1.918
- Berggren, E., & Nacher, T. (2000). El quid de las buenas ideas. *Harvard Deusto Márketing y Ventas*, 39, 73-78.
- CODESIN. (2021). *Emprendimiento en Sinaloa*. Consejo para el Desarrollo Económico de Sinaloa. <https://sinaloaennumeros.codesin.mx/category/noticias/reportes-economicos/empresas/> (accessed: 29.06.2023).
- Ferris, T. (2016). *La semana laboral de 4 horas*. RBA Editores México.
- Flores, R. B., Mariños, D. C., Rodríguez, N. B., & Rodríguez, D. S. (2013). Optimización de las condiciones de extracción de pectina a partir de cáscara de limón francés (*Citrus medica*) utilizando la metodología de superficie de respuesta. *Agroindustrial Science*, 3(2), 77-89.
DOI: 10.17268/agroind.science.2013.02.01
- Giraldo, J. P. (2004). *Metodología para el desarrollo de nuevos productos*. Primer Encuentro Nacional de Investigación en Diseño Universidad.
- Hernández, S. R. (2018). *Metodología de la investigación: las rutas cuantitativa, cualitativa y mixta*. McGraw Hill.

- Herruzo-Gómez, E., Hernández-Sánchez, B., Cardella, G. M., Sánchez-García, J.-S. (Eds.). (2019). *Emprendimiento e innovación: oportunidades para todos*. Dykinson.
- INEGI. (23 de junio de 2022). *Demografía de los establecimientos mipyme en el contexto de la pandemia por COVID-19*. https://www.inegi.org.mx/contenidos/saladeprensa/aproposito/2022/EAP_Demog_MIPYME22.pdf (accessed: 24.06.2023).
- Jamexico. (2020). *Emprendimiento en México*. <https://www.jamexico.org.mx/post/emprendimiento-en-m%C3%A9xico> (accessed: 17.06.2023).
- Jiménez, A. A. P., Heredia, J. B., Grijalva, E. G., Quintana-Obregón, E. A., & Rangel, M. D. M. (2022). Potencial industrial de la cáscara de mango (*Mangifera indica* L.) para la obtención de pectina en México. *TIP Revista Especializada en Ciencias Químico-Biológicas*, 25(1), 1-13. DOI: 10.22201/fesz.23958723e.2022.419
- Lafuente, J. M. (2010). *Marketing, innovación y nuevos negocios*. ESIC Editorial.
- Mao, X., Guo, N., Sun, J., & Xue, C. (2017). Comprehensive utilization of shrimp waste based on biotechnological methods: A review. *Journal of Cleaner Production*, 143, 814-823. DOI: 10.1016/j.jclepro.2016.12.042
- Osterwalder, A., & Pigneur, Y. (2010). *Business Model Generation*. John Wiley & Sons.
- Pattanaik, S. S., Sawant, P. B., Xavier, K. M., Dube, K., Srivastava, P. P., Dhanabalan, V., & Chadha, N. K. (2020). Characterization of Carotenoprotein from Different Shrimp Shell Waste for Possible Use as Supplementary Nutritive Feed Ingredient in Animal Diets. *Aquaculture*, 515, 734594. DOI: 10.1016/j.aquaculture.2019.734594
- Ricart, J. (2009). *Modelo de Negocio: El eslabón perdido en la dirección estratégica*. http://ubr.universia.net/pdfs_web/UBR_2300912.pdf (accessed: 17.06.2023).
- Rojo Gutiérrez, M. A., Bonilla Jurado, D. M., & Masaquiza Caiza, C. S. (2018). El desarrollo de nuevos productos y su impacto en la producción: caso de estudio BH Consultores. *Universidad y Sociedad*, 10(1), 134-142. <http://rus.ucf.edu.cu/index.php/rus> (accessed: 21.06.2023).
- Secretaría de Economía. (8 de febrero de 2022). Data México. <https://datamexico.org/es/profile/geo/sinaloa-si>
- SIAP. (31 de diciembre de 2022). Avance de Siembras y Cosechas. Recuperado de https://nube.siap.gob.mx/avance_agricola/ (accessed: 19.06.2023).
- Sudhakar, D. V., & Maini, S. B. (2000). Isolation and Characterization of Mango Peel Pectins. *Journal of Food Processing and Preservation*, 24, 209-227. DOI: 10.1111/j.1745-4549.2000.tb00414.x
- Sumaya-Martínez, M. T., Herrera, L. M., García, G. T., & Paredes, D. G. (2012). Red de valor del mango y sus desechos con base en las propiedades nutricionales y funcionales. *Revista Mexicana de Agronegocios*, 30, 826-833.
- Taylor, S. J., & Bogdan, R. (1984). *Introducción a los métodos cualitativos de investigación. La búsqueda de significados*. Paidós. DOI: 10.1142/s1084946706000350

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ROZWÓJ NOWYCH PRODUKTÓW – ALTERNATYWA DLA PRZEDSIĘBIORCZOŚCI

Streszczenie: W firmach przetwórczych jednym z problemów, z jakimi się borykają, jest ostateczne wykorzystanie odpadów powstałych z surowców. Z tego powodu znalezienie możliwości przetwórstwa, pozwalającego na wykorzystanie surowców i generującego dochody, jest alternatywą dla zarządzania nowymi biznesami. W Meksyku 33% przedsiębiorców stara się rozwiązać problem na rynku lub w społeczeństwie, dywersyfikując źródła dochodów i rozwijając swoją kreatywność. Celem tej pracy badawczej jest opracowanie nowego produktu wykorzystującego odpady z krewetek i mango do produkcji sosu, który zaspokoi potrzeby rynku i pozwoli na stworzenie nowego biznesu. Badanie przeprowadzono na podstawie przeglądu raportów literaturowych i raportów ze źródeł takich jak Serwis Informacji Rolno-Spożywczej i Rybołówstwa (SIAP), Narodowy Instytut Statystyki i Geografii (INEGI), Rada Rozwoju Gospodarczego Sinaloa (CODESIN), Ministerstwo Gospodarki. Przedmiotem badań był rozwój nowych produktów i przedsiębiorczości. Zgodnie z diagnozą CODESIN obszarami mającymi największą szansę w krótkim okresie (od 1 do 3 lat) na rozwój nowych produktów, czyli powstanie nowych firm w obszarze biogospodarki, jest żywność przetworzona, bionawozy i nutraceutyki. Podsumowując – opracowanie nowego produktu, takiego jak sos z krewetek i mango, jest opcją inżynierską i projektową stanowiącą szansę dla rozwoju nowych biznesów.

Słowa kluczowe: zarządzanie przedsiębiorstwem, przedsiębiorczość, nowe produkty

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