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**Ingeniería Bioquímica:** Instituto Tecnológico de Acapulco

**Estudios de Maestría:** CINEVESTAV-IPN  
Maestría en Bioingeniería

**Estudios de Doctorado:** CINEVESTAV-IPN  
Doctorado en Biotecnología de Plantas

**Posdoctorado:** INRA-Nantes, Francia

**Programas de Posgrado en los que participa:**

- Doctorado en Ciencias en Desarrollo de Productos Bióticos
- Maestría en Ciencias en Desarrollo de Productos Bióticos

**Tema(s) de Estudio:**

- Polisacáridos de interés alimentario: almidón y fibra dietética

**Línea de Investigación:**

- Estudio y Aprovechamiento de Macromoléculas

Proyectos de Investigación

Proyecto de redes internacionales entre Creas-Chile y Ceprobi-IPN-México financiado por el <b>Conicyt-Chile, 2017-2018</b>
Las interacciones hidrofóbicas fenólicos-almidón modifican la estructura del polisacárido y su digestibilidad ( <b>A1-S-8746</b> )
Estudio metabolómico de espagueti sin gluten con la mezcla de harinas nutraceuticas ( <b>SIP-20180450</b> )
Estudios del almidón esterificado con anhídrido octenil succínico ( <b>SIP-20190073</b> )

Publicaciones Recientes

Vernon-Carter, E.J., Alvarez-Ramirez, J. <b>Bello-Pérez, L.A.</b> , González, M., Reyes, I. y Alvarez-Poblano, L. 2020. Supplementin white maize masa with anthocyanins: Effects on masa rheology and on the in vitro digestibility and hardness of tortilla. Journal of Cereal Science, 91, Article 102883
Magallanes-Cruz, P.A., <b>Bello-Pérez, L.A.</b> , Agama-Acevedo, E., Tovar, J. y Carmona-García, R. 2020. Effect of the addition of thermostable and non-thermostable type 2 resistant starch (rs2) in cake batters. LWT-Food Science and Technology, 118, Article 108834
López-Silva, M., <b>Bello-Pérez, L.A.</b> , Castillo-Rodríguez, V.M., Agama-Acevedo, E. y Alvarez-Ramírez, J. 2020. In vitro digestibility characteristics of octenyl succinic acid (OSA) modified starch with different amylose content. Food Chemistry, 304, Article 125434
Patiño-Rodríguez, O., Agama-Acevedo, E., Ramos-López, G. y <b>Bello-Pérez, L.A.</b> 2020. Unripe mango kernel starch: Partial characterization. Food Hydrocolloids,101, Article 105512
Quintero-Castaño, V.D., Castellanos-Galeano, F.J., Alvarez-Barreto, C.I., <b>Bello-Pérez, L.A.</b> y Alvarez-Ramirez, J. 2020. In vitro digestibility of actenyl succinic anhydride-starch from the fruit of thrtree colombian musa. Food Hydrocolloids, 101. ARTICLE 105566
Vernon-Carter, E.J., Alvarez-Ramirez, J., Meraz, M., <b>Bello-Pérez, L.A.</b> y García-Díaz, S. 2020. Canola oil/candelilla wax oleogel improves texture, retards staling and reduces in vitro starch digestibility of maize tortillas. Journal of the Science of Food and Agriculture, 100, 1238-1245

Sotelo-Bautista, M., **Bello-Pérez, L.A.** González-Soto, R.A., Yañez-Fernandez, J. y Alvarez-Ramirez, J. 2020. OSA-maltodextrin as wall material for encapsulation of essential avocado oil by spray drying. *Journal of Dispersion Science and Technology*, 41(2), 235-242

Alonso-Gómez, L.A., Solarte-Toro, J.C., **Bello-Pérez, L.A.** y Cardona-Alzate, C.A. 2020. Performance evaluation and economic analysis of the bioethanol and flour production using rejected unripe plantain fruits (*Musa paradisiaca* L.) as raw material. *Food and Bioproducts Processing*, 121, 29-42

Quintero-Castaño, V.D., Castellanos-Galeano, F.J., Alvarez-Barreto, C.I., Lucas-Aguirre, J.C., **Bello-Pérez, L.A.** y Rodriguez-Garcia, M.E. 2020. Starch from two unripe plantains and esterified with octenyl succinic anhydride (OSA): Partial characterization. *Food Chemistry*, 315. Article 126241

Solís-Badillo, E., Agama-Acevedo, E., Tiessen, A., López-Valenzuela, J.A. y **Bello-Pérez, L.A.** 2020. ADP-glucose pyrophosphorylase is located in the pastid and cytosol in the pulp of tropical banana fruit (*Musa acuminata*). *Plants Foods for Human Nutrition*, 75, 76-82

Cardenas-Castro, A.P., Peres-Jimenes, J., **Bello-Pérez, L.A.**, Tovar, J. y Sayago-Ayerdi, S.G. 2020. Bioaccessibility of phenolic compounds in common beans (*Phaseolus vulgaris* L.) after in vitro gastrointestinal digestion: A comparison of two cooking procedures. *Cereal Chemistry*, 97, 670-680

Velásquez-Barreto, F.F., **Bello-Pérez, L.A.**, Yee-Madeira, H., Alvarez-Ramírez, J. y Velezmoro-Sánchez, C.E. 2020. Effect of the OSA esterification of oxalis tuberosa starch on the physicochemical, molecular, and emulsification properties. *Starch/Starke*, 72, 1900305

**Bello-Pérez, L.A.**, Agama-Acevedo, E., García-Valle, D.E. y Alvarez-Ramirez, J. 2019. A multiscale kinetics model for the analysis of starch amylolysis. *International Journal of Biological Macromolecules*, 112, 205-209

Hoyos-Leyva, J.D., **Bello-Pérez, L.A.**, Agama-Acevedo, E., Alvarez-Ramirez, J. y Jaramillo-Echeverry, L.M. 2019. Characterization of spray drying microencapsulation of almond oil into taro starch spherical aggregates. *LWT- Food Science and Technology*, 101, 526-533

Vernon-Carter, E.J., Alvarez-Ramirez, J., **Bello-Pérez, L.A.**, Reyes, I. y Hernandez-Jaimes, C. 2019. Inhibition of the amylolytic hydrolysis of starch by ethanol. *Food Hydrocolloids*, 90, 285-290

Velásquez-Barreto, F.F., **Bello-Pérez, L.A.**, Yee-Madeira, H. y Velezmoro-Sanchez, C.E. 2019. Esterification and characterization of starch from Andean tubers. *Starch/Starke*, 71

- García-Valle, D.E., **Bello-Pérez, L.A.**, Flores-Silva, P.C., Agama-Acevedo, E. y Tovar, J. 2019. Extruded unripe plantain flour as an indigestible carbohydrate-rich ingredient. *Frontiers in Nutrition*, 6, Article 2
- Yniestra-Marure, L.M., Núñez-Santiago, M.C., Agama-Acevedo, E. y **Bello-Pérez, L.A.** 2019. Starch characterization of improved chickpea varieties grown in Mexico. *Starch/Starke*, 71
- González-Soto, R.A., Núñez-Santiago, M.C. y **Bello-Pérez, L.A.** 2019. Preparation and partial characterization of films made with dual-modified (acetylation and crosslinking) potato starch. *Journal of the Science of Food and Agriculture*, 99-3134-3141
- Reyes-Atrizco, J.N., Agama-Acevedo, E., **Bello-Pérez, L.A.** y Alvarez-Ramirez, J. 2019. Morphological, molecular evolution and in vitro digestibility of filamentous granules of banana starch during fruit development. *International Journal of Biological Macromolecules*, 132, 119-125
- Sánchez-Rivera, M.M., **Bello-Pérez, L.A.**, Tovar, J., Martínez, M.M. y Agama-Acevedo, E. 2019. Esterified plantain flour for the production of cookies rich in indigestible carbohydrates. *Food Chemistry*, 292, 1-5
- Leyva-López, R., Palma-Rodríguez, H.M., López-Torres, A., Capataz-Tafur, J., **Bello-Pérez, L.A.** y Vargas-Torres, A. 2019. Use of enzymatically modified starch in the microencapsulation of ascorbic acid: Microcapsule characterization, release behavior and in vitro digestion. *Food Hydrocolloids*, 96, 259-266
- Bello-Pérez, L.A.**, Agama-Acevedo, E., López-Silva, M. y Alvarez-Ramirez, J. 2019. Molecular characterization of corn starches by hpsec-mals-ri: A comparison with af4-mals-ri system. *Food Hydrocolloids*, 96, 373-376
- Moo-Huchin, V.M., Pérez-Pacheco, E., Ríos-Soberanis, C.R., **Bello-Pérez, L.A.**, Cervantes-Uc, J.M., Dzul-Cervantes, M.A.A. y Estrada-León, R.J. 2019. Extraction and characterization of natural cellulosic fiber from jipijapa (*Carludovica palmata*). *Chiang Ma Journal Science*, 46(3), 579-591
- Martínez, P., Peña, F., **Bello-Pérez, L.A.**, Núñez-Santiago, C., Yee-Madeira, H. y Velezmoro, C. 2019. Physicochemical, functional and morphological characterization of starches isolated from three native potatoes of the Andean region. *Food Chemistry: X*, 2, 100030
- Chávez-Salazar, A., Castellanos-Galeano, F.J., Álvarez-Barreto, C.I., **Bello-Pérez, L.A.**, Cortes-Rodríguez, M. y Hoyos-Leyva, J.D. 2019. Optimization of the spray drying process of the esterified plantain starch by response surface methodology. *Starch/Starke*, 71 (7-8)

<p>Fonseca-Florido, H.A., Mendez-Montealvo, G., Velázquez De La Cruz, G., Rodríguez-García, M.E., <b>Bello-Pérez, L.A.</b>, Hernandez-Hernandez, E. y Gómez-Aldapa, C.A. 2019. Physicochemical characteristics of stored gels from starch blends. <i>LWT-Food Science and Technology</i>, 114</p>
<p>Patiño-Rodríguez, O., Agama-Acevedo, E., Pacheco-Vargas, G., Alvarez-Ramirez, J. and <b>Bello-Pérez, L.A.</b> 2019. Physicochemical, microstructural and digestibility analysis of gluten-free spaghetti of whole unripe plantain flour. <i>Food Chemistry</i>, 298</p>
<p>López-Silva, M., <b>Bello-Pérez, L.A.</b>, Agama-Acevedo, E. y Alvarez-Ramirez, J. 2019. Effect of amylose content in morphological, functional and emulsification properties of OSA modified corn starch. <i>Food Hydrocolloids</i>, 97, 373-376</p>
<p>Agama-Acevedo, E., <b>Bello-Pérez, L.A.</b>, Pacheco-Vargas, G., Tovar, J. y Sayago-Ayerdi, S.G. 2019. Unripe plantain flour as a dietary fiber source in gluten-free spaghetti with moderate glycemic index. <i>Journal of Food Processing and Preservation</i>, 43</p>
<p>Alonso-Gómez, L.A., Heredia-Solis, E., Serna-Saldivar, S.O. y <b>Bello-Pérez, L.A.</b> 2019. Whole unripe plantain (<i>Musa paradisiaca</i> L.) as raw material for bioethanol production. <i>Journal of the Science of Food and Agriculture</i>, 99, 5784-5791</p>
<p>Agama-Acevedo, E., Pacheco-Vargas, G., Gutiérrez-Meraz, F., Tovar, J. y <b>Bello-Pérez, L.A.</b> 2019. Dietary fiber content, texture, and in vitro starch digestibility of different white bread crusts. <i>Journal of Cereal Science</i>, 89, 102824</p>
<p>Sánchez-De la Concha, B.B., Agama-Acevedo, E., Núñez-Santiago, M.C., <b>Bello-Pérez, L.A.</b>, García, H.S. y Alvarez-Ramirez, J. 2018. Acid hydrolysis of waxy starches with different granule size for nanocrystal production. <i>Journal of Cereal Science</i>, 79, 193-200</p>
<p>García-Solis, S.E., <b>Bello-Pérez, L.A.</b>, Agama-Acevedo, E. y Flores-Silva, P.C. 2018. Plantain flour: A potential nutraceutical ingredient to increase fiber and reduce starch digestibility of gluten-free cookies. <i>Starch/Starke</i>, 70</p>
<p>Camelo-Méndez, G.A., Flores-Silva, P.C., Agama-Acevedo, E., Tovar, J. y <b>Bello-Pérez, L.A.</b> 2018. Incorporation of whole blue maize flour increase antioxidant capacity and reduces in vitro starch digestibility of gluten-free pasta. <i>Starch/Starke</i>, 70</p>
<p>Hoyos-Leyva, J.D., <b>Bello-Pérez, L.A.</b>, Alvarez-Ramirez, J. y García, H.S. 2018. Microencapsulation using starch as wall material: A review. <i>Foods Reviews International</i>, 34 (2), 148-161</p>

Patiño-Rodríguez, O., **Bello-Pérez, L.A.**, Flores-Silva, P.C., Sánchez-Rivera, M.M. y Romero-Bastida, C.A. 2018. Physicochemical properties and metabolomic profile of gluten-free spaghetti prepared with unripe plantain flours. *LWT- Food Science and Technology*, 90, 297-302

Agama-Acevedo, E., Pacheco-Vargas, G., **Bello-Pérez, L.A.** y Alvarez-Ramirez, J. 2018. Effect of drying method and hydrothermal treatment of pregelatinized hylon vii starch on resistant starch content. *Food Hydrocolloids*, 77, 817-824

Rincón-Aguirre, A., **Bello-Perez, L.A.**, Mendoza, S., Del Real, A. y Rodriguez-Garcia, M. 2018. Physicochemical studies of taro starch chemically modified by acetylation, phosphorylation, and succinylation. *Starch/Starke*, 70

Hoyos-Leyva, J.D., **Bello-Pérez, L.A.** y Alvarez-Ramirez, J. 2018. Thermodynamic criteria analysis for the use of taro starch spherical aggregates as microencapsulant matrix. *Food Chemistry*, 259, 175-180

Camelo-Méndez, G.A., Agama-Acevedo, E., Rosell, C.M., Perea-Flores M.J. y **Bello-Pérez, L.A.** 2018. Starch and antioxidant compound release during in vitro gastrointestinal digestion of gluten-free pasta. *Food Chemistry*, 263, 201-207

Flores-Silva, P.C., Alvarez-Ramirez, J. y **Bello-Pérez, L.A.** 2018. Effect of dual modification order with ultrasound and hydrothermal treatments on starch digestibility. *Starch/Starke*, 70

Romero-Bastida, C.A., Chavez-Gutierrez, M., **Bello-Pérez, L.A.**, Abarca-Ramírez, E., Velázquez, G. y Mendez-Montealvo, G., 2018. Rheological properties of nanocomposite-forming solutions and film based on montmorillonite and corn starch with different amylose content. *Carbohydrate Polymers*, 188, 121-127

Hoyos-Leyva, J.D., Chávez-Salazar, A., Castellanos-Galeano, F., **Bello-Perez, L.A.** y Alvarez-Ramirez, J. 2018. Physical and chemical stability of l-ascorbic acid microencapsulated into taro starch spherical aggregates by spray drying. *Food Hydrocolloids*, 83, 143-152

Zamora-Gasga, V.M., Álvarez-Vidal, C., Montalvo-González, E., Loarca-Piña, G., Vazquez-Landaverde, P.A., **Bello-Pérez, L.A.**, Tovar, J. y Sayago-Ayerdi, S.G. 2018. Gut metabolites associated with pH and antioxidant capacity during in vitro colonic fermentation of Mexican corn products. *Cereal Chemistry*, 95, 399-410

Vernon-Carter, E.J., Alvarez-Ramirez J., **Bello-Pérez, L.A.**, Garcia-Hernandez, A., Roldan-Cruz, C. y García-Díaz, S. 2018. In vitro digestibility of normal and waxy corn starch is modified by the addition of tween 80. *International Journal of Biological Macromolecules*, 116, 715-720

Muñoz-Hernández, D., Villalobos-Espinosa, J., Santiago-Roque, I., González-Herrera, S.L., Herrera-Meza, S., Meza-Alvarado, E., **Bello-Pérez, L.A.**, Osorio-Díaz, P., Chanona-Pérez, J., Mendez-Mendez, J.V., Acosta-Mesa, H.G., Chávez-Serbia, J.L., Azuara-Nieto, E. y Guzman-Geronimo, R.I. 2018. Biofunctionality of native and nano-structured blue corn starch in prediabetic wistar rats. *Cyta-Journal of Food*, 16(1), 477-483

Ríos-Romero, E.A., Ochoa-Martínez, L.A., Morales-Castro, J., **Bello-Pérez, L.A.**, Quintero-Ramos, A. y Gallegos-Infante, J.A. 2018. Ultrasound in orange sweet potato juice: Bioactive compounds, antioxidant activity, and enzymatic inactivation. *Journal of Food Processing and Preservation*, 42(6)

Hoyos-Leyva, J.D., **Bello-Pérez, L.A.**, Agama-Acevedo, E. y Alvarez-Ramirez, J. 2018. Thermodynamic analysis for assessing the physical stability of core materials microencapsulated in taro starch spherical aggregates. *Carbohydrate Polymers*, 197, 431-441

Camelo-Méndez, G.A., Tovar, J. y **Bello-Pérez, L.A.** 2018. Influence of blue maize flour on gluten-free pasta quality and antioxidant retention characteristics. *Journal of Food Science and Technology*, 55(7), 2739-2748

Vernon-Carter, E.J., Alvarez-Ramirez J., **Bello-Pérez, L.A.** y García-Hernández, A. 2018. The in vitro digestibility of starch fractions in maize tortilla can be rendered healthier by treating the nixtamalized masa with commercial baking yeast. *Journal of Cereal Science*, 82, 216-222

Agama-Acevedo, E., **Bello-Pérez, L.A.**, Lim, J., Lee, B.-H. y Hamaker, B.R. 2018. Pregelatinized starches enriched in slowly digestible and resistant fractions. *LWT-Food Science and Technology*, 97, 187-192

Hoyos-Leyva, J.D., **Bello-Pérez, L.A.**, Agama-Acevedo, E. y Alvarez-Ramirez, J. 2018. Potential of taro starch spherical aggregates as wall material for spray drying microencapsulation: Functional, physical and thermal properties. *International Journal of Biological Macromolecules*, 120, 237-244

**Bello-Pérez, L.A.**, Rodríguez-Ambríz, S.L., Hoyos-Leyva, J.D., Agama-Acevedo, E., Pacheco-Vargas, G. y Alvarez-Ramirez, J. 2018. Characteristics of starch from opaque and translucent perisperm of amaranth (*A. hypochondriacus*) grains. *Starch/Starke*, 70

Alvarez-Ramirez, J., García-Díaz, S., Vernon-Carter, J.E. y **Bello-Pérez, L.A.** 2018. A novel, simple, economic and effective method for retarding maize tortilla staling. *Journal of the Science of Food and Agriculture*, 98(12), 4403-4410

Alonso-Gómez, L.A. y **Bello-Pérez, L.A.** 2018. Materias primas usadas para la producción de etanol de cuatro generaciones: Retos y oportunidades. *Agrociencia*, 52, 967-990

#### Publicación de Libros

- Agama-Acevedo, E., Flores-Silva, P.C. y **Bello-Pérez, L.A.** 2019. Cereal starch production for applications en: *Starches for food application- chemical, technological and health properties*. Maria Teresa Pedroa Silva Clerici y Marcio Schmiele (eds.). Elsevier, Academic Press, p. 1-102.
- Yahia, E., Carrillo-López, A. y **Bello-Pérez, L.A.** 2019. Carbohydrates en: *Postharvest, physiology and biochemistry of fruits and vegetables*. Elhadi M. Yahia y Armando Carrillo-López (eds.). Elsevier INC. P. 175-205.
- **Bello-Pérez, L. A.**, Agama-Acevedo, E. 2019. Banana and mango flours en: *Flour and bread their fortification in health and disease prevention*. V. R. Preedy y R. R. Watson (eds.) London Burlington, San Diego: Academic Press, Elsevier, p. 153-164.
- **Bello-Pérez, L.A.** y Agama-Acevedo, E. 2018. Amaranth en: *Papel de los cereales y los pseudocereales en la seguridad alimentaria*. Ana Silvia Bermúdez (ed.). International Life Sciences Institute, Nor-Andino, p. 75-90.

#### Tesis Dirigidas Recientes

##### Doctorado

Propiedades fisicoquímicas de agregados esféricos de almidón de malanga asociados a la microencapsulación de compuestos bioactivos. Javier Darío Hoyos Leyva; Doctorado en Ciencias en Desarrollo de Productos Bióticos. Centro de Desarrollo de Productos bióticos del Instituto Politécnico Nacional. Fecha de examen: 5 de julio de 2018

Impacto del procesamiento sobre las propiedades fisicoquímicas, funcionales y de digestibilidad en un jugo de camote (*Ipomea batatas* L.). Evelyn Alicia Ríos Romero. Instituto Tecnológico de Durango. Fecha de examen: 01 de noviembre de 2018



## Maestría

Modificación y caracterización de maltodextrinas con anhídrido octenil succínico (osa) y su aplicación en la encapsulación de una sustancia lipídica. Martín Sotelo Bautista; Maestría en Ciencias en Desarrollo de Productos Bióticos. Centro de Desarrollo de Productos Bióticos del Instituto Politécnico Nacional. Fecha de examen: 19 de enero de 2018

Estructura y función de almidón de cuatro variedades de garbanzo. Lucero Marlen Yniestra Marure; Maestría en Ciencias en Desarrollo de Productos Bióticos. Centro de Desarrollo de Productos Bióticos del Instituto Politécnico Nacional. Fecha de examen: 31 de julio de 2018

Obtención y caracterización de un ingrediente con alto contenido de fibra dietética a partir de la extrusión de plátano macho (*Musa paradisiaca* L.) inmaduro completo. Daniel Edivaldo García Valle; Maestría en Ciencias en Desarrollo de Productos Bióticos. Centro de Desarrollo de Productos Bióticos del Instituto Politécnico Nacional. Fecha de examen: 07 de diciembre de 2018

Producción de almidón resistente de malanga (*Colocasia esculenta*) y evaluación de su digestibilidad en un digestor dinámico. Lucero Elizabeth Guzmán De la Hoz. Instituto Tecnológico de Veracruz. Fecha de examen: 28 de enero de 2019

Efecto del contenido de amilosa en la esterificación del almidón. Madai Lopez Silva; Maestría en Ciencias en Desarrollo de Productos Bióticos. Centro de Desarrollo de Productos Bióticos del Instituto Politécnico Nacional. Fecha de examen: 02 de julio de 2019

Modificación por esterificación del almidón de malanga (*Colocasia esculenta*) para la encapsulación de aceite vegetal. Héctor Adán Romero Hernández; Maestría en Ciencias en Desarrollo de Productos Bióticos. Centro de Desarrollo de Productos Bióticos del Instituto Politécnico Nacional. Fecha de examen: 10 de enero de 2020