

## BIBLIOGRAPHY

- Abdelhedi, O., Leticia M., Ines J., Mourad J., Fidel T., Moncef N., and Rim N. 2017. *Effect of Ultrasound Pretreatment and Maillard Reaction on Structure and Antioxidant Properties of Ultrafiltrated Smooth-Hound Viscera Proteins-Sucrose Conjugates*. Food Chemistry 230:507-15.
- Abid, M., S.Cheikhrouhou, Catherine M.G.C. Renard, Sylvie Bureau, Gérard Cuvelier, Hamadi Attia, and M.A. Ayadi. 2017. *Characterization of Pectins Extracted from Pomegranate Peel and Their Gelling Properties*. Food Chemistry 215: 318–25.
- Al-hakkak, Jafar, and Fadia Al-hakkak. 2010. *Functional Egg White – Pectin Conjugates Prepared by Controlled Maillard Reaction*. Journal of Food Engineering 100 (1): 152–59.
- Alba, K, and V Kontogiorgos. 2017. *Food Hydrocolloids Pectin at the Oil-Water Interface : Relationship of Molecular Composition and Structure to Functionality*. Food Hydrocolloids 68: 211–18.
- Ali, Ali, Ghozlene Mekhlou, Nicolas Huang, and Florence Agnely. 2016. *B - Lactoglobulin Stabilized Nanemulsions — Formulation and Process Factors Affecting Droplet Size and Nanoemulsion Stability*. International Journal of Pharmaceutics 500: 291–304.
- Álvarez, Carlos, Vanessa García, Manuel Rendueles, and Mario Díaz. 2012. *Food Hydrocolloids Functional Properties of Isolated Porcine Blood Proteins Modified by Maillard ' s Reaction*. Food hydrocolloids 28(2): 267–74.
- Broersen, Kerensa, Alphons G J Voragen, Rob J Hamer, and Harmen H J De Jongh. 2004. *Glycoforms of B -Lactoglobulin With Improved Thermostability and Preserved Structural Packing*. Biotechnology and Bioengineering 80(1).
- Castellani, Oscar, Saphwan Al-Assaf, Monique Axelos, Glyn O. Phillips, and Marc Anton. 2010. *Food Hydrocolloids Hydrocolloids with Emulsifying Capacity . Part 2 – Adsorption Properties at the n-Hexadecane – Water Interface*. Food hydrocolloids 24(2–3): 121–30.
- Chen, Bingcan, david julian McClements, and eric andrew Decker. 2010. *Role of*

*Continuous Phase Anionic Polysaccharides on the Oxidative Stability of Menhaden Oil-in-Water Emulsions*. J. Agric. Food Chem 58 : 3779–84.

Chen, Hao, Aiguo Ji, Shuang Qiu, Yan Liu, Qiaomei Zhu, and Lijun Yin. 2018. *Food Hydrocolloids Covalent Conjugation of Bovine Serum Album and Sugar Beet Pectin through Maillard Reaction / Laccase Catalysis to Improve the Emulsifying Properties*. Food hydrocolloids 76: 173–83.

Ciriminna, Rosaria, Alexandra Ridalgo, Riccardo Delisi1, Laura m. Ilharco, Mario Pagliaro. 2016. *Pectin Production and Global Market*. Agro Food Industry Hi Tech 27(5).

Costa, Carolina, Bruno Medronho, Alexandra Filipe, Isabel Mira, Björn Lindman, Håkan Edlund and Magnus Norgren. 2019. *Emulsion Formation and Stabilization by Biomolecules : The Leading Role of Cellulose*. Review, Polymers 11:1–18.

Das, K P, and J E Kinsella. 1990. *Stability Of Food Emulsions : Physicochemical Role Of Protein And Nonprotein Emulsifiers*.34.

Dickinson, Eric. 2008. *Hydrocolloids as emulsifiers and emulsion stabilizers*. Food Hydrocolloids 23: 1473–1482.

Dickinson, Eric. 2017. *Food Hydrocolloids Biopolymer-Based Particles as Stabilizing Agents for Emulsions and Foams*. Food hydrocolloids 68: 219–31. <http://dx.doi.org/10.1016/j.foodhyd.2016.06.024>.

El-salam, M H Abd, Safinaz El-shibiny, and Aida Salem. 2009. *Factors Affecting the Functional Properties of Whey Protein Products : A Review Factors Affecting the Functional Properties of Whey Protein Products : A Review*. Taylor & Francis Group 25: 251–70.

Flores-andrade, Enrique, Zaira Allende-Baltazar, Paola E. Sandoval-Gonzalez, Maribel Jimenez-Fernandez, Cesar I. Beristain, and Luz A. Pascual-Pineda. 2021. *Carotenoid Nanoemulsions Stabilized by Natural Emulsifiers : Whey Protein , Gum Arabic , and Soy Lecithin*. Journal of Food Engineering 290: 110208.

Fracassoa, Aline Francielle, Camila Augusto Perussello, Danielle Carpinéa, Carmen Lúcia de Oliveira Petkowicz, and Charles Windson Isidoro Haminiuk. 2018. *International Journal of Biological Macromolecules Chemical Modification of*

*Citrus Pectin : Structural , Physical and Rheological Implications*. International Journal of Biological Macromolecules 109: 784–92.

Funami, Takahiro, Guoyan Zhanga, Mika Hiroea, Sakie Nodaa, Makoto Nakaumaa, Iwao Asaia, Mary K. Cowmanb, Saphwan Al-Assafc, and Glyn O. Phillips. 2007. *Effects of the Proteinaceous Moiety on the Emulsifying Properties of Sugar Beet Pectin*. Article In Press Food Hydrocolloids 21: 1319–1329.

Funami, Takahiro, Makoto Nakauma, Sayaka Ishihara, Rie Tanaka, Takeo Inoue, and Glyn O. Phillips. 2011. *Food Hydrocolloids Structural Modifications of Sugar Beet Pectin and the Relationship of Structure to Functionality*. Food hydrocolloids 25(2): 221–29.

Gerrard, Juliet A. 2002. *New Aspects of an AGEing Chemistry— Recent Developments Concerning the Maillard Reaction*. Review. J. Chem. 55, 299–310

Güell, Carme, Alexandre Trentin, and Karin Schroën. 2017. *Apparent Interfacial Tension Effects in Protein Stabilized Emulsions Prepared with Microstructured Systems*. Membrane 7(19) : 5–7.

Guerra-hernandez, Eduardo. 2006. *Colour Measurement as Indicator for Controlling the Manufacture and Storage of Enteral Formulas*. Food Control 17: 489–93.

Guerrero, Pedro, Joe P Kerry, and Koro De. 2014. *FTIR Characterization of Protein – Polysaccharide Interactions in Extruded Blends*. Carbohydrate Polymers 111: 598–605.

Guo, Xiaobing, Xiaoming Guo, Hecheng Meng, Xiaowei Chen, Qiaohui Zeng and Shujuan Yu. 2019. *International Journal of Biological Macromolecules In Flucens of Different Pectins on the Emulsifying Performance of Conjugates Formed between Pectin and Whey Protein Isolate*. International Journal of Biological Macromolecules 123: 246–54.

Jambrak, Anet Režek, Timothy J. Mason, Vesna Lelas, Larysa Paniwnyk, and Zoran Herceg. 2014. “*Effect of Ultrasound Treatment on Particle Size and Molecular Weight of Whey Proteins*”. Journal of Food Engineering 121: 15–23.

Janser, Ruann, Maria Aliciane Fontenele Domingues, André Oharac, Paula Kiyomi Okurod, Jessika Gonçalves dos Santosa, Ramon Peres Brexóá, and Hélia Harumi

- Satoa. 2017. *Whey Protein as a Key Component in Food Systems : Physicochemical Properties , Production Technologies and Applications*. Food Structure 14: 17–29.
- Jime, Laura, Mar Villamiel, and Rosina Lo. 2007. ARTICLE IN PRESS *Glycosylation of Individual Whey Proteins by Maillard Reaction Using Dextran of Different Molecular Mass*. Food Hydrocolloids 21: 433–43.
- Karseno, Erminawati, Tri Yanto, Setyowati, R. and Haryanti, P. 2017. *Effect of PH and Temperature on Browning Intensity of Coconut Sugar and Its Antioxidant Activity*. Food Research 2 (1): 32 - 38
- Kutzli, Ines, Monika Gibis, Stefan K Baier, and Jochen Weiss. 2018. *Functional Structure / Activity Relationships Formation of Whey Protein Isolate ( WPI ) - Maltodextrin Conjugates in Fibers Produced by Needleless Electrospinning*. Journal of Agricultural and Food Chemistry 66(39): 10283–10291.
- Lam, Ricky S H, and Michael T Nickerson. 2013. *Food Proteins : A Review on Their Emulsifying Properties Using a Structure – Function Approach*. Food chemistry 141(2): 975–84.
- Lam, Ricky S H, and Michael T Nickerson. 2015. *The Effect of PH and Temperature Pre-Treatments on the Structure , Surface Characteristics and Emulsifying Properties of Alpha-Lactalbumin*. Food chemistry 173: 163–70.
- Li, Yue, Fang Zhong, Wei Ji, Wallace Yokoyama, Charles F. Shoemaker, Song Zhu, and Wenshui Xia. 2013. *Food Hydrocolloids Functional Properties of Maillard Reaction Products of Rice Protein Hydrolysates with Mono- , Oligo- and Polysaccharides*. Food hydrocolloids 30(1): 53–60.
- Liu, Fuguo, Cuicui Ma, David Julian, and Yanxiang Gao. 2016. *Development of Polyphenol-Protein-Polysaccharide Ternary Complexes as Emulsi Fi Ers for Nutraceutical Emulsions : Impact on Formation , Stability , and Bioaccessibility of  $\beta$ -Carotene Emulsions*. Food hydrocolloids 61: 578–88.
- Liu, Jianhua, Qiaomei Ru, and Yuting Ding. 2012. *Glycation a Promising Method for Food Protein Modi Fi Cation : Physicochemical Properties and Structure , a Review*. FRIN 49(1): 170–83.

- Malec, L S, A S Pereyra Gonzales, G B Naranjo, and M S Vigo. 2002. *Influence of Water Activity and Storage Temperature on Lysine Availability of a Milk like System.* Food Research International 35:849–853.
- Martinez-Alvarenga, M.S., E.Y. Martinez-Rodriguez, L.E. Garcia-Amezquita, G.I. Olivas, P.B. Zamudio-Flores, C.H. Acosta-Muniz, and D.R. Sepulveda. 2014. *Food Hydrocolloids Effect of Maillard Reaction Conditions on the Degree of Glycation and Functional Properties of Whey Protein Isolate e Maltodextrin Conjugates.* Food Hydrocolloids 38:110-118.
- Mcclements, David Julian, Long Bai, and Cheryl Chung. 2017. *Recent Advances in the Utilization of Natural Emulsifiers to Form and Stabilize Emulsions.* Food Sci. Technol. 2017. 8:10.1–10.32.
- Mcclements, David Julian, and Cansu Ekin Gumus. 2016. *Colloidal Particles : Molecular and Physicochemical Basis of Functional Performance.* Advances in Colloid and Interface Science 234: 3–26.
- Mcclements, David Julian, and Seid Mahdi. 2018. *Improving Emulsion Formation , Stability and Performance Using Mixed Emulsi Fi Ers : A Review.* Advances in Colloid and Interface Science 251: 55–79.
- Muhoza, Bertrand et al. 2017. *Time Effect on Coenzyme Q 10 Loading and Stability of Micelles Based on Glycosylated Casein via Maillard Reaction.* Food Hydrocolloids 72: 271–80.
- Mulcahy, Eve M, Daniel M Mulvihill, and James A O Mahony. 2016. *Physicochemical Properties of Whey Protein Conjugated with Starch Hydrolysis Products of Different Dextrose Equivalent Values.* International Dairy Journal 53: 20–28.
- Nascimento, Georgia, Fernanda F. Simas-Tosin, Marcello Iacomini, Philip Albert James Gorin, and Lucimara M.C. Cordeiro. 2016. *Rheological Behavior of High Methoxyl Pectin from the Pulp of Tamarillo Fruit ( Solanum Betaceum ).* Carbohydrate Polymers 139: 125–30.
- Neckebroeck, B, S.H.E. Verkempinck , J. Van Audenhove , T. Bernaerts , H. de Wilde d'Estmael , M.E. Hendrickx , and A.M. Van Loey. 2021. *Structural and Emulsion Stabilizing Properties of Pectin Rich Extracts Obtained from Different Botanical*

Sources. Food Research International 141: 110087.

- Ngouemazong, Eugénie D. Stefanie Christiaens, Avi Shpigelman, Ann Van Loey, and Marc Hendrickx. 2015. *The Emulsifying and Emulsion-Stabilizing Properties of Pectin : A Review*. Comprehensive Reviews in Food Science and Food Safety 14: 705–18.
- Nooshkam, Majid, and Ashkan Madadlou. 2016. *Maillard Conjugation of Lactulose with Potentially Bioactive Peptides*. Food Chemistry 192: 831–36.
- Olivas, G I, and D R Sepulveda. 2014. *Food Hydrocolloids Effect of Maillard Reaction Conditions on the Degree of Glycation and Functional Properties of Whey Protein Isolate e Maltodextrin Conjugates*. Food hydrocolloids 38: 110–18.
- Oliver, Christine M. 2011. *Insight into the Glycation of Milk Proteins : An ESI- and MALDI-MS Perspective ( Review )*. FoodScience and Nutrition 51:410–431
- Ozturk, Bengu, Sanem Argin, Mustafa Ozilgen, and David Julian. 2015. *Formation and Stabilization of Nanoemulsion-Based Vitamin E Delivery Systems Using Natural Biopolymers : Whey Protein Isolate and Gum Arabic*. Food chemistry 188: 256–63.
- Pan and Melton. 2007. *Nonenzymatic Browning of Lactose and Caseinate during Dry Heating at Different Relative Humidities*. J. Agric. Food Chem. 2007, 55, 10036–10042
- Park, Keun-young, Do-yeong Kim, and Weon-sun Shin. 2015. *Roles of Chondroitin Sulfate in Oil-in-Water Emulsions Formulated Using Bovine Serum Albumin*. Food Sci. Biotechnol. 24(5): 1583-1589.
- Phisut, N, and B Jiraporn. 2013. *Characteristics and Antioxidant Activity of Maillard Reaction Products Derived from Chitosan-Sugar Solution*. IFJR 20(3): 1077–85.
- Qi, Phoebe X, Yingping Xiao, and Edward D Wickham. 2017. *Food Hydrocolloids Changes in Physical , Chemical and Functional Properties of Whey Protein Isolate ( WPI ) and Sugar Beet Pectin ( SBP ) Conjugates Formed by Controlled Dry-Heating*. Food hydrocolloids 69: 86–96.
- Schmidt, U S, V L Pietsch, et al. 2015. “AC SC.” *Food Hydrocolloids*.
- Schmidt, U S, K Schmidt, T.Kurz, H.-U. Endreß, and H.P. Schuchmann. 2015. *Food*

*Hydrocolloids Pectins of Different Origin and Their Performance in Forming and Stabilizing Oil-in-Water-Emulsions*. Food hydrocolloids 46: 59–66.

Schmidt, U S., V.L. Pietsch, C. Rentschler, T. Kurz, and H.-U. Endreß. 2016. *Food Hydrocolloids Influence of the Degree of Esterification on the Emulsifying Performance of Conjugates Formed between Whey Protein Isolate and Citrus Pectin*. Food hydrocolloids 56: 1–8.

Schmidt, U S, L Schütz, and H P Schuchmann. 2017. *Food Hydrocolloids Interfacial and Emulsifying Properties of Citrus Pectin : Interaction of PH, Ionic Strength and Degree of Esterification*. Food hydrocolloids 62: 288–98.

Setiowati, Arima Diah, Serveh Saeedi, Wahyu Wijaya, and Paul Van Der Meeren. 2017a. *Food Hydrocolloids Improved Heat Stability of Whey Protein Isolate Stabilized Emulsions via Dry Heat Treatment of WPI and Low Methoxyl Pectin : Effect of Pectin Concentration, PH, and Ionic Strength*. Food hydrocolloids 63: 716–26.

Setiowati, Arima Diah, Serveh Saeedi, Wahyu Wijaya, and Paul Van der Meeren. 2017b. *Improved Heat Stability of Whey Protein Isolate Stabilized Emulsions via Dry Heat Treatment of WPI and Low Methoxyl Pectin : Effect of Pectin Concentration, PH, and Ionic Strength*. Food Hydrocolloids Improved Heat Stability of Whey Protein Isolate Stabilized Emulsions via Dry Heat Treatment of WPI and Low Methoxyl Pectin : Effect of Pectin Concentration, PH, and Ionic Strength. Food hydrocolloids 63: 716–26.

Silván, Jose M, Shima H. Assar, Chou Srey, M. Dolores del Castillo, and Jennifer M. Ames. 2011. *Control of the Maillard Reaction by Ferulic Acid*. Food Chemistry 128: 208–13.

Strahan, Gary D, and Arland T Hotchkiss. 2012. *Formation of Corn Fiber Gum – Milk Protein Conjugates and Their Molecular Characterization*. Food Hydrocolloids 26:326-333.

Sun, Changhui, Sundaram Gunasekaran, and Mark P Richards. 2007. *ARTICLE IN PRESS Effect of Xanthan Gum on Physicochemical Properties of Whey Protein Isolate Stabilized Oil-in-Water Emulsions*. Food Hydrocolloids 21: 555–64.

- Tcholakova, Slavka, Nikolai D Denkov, Ivan B Ivanov, and Bruce Campbell. 2006. *Coalescence Stability of Emulsions Containing Globular Milk Proteins*. *Advances in Colloid and Interface Science* 123–126:259–293
- Wang, Wen-duo, Chao Li, Zhang Bin, Qiang Huang, Li-Jun You, Chun Chen, Xiong Fu, and Rui Hai Liu. 2020. *Physicochemical Properties and Bioactivity of Whey Protein Isolate-Inulin Conjugates Obtained by Maillard Reaction*. *International Journal of Biological Macromolecules* 150: 326–35.
- Wang, Zhongjiang, Feifei Han, Xiaonan Sui, Baokun Qi, Yong Yang, Hui Zhang, Rui Wang, Yang Lia and Lianzhou Jiang. 2015. *Effect of Ultrasound Treatment on the Wet Heating Maillard Reaction between Mung Bean [ Vigna Radiate ( L .)] Protein Isolates and Glucose and on Structural and Physico-Chemical Properties of Conjugates.* *J.Sci. Food Agric* 96: 1532–1540
- Wen-qiong, Wang, Bao Yi-hong, and Chen Ying. 2013. *Characteristics and Antioxidant Activity of Water-Soluble Maillard Reaction Products from Interactions in a Whey Protein Isolate and Sugars System*. *Food Chemistry* 139(1–4): 355–61.
- Weng, Jingyi, Junru Qi, Shouwei Yin, Jinmei Wang, Jian Guo, Jilu Feng, Qianru Liu, Jianhua Zhu, and Xiaoquan Yang. 2016. *Fractionation and Characterization of Soy  $\beta$ -Conglycinin – Dextran Conjugates via Macromolecular Crowding Environment and Dry Heating*. *Food Chemistry* 196: 1264–71.
- Wierenga, Peter A, Maarten R Egmond, Alphons G J Voragen, and Harmen H J De Jongh. 2006. *The Adsorption and Unfolding Kinetics Determines the Folding State of Proteins at the Air – Water Interface and Thereby the Equation of State*. *Journal of Colloid and Interface Science* 299: 850–57.
- Xi, Chunyu, Naixin Kang, Changhui Zhao, Yujia Liu, Zhengwei Sun, and Tiehua Zhang. 2020. *Food Bioscience Effects of PH and Different Sugars on the Structures and Emulsion Properties of Whey Protein Isolate-Sugar Conjugates*. *Food Bioscience* 33: 100507
- Xu, Duoxia, Xiaoya Wang, Junping Jiang, Fang Yuan, and Yanxiang Gao. 2012.

*Impact of Whey Protein e Beet Pectin Conjugation on the Physicochemical Stability of  $\beta$ -Carotene Emulsions.* Food hydrocolloids 28(2): 258–66.

Xu, Duoxia, Fang Yuan, Yanxiang Gao, Atikorn Panya, David Julian McClements, and Eric Andrew Decker. 2014. *Influence of Whey Protein – Beet Pectin Conjugate on the Properties and Digestibility of  $\beta$ -Carotene Emulsion during in Vitro Digestion.* Food Chemistry 156: 374–79.

Xu , Duoxia, Yameng Qi, Xu Wang, Xin Li, Shaojia Wang, Yanping Cao, Chengtao Wang, Baoguo Sun, Eric Decker, and Atikorn Panya. 2016. *Influence of flaxseed gum on the microrheological property and physicochemical stability of whey protein stabilized  $\beta$ -carotene emulsion.* Food & Function

Yapo, Beda M. 2011. *Pectic Substances : From Simple Pectic Polysaccharides to Complex Pectins — A New Hypothetical Model.* Carbohydrate Polymers 86(2): 373–85.

Yin, Siew, Wee Sim, David James, and Xian Jun. 2017. *Pectin as a Rheology Modifier : Origin , Structure , Commercial Production and Rheology.* Carbohydrate Polymers 161: 118–39.

Yuan, Yuan, and Yanxiang Gao. 2008. *Characterization and Stability Evaluation of  $\beta$ -Carotene Nanoemulsions Prepared by High Pressure Homogenization under Various Emulsifying Conditions.* Food Research International 41: 61–68.

Zhai, Jia liDay, Li, Mare-isabel Aguilar, and Tim J Wooster. 2013. *Current Opinion in Colloid & Interface Science Protein Folding at Emulsion Oil / Water Interfaces.* Current Opinion in Colloid & Interface Science 18(4): 257–71.

Zhang, Haixia, Qi Fana, Di Lia, Xing Chena, and Li Liang. 2019. *Impact of Gum Arabic on The Partition and Stability of Resveratrol in Sunflower Oil Emulsions Stabilized by Whey Protein Isolate.* Colloids and Surfaces B: Biointerfaces 181: 749–755.

Zhang.Y and Zhang.Y. 2007. *Formation and Reduction of Acrylamide in Maillard Reaction : A Review Based on the Current State of Formation and Reduction of Acrylamide in Maillard Reaction : A Review Based on the Current State.* Food Science and Nutrition 47:521–542

Zhu, Fan. 2019. *Trends in Food Science & Technology Starch Based Pickering*



UNIVERSITAS  
GADJAH MADA

**EFFECT OF TEMPERATURE AND RH ON THE PHYSICOCHEMICAL PROPERTIES OF WHEY PROTEIN ISOLATE AND COMMERCIAL CITRUS PECTIN CONJUGATES: APPLICATION AS AN EMULSIFIER IN  $\beta$ -CAROTENE O/W EMULSION**

SONIA DORA FEBRI ESA, Prof. Dr. Ir. Chusnul Hidayat ; Dr. Arima Diah Setiowati, S.T.P., M. Sc.

Universitas Gadjah Mada, 2021 | Diunduh dari <http://etd.repository.ugm.ac.id/>

*Emulsions : Fabrication , Properties , and Applications.* Trends in Food Science & Technology 85: 129–37.