



## REFERENCES

- Abudunia, A.M., Marmouzi, I., Faouzi, M.E.A., Ramli, Y., Taoufik, J., El Madani, N., Essassi, E.M., Salama, A., Khedid, K., Ansar, M., Ibrahim, A., 2017. Activité anti-candidose, antibactérienne, cytotoxique et antioxydante des fleurs de *Calendula arvensis*. *J. Mycol. Med.* 27, 90–97. <https://doi.org/10.1016/j.mycmed.2016.11.002>
- Adjé, F., Lozano, Y.F., Lozano, P., Adima, A., Chemat, F., Gaydou, E.M., 2010. Optimization of anthocyanin, flavonol and phenolic acid extractions from *Delonix regia* tree flowers using ultrasound-assisted water extraction. *Ind. Crops Prod.* 32, 439–444. <https://doi.org/10.1016/j.indcrop.2010.06.011>
- Ak, G., Zengin, G., Sinan, K.I., Mahomoodally, M.F., Picot-Allain, M.C.N., Cakir, O., Bensari, S., Yilmaz, M.A., Gallo, M., Montesano, D., 2020. A comparative bio-evaluation and chemical profiles of *Calendula officinalis* L. extracts prepared via different extraction techniques. *Appl. Sci.* 10. <https://doi.org/10.3390/app10175920>
- Al-hashimi, A.G., 2012. Antioxidant and antibacterial activities of *Hibiscus sabdariffa* L. extracts. *African J. Food Sci.* 6, 506–511. <https://doi.org/10.5897/AJFS12.099>
- Alarcón-Alonso, J., Zamilpa, A., Aguilar, F.A., Herrera-Ruiz, M., Tortoriello, J., Jimenez-Ferrer, E., 2012. Pharmacological characterization of the diuretic effect of *Hibiscus sabdariffa* Linn (Malvaceae) extract. *J. Ethnopharmacol.* 139, 751–756. <https://doi.org/10.1016/j.jep.2011.12.005>
- Alhakmani, F., Kumar, S., Khan, S.A., 2013. Estimation of total phenolic content, in-vitro antioxidant and anti-inflammatory activity of flowers of *Moringa oleifera*. *Asian Pac. J. Trop. Biomed.* 3, 623–627. [https://doi.org/10.1016/S2221-1691\(13\)60126-4](https://doi.org/10.1016/S2221-1691(13)60126-4)
- Aliyazicioglu, R., Demir, S., Badem, M., Sener, S.O., Korkmaz, N., Demir, E.A., Ozgen, U., Karaoglu, S.A., Aliyazicioglu, Y., 2017. Antioxidant, antigenotoxic, antimicrobial activities and phytochemical analysis of *Dianthus carmelitarum*. *Rec. Nat. Prod.* 11, 270–284.
- An, H.J., Kim, I.T., Park, H.J., Kim, H.M., Choi, J.H., Lee, K.T., 2011. Tormentonic acid, a triterpenoid saponin, isolated from *Rosa rugosa*, inhibited LPS-induced iNOS, COX-2, and TNF- $\alpha$  expression through inactivation of the nuclear factor- $\kappa$ b pathway in RAW 264.7 macrophages. *Int. Immunopharmacol.* 11, 504–510. <https://doi.org/10.1016/j.intimp.2011.01.002>
- Ang, L.Z.P., Hashim, R., Sulaiman, S.F., Coulibaly, A.Y., Sulaiman, O., Kawamura, F., Salleh, K.M., 2015. In vitro antioxidant and antidiabetic activities of *Gluta torquata*. *Ind. Crops Prod.* 76, 755–760. <https://doi.org/10.1016/j.indcrop.2015.07.065>
- Anokwuru, C.P., Esiaba, I., Ajbaye, O., Adesuyi, A.O., 2011. Polyphenolic Content and Antioxidant Activity of *Hibiscus sabdariffa* Calyx. *Res. J. Med. Plant* 5, 557–566. <https://doi.org/10.3923/rjmp.2011.557.566>
- Anzian, A., Rashidah, S., Saari, N., Che Wan Sapawi, C.W.N.S., Meor Hussin, A.S., 2017. Chemical composition and antioxidant activity of Torch Ginger (*Etlingera elatior*) flower extract. *Food Appl. Biosci. J.* 5, 32–49.
- Awe, E.O., J.M., M., Adeloje, O. a., Banjoko, S.O., 2009. Membrane stabilizing



- activity of *Russelia equisetiformis*, Schlecht & Chan. *J. Nat. Prod.* 2, 3–9.
- Baessa, M., Rodrigues, M.J., Pereira, C., Santos, T., da Rosa Neng, N., Nogueira, J.M.F., Barreira, L., Varela, J., Ahmed, H., Asif, S., Boukhari, S.A., Kayani, W.K., Ahmad, K.S., Zengin, G., Mollica, A., Custódio, L., 2019. A comparative study of the in vitro enzyme inhibitory and antioxidant activities of *Butea monosperma* (Lam.) Taub. and *Sesbania grandiflora* (L.) Poiret from Pakistan: New sources of natural products for public health problems. *South African J. Bot.* 120, 146–156. <https://doi.org/10.1016/j.sajb.2018.04.006>
- Baydar, N.G., Baydar, H., 2013. Phenolic compounds, antiradical activity and antioxidant capacity of oil-bearing rose (*Rosa damascena* Mill.) extracts. *Ind. Crops Prod.* 41, 375–380. <https://doi.org/10.1016/j.indcrop.2012.04.045>
- Begum, Y.A., Deka, S.C., 2019. Chemical profiling and functional properties of dietary fibre rich inner and outer bracts of culinary banana flower. *J. Food Sci. Technol.* 56, 5298–5308. <https://doi.org/10.1007/s13197-019-04000-4>
- Beltrán-Debón, R., Alonso-Villaverde, C., Aragonès, G., Rodríguez-Medina, I., Rull, A., Micol, V., Segura-Carretero, A., Fernández-Gutiérrez, A., Camps, J., Joven, J., 2010. The aqueous extract of *Hibiscus sabdariffa* calices modulates the production of monocyte chemoattractant protein-1 in humans. *Phytomedicine* 17, 186–191. <https://doi.org/10.1016/j.phymed.2009.08.006>
- Besbas, S., Mouffouk, S., Haba, H., Marcourt, L., Wolfender, J.L., Benkhaled, M., 2020. Chemical composition, antioxidant, antihemolytic and anti-inflammatory activities of *Ononis mitissima* L. *Phytochem. Lett.* 37, 63–69. <https://doi.org/10.1016/j.phytol.2020.04.002>
- Bhaskar, J.J., Shobha, M.S., Sambaiah, K., Salimath, P. V., 2011. Beneficial effects of banana (*Musa* sp. var. elakki bale) flower and pseudostem on hyperglycemia and advanced glycation end-products (AGEs) in streptozotocin-induced diabetic rats. *J. Physiol. Biochem.* 67, 415–425. <https://doi.org/10.1007/s13105-011-0091-5>
- Braun, N.A., Kohlenberg, B., Sim, S., Meier, M., Hammerschmidt, F.J., 2009. *Jasminum flexile* flower absolute from India - A detailed comparison with three other jasmine absolutes. *Nat. Prod. Commun.* 4, 1239–1250. <https://doi.org/10.1177/1934578X0900400917>
- Bray, F., Ferlay, J., Soerjomataram, I., Siegel, R.L., Torre, L.A., Jemal, A., 2018. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA. Cancer J. Clin.* 68, 394–424. <https://doi.org/10.3322/caac.21492>
- Brglez Mojzer, E., Knez Hrnčič, M., Škerget, M., Knez, Ž., Bren, U., 2016. Polyphenols: Extraction Methods, Antioxidative Action, Bioavailability and Anticarcinogenic Effects. *Molecules* 21. <https://doi.org/10.3390/molecules21070901>
- Castro, L., Freeman, B.A., 2001. Reactive oxygen species in human health and disease. *Nutrition.* [https://doi.org/10.1016/S0899-9007\(00\)00570-0](https://doi.org/10.1016/S0899-9007(00)00570-0)
- Cavaiuolo, M., Cocetta, G., Ferrante, A., 2013. The antioxidants changes in ornamental flowers during development and senescence. *Antioxidants* 2, 132–155. <https://doi.org/10.3390/antiox2030132>
- Chaichian, Y., Chohan, S., Becker, M.A., 2014. Long-term management of gout:



- Nonpharmacologic and pharmacologic therapies. *Rheum. Dis. Clin. North Am.* 40, 357–374. <https://doi.org/10.1016/j.rdc.2014.01.012>
- Chaudhary, K., Malhotra, K., Sowers, J., Aror, A., 2013. Uric acid-key ingredient in the recipe for cardiorenal metabolic syndrome. *CardioRenal Med.* 3, 208–220. <https://doi.org/10.1159/000355405>
- China, R., Mukherjee, S., Sen, S., Bose, S., Datta, S., Koley, H., Ghosh, S., Dhar, P., 2012. Antimicrobial activity of *Sesbania grandiflora* flower polyphenol extracts on some pathogenic bacteria and growth stimulatory effect on the probiotic organism *Lactobacillus acidophilus*. *Microbiol. Res.* 167, 500–506. <https://doi.org/10.1016/j.micres.2012.04.003>
- Chithra, M.A., Ijnu, T.P., Kharkwal, H., Sharma, R.K., Janardhanan, K.K., Pushpangadan, P., George, V., 2020. *Cocos nucifera* L. Inflorescence extract: An effective hepatoprotective agent. *Indian J. Tradit. Knowl.* 19, 128–136.
- Chong, F.C., Gwee, X.F., 2015. Ultrasonic extraction of anthocyanin from *Clitoria ternatea* flowers using response surface methodology. *Nat. Prod. Res.* 29, 1485–1487. <https://doi.org/10.1080/14786419.2015.1027892>
- Chu, Y.F., Sun, J., Wu, X., Liu, R.H., 2002. Antioxidant and antiproliferative activities of common vegetables. *J. Agric. Food Chem.* 50, 6910–6916. <https://doi.org/10.1021/jf020665f>
- Costa, R.M., Magalhães, A.S., Pereira, J.A., Andrade, P.B., Valentão, P., Carvalho, M., Silva, B.M., 2009. Evaluation of free radical-scavenging and antihemolytic activities of quince (*Cydonia oblonga*) leaf: A comparative study with green tea (*Camellia sinensis*). *Food Chem. Toxicol.* 47, 860–865. <https://doi.org/10.1016/j.fct.2009.01.019>
- Cristóvão, M.B., Janssens, R., Yadav, A., Pandey, S., Luis, P., Van der Bruggen, B., Dubey, K.K., Mandal, M.K., Crespo, J.G., Pereira, V.J., 2020. Predicted concentrations of anticancer drugs in the aquatic environment: What should we monitor and where should we treat? *J. Hazard. Mater.* 392. <https://doi.org/10.1016/j.jhazmat.2020.122330>
- Cruceriu, D., Diaconeasa, Z., Socaci, S., Socaciu, C., Rakosy-Tican, E., Balacescu, O., 2020. Biochemical profile, selective cytotoxicity and molecular effects of *Calendula officinalis* extracts on breast cancer cell lines. *Not. Bot. Horti Agrobot. Cluj-Napoca* 48, 24–39. <https://doi.org/10.15835/nbha4811178>
- Das, B., De, A., Das, M., Das, S., Samanta, A., 2017. A new exploration of *Dregea volubilis* flowers: Focusing on antioxidant and antidiabetic properties. *South African J. Bot.* 109, 16–24. <https://doi.org/10.1016/j.sajb.2016.12.003>
- Degirmenci, H., Erkurt, H., 2020. Chemical profile and antioxidant potency of *Citrus aurantium* L. flower extracts with antibacterial effect against foodborne pathogens in rice pudding. *Lwt* 126, 109273. <https://doi.org/10.1016/j.lwt.2020.109273>
- Delgado-Marín, L., Sánchez-Borzone, M., García, D.A., 2017. Neuroprotective effects of gabaergic phenols correlated with their pharmacological and antioxidant properties. *Life Sci.* 175, 11–15. <https://doi.org/10.1016/J.LFS.2017.03.005>
- Devi, K.P., Malar, D.S., Nabavi, S.F., Surenda, A., Xiao, J., Nabavi, S.M., Daglia, M., 2015. Kaempferol and inflammation: From chemistry to medicine.



- Pharmacol. Res. <https://doi.org/10.1016/j.phrs.2015.05.002>
- Dwivedi, M.K., Sonter, S., Mishra, S., Patel, D.K., Singh, P.K., 2020. Antioxidant, antibacterial activity, and phytochemical characterization of *Carica papaya* flowers. *Beni-Suef Univ. J. Basic Appl. Sci.* 9. <https://doi.org/10.1186/s43088-020-00048-w>
- Escher, G.B., Marques, M.B., do Carmo, M.A.V., Azevedo, L., Furtado, M.M., Sant'Ana, A.S., da Silva, M.C., Genovese, M.I., Wen, M., Zhang, L., Oh, W.Y., Shahidi, F., Rosso, N.D., Granato, D., 2019. *Clitoria ternatea* L. petal bioactive compounds display antioxidant, antihemolytic and antihypertensive effects, inhibit  $\alpha$ -amylase and  $\alpha$ -glucosidase activities and reduce human LDL cholesterol and DNA induced oxidation. *Food Res. Int.* 128, 108763. <https://doi.org/10.1016/j.foodres.2019.108763>
- Fachel, F.N.S., Schuh, R.S., Veras, K.S., Bassani, V.L., Koester, L.S., Henriques, A.T., Braganhol, E., Teixeira, H.F., 2019. An overview of the neuroprotective potential of rosmarinic acid and its association with nanotechnology-based delivery systems: A novel approach to treating neurodegenerative disorders. *Neurochem. Int.* 122, 47–58. <https://doi.org/10.1016/J.NEUINT.2018.11.003>
- Fattouch, S., Caboni, P., Coroneo, V., Tuberoso, C.I.G., Angioni, A., Dessi, S., Marzouki, N., Cabras, P., 2007. Antimicrobial activity of tunisian quince (*Cydonia oblonga* Miller) pulp and peel polyphenols extracts. *J. Agric. Food Chem.* 55, 963–969. <https://doi.org/10.1021/jf062614e>
- Feitosa, V.A., de Almeida, V.C., Malheiros, B., de Castro, R.D., Barbosa, L.R.S., Cerize, N.N.P., Rangel-Yagui, C. de O., 2019. Polymeric micelles of pluronic F127 reduce hemolytic potential of amphiphilic drugs. *Colloids Surfaces B Biointerfaces* 180, 177–185. <https://doi.org/10.1016/j.colsurfb.2019.04.045>
- Fernandes, L., Casal, S., Pereira, J.A., Saraiva, J.A., Ramalhosa, E., 2017a. Edible flowers: A review of the nutritional, antioxidant, antimicrobial properties and effects on human health. *J. Food Compos. Anal.* 60, 38–50. <https://doi.org/10.1016/j.jfca.2017.03.017>
- Fernandes, L., Casal, S., Pereira, J.A., Saraiva, J.A., Ramalhosa, E., 2017b. Edible flowers: A review of the nutritional, antioxidant, antimicrobial properties and effects on human health. *J. Food Compos. Anal.* 60, 38–50. <https://doi.org/10.1016/j.jfca.2017.03.017>
- Fernandes, L., Casal, S.I.P., Pereira, J.A., Ramalhosa, E., Saraiva, J.A., 2017c. Optimization of high pressure bioactive compounds extraction from pansies (*Viola × wittrockiana*) by response surface methodology. *High Press. Res.* 37, 415–429. <https://doi.org/10.1080/08957959.2017.1347925>
- Fernández-Arroyo, S., Rodríguez-Medina, I.C., Beltrán-Debón, R., Pasini, F., Joven, J., Micol, V., Segura-Carretero, A., Fernández-Gutiérrez, A., 2011. Quantification of the polyphenolic fraction and in vitro antioxidant and in vivo anti-hyperlipemic activities of *Hibiscus sabdariffa* aqueous extract. *Food Res. Int.* 44, 1490–1495. <https://doi.org/10.1016/j.foodres.2011.03.040>
- Figueiredo-González, M., Reboredo-Rodríguez, P., González-Barreiro, C., Simal-Gándara, J., Valentão, P., Carrasco-Pancorbo, A., Andrade, P.B., Cancho-Grande, B., 2018. Evaluation of the neuroprotective and antidiabetic potential of phenol-rich extracts from virgin olive oils by in vitro assays. *Food Res. Int.*



- 106, 558–567. <https://doi.org/10.1016/J.FOODRES.2018.01.026>
- Fowler, M.J., 2011. Microvascular and macrovascular complications of diabetes. *Clin. Diabetes* 29, 116–122. <https://doi.org/10.2337/diaclin.29.3.116>
- Gawlik-Dziki, U., Jeżyna, M., Świeca, M., Dziki, D., Baraniak, B., Czyż, J., 2012. Effect of bioaccessibility of phenolic compounds on in vitro anticancer activity of broccoli sprouts. *Food Res. Int.* 49, 469–476. <https://doi.org/10.1016/J.FOODRES.2012.08.010>
- Georgiev, V., Ananga, A., Tsoлова, V., 2014. Recent advances and uses of grape flavonoids as nutraceuticals. *Nutrients* 6, 391–415. <https://doi.org/10.3390/nu6010391>
- Ghasemzadeh, A., Jaafar, H.Z.E., Rahmat, A., Ashkani, S., 2015. Secondary metabolites constituents and antioxidant, anticancer and antibacterial activities of *Etlingera elatior* (Jack) R.M.Sm grown in different locations of Malaysia. *BMC Complement. Altern. Med.* 15, 1–10. <https://doi.org/10.1186/s12906-015-0838-6>
- González-Barrio, R., Periago, M.J., Luna-Recio, C., Garcia-Alonso, F.J., Navarro-González, I., 2018. Chemical composition of the edible flowers, pansy (*Viola wittrockiana*) and snapdragon (*Antirrhinum majus*) as new sources of bioactive compounds. *Food Chem.* 252, 373–380. <https://doi.org/10.1016/j.foodchem.2018.01.102>
- Gradinaru, G., Biliaderis, C.G., Kallithraka, S., Kefalas, P., Garcia-Viguera, C., 2003. Thermal stability of *Hibiscus sabdariffa* L. anthocyanins in solution and in solid state: Effects of copigmentation and glass transition. *Food Chem.* 83, 423–436. [https://doi.org/10.1016/S0308-8146\(03\)00125-0](https://doi.org/10.1016/S0308-8146(03)00125-0)
- Harnett, J.J., Roubert, V., Dolo, C., Charnet, C., Spinnewyn, B., Cornet, S., Rolland, A., Marin, J.-G., Bigg, D., Chabrier, P.-E., 2004. Phenolic thiazoles as novel orally-active neuroprotective agents. *Bioorg. Med. Chem. Lett.* 14, 157–160. <https://doi.org/10.1016/J.BMCL.2003.09.077>
- Hashemi, S.M.B., Amininezhad, R., Shirzadinezhad, E., Farahani, M., Yousefabad, S.H.A., 2016. The Antimicrobial and Antioxidant Effects of *Citrus aurantium* L. Flowers (Bahar Narang) Extract in Traditional Yoghurt Stew during Refrigerated Storage. *J. Food Saf.* 36, 153–161. <https://doi.org/10.1111/jfs.12222>
- Ho, S.C., Hwang, L.S., Shen, Y.J., Lin, C.C., 2007. Suppressive effect of a proanthocyanidin-rich extract from longan (*Dimocarpus longan* Lour.) flowers on nitric oxide production in lps-stimulated macrophage cells. *J. Agric. Food Chem.* 55, 10664–10670. <https://doi.org/10.1021/jf0721186>
- Hong-Qi, Y., Zhi-Kun, S., Sheng-Di, C., 2012. Current advances in the treatment of Alzheimer's disease: focused on considerations targeting A $\beta$  and tau. *Transl. Neurodegener.* 1, 1–12. <https://doi.org/10.1186/2047-9158-1-21>
- Hori, T., Ouchi, M., Otani, N., Nohara, M., Morita, A., Otsuka, Y., Jutabha, P., Shibasaki, I., Matsushita, Y., Fujita, T., Fukuda, H., Anzai, N., 2018. The uricosuric effects of dihydropyridine calcium channel blockers in vivo using urate under-excretion animal models. *J. Pharmacol. Sci.* 136, 196–202. <https://doi.org/10.1016/j.jphs.2017.11.011>
- Hsieh, M.C., Shen, Y.J., Kuo, Y.H., Hwang, L.S., 2008. Antioxidative activity and



- active components of longan (*Dimocarpus longan* Lour.) flower extracts. *J. Agric. Food Chem.* 56, 7010–7016. <https://doi.org/10.1021/jf801155j>
- Iriti, M., Vitalini, S., Fico, G., Faoro, F., 2010. Neuroprotective herbs and foods from different traditional medicines and diets. *Molecules* 15, 3517–3555. <https://doi.org/10.3390/molecules15053517>
- Ismail, A., Marjan, Z.M., Foong, C.W., 2004. Total antioxidant activity and phenolic content in selected vegetables. *Food Chem.* 87, 581–586. <https://doi.org/10.1016/j.foodchem.2004.01.010>
- Jabeur, I., Pereira, E., Barros, L., Calhella, R.C., Soković, M., Oliveira, M.B.P.P., Ferreira, I.C.F.R., 2017. *Hibiscus sabdariffa* L. as a source of nutrients, bioactive compounds and colouring agents. *Food Res. Int.* 100, 717–723. <https://doi.org/10.1016/j.foodres.2017.07.073>
- Jajic, I., Sarna, T., Strzalka, K., 2015. Senescence, stress, and reactive oxygen species. *Plants*. <https://doi.org/10.3390/plants4030393>
- Jesus, F., Gonçalves, A.C., Alves, G., Silva, L.R., 2019. Exploring the phenolic profile, antioxidant, antidiabetic and anti-hemolytic potential of *Prunus avium* vegetal parts. *Food Res. Int.* 116, 600–610. <https://doi.org/10.1016/j.foodres.2018.08.079>
- Kaisoon, O., Siriamornpun, S., Weerapreeyakul, N., Meeso, N., 2011. Phenolic compounds and antioxidant activities of edible flowers from Thailand. *J. Funct. Foods* 3, 88–99. <https://doi.org/10.1016/j.jff.2011.03.002>
- Karimi, E., Oskoueian, E., Hendra, R., Oskoueian, A., Jaafar, H.Z.E., 2012. Phenolic compounds characterization and biological activities of citrus aurantium bloom. *Molecules* 17, 1203–1218. <https://doi.org/10.3390/molecules17021203>
- Khan, H., Ullah, H., Aschner, M., Cheang, W.S., Akkol, E.K., 2020. Neuroprotective effects of quercetin in Alzheimer's disease. *Biomolecules* 10. <https://doi.org/10.3390/biom10010059>
- Kim, K.S., Lee, D.S., Bae, G.S., Park, S.J., Kang, D.G., Lee, H.S., Oh, H., Kim, Y.C., 2013. The inhibition of JNK MAPK and NF- $\kappa$ B signaling by tenuifolioside A isolated from *Polygala tenuifolia* in lipopolysaccharide-induced macrophages is associated with its anti-inflammatory effect. *Eur. J. Pharmacol.* 721, 267–276. <https://doi.org/10.1016/j.ejphar.2013.09.026>
- Krolkiewicz-Renimel, I., Michel, T., Destandau, E., Reddy, M., André, P., Elfakir, C., Pichon, C., 2013. Protective effect of a *Butea monosperma* (Lam.) Taub. flowers extract against skin inflammation: Antioxidant, anti-inflammatory and matrix metalloproteinases inhibitory activities. *J. Ethnopharmacol.* 148, 537–543. <https://doi.org/10.1016/j.jep.2013.05.001>
- Kushiyama, A., Nakatsu, Y., Matsunaga, Y., Yamamotoya, T., Mori, K., Ueda, K., Inoue, Y., Sakoda, H., Fujishiro, M., Ono, H., Asano, T., 2016. Role of uric acid metabolism-related inflammation in the pathogenesis of metabolic syndrome components such as atherosclerosis and nonalcoholic steatohepatitis. *Mediators Inflamm.* 2016. <https://doi.org/10.1155/2016/8603164>
- Kutty, N.N., Mitra, A., 2019. Profiling of volatile and non-volatile metabolites in *Polianthes tuberosa* L. flowers reveals intraspecific variation among cultivars.



- Phytochemistry 162, 10–20. <https://doi.org/10.1016/j.phytochem.2019.02.006>
- Lee, Y.S., Son, E., Kim, S.H., Lee, Y.M., Kim, O.S., Kim, D.S., 2017. Synergistic Uric Acid-Lowering Effects of the Combination of *Chrysanthemum indicum* Linne Flower and *Cinnamomum cassia* (L.) J. Persl Bark Extracts. Evidence-based Complement. Altern. Med. 2017. <https://doi.org/10.1155/2017/9764843>
- Lee, Y.S., Sung, Y.Y., Yuk, H.J., Son, E., Lee, S.J., Kim, J.S., Kim, D.S., 2019. Anti-hyperuricemic effect of *Alpinia oxyphylla* seed extract by enhancing uric acid excretion in the kidney. *Phytomedicine* 62, 152975. <https://doi.org/10.1016/j.phymed.2019.152975>
- Li, A.N., Li, S., Li, H. Bin, Xu, D.P., Xu, X.R., Chen, F., 2014. Total phenolic contents and antioxidant capacities of 51 edible and wild flowers. *J. Funct. Foods* 6, 319–330. <https://doi.org/10.1016/j.jfff.2013.10.022>
- Li, M., Li, B., Hou, Y., Tian, Y., Chen, L., Liu, S., Zhang, N., Dong, J., 2019. Anti-inflammatory effects of chemical components from *Ginkgo biloba* L. male flowers on lipopolysaccharide-stimulated RAW264.7 macrophages. *Phyther. Res.* 33, 989–997. <https://doi.org/10.1002/ptr.6292>
- Li, Z., Lee, H.W., Liang, X., Liang, D., Wang, Q., Huang, D., Ong, C.N., 2018. Profiling of phenolic compounds and antioxidant activity of 12 cruciferous vegetables 23. <https://doi.org/10.3390/molecules23051139>
- Lin, H., Tu, C., Niu, Y., Li, F., Yuan, L., Li, N., Xu, A., Gao, L., Li, L., 2019. Dual actions of norathyriol as a new candidate hypouricaemic agent: uricosuric effects and xanthine oxidase inhibition. *Eur. J. Pharmacol.* 853, 371–380. <https://doi.org/10.1016/j.ejphar.2019.04.034>
- Liu, H., Ma, L., Lin, J., Cao, B., Qu, D., Luo, C., Huang, W., Han, L., Xu, H., Wu, Z., Xu, R., Zhang, D., 2020. Advances in molecular mechanisms of drugs affecting abnormal glycosylation and metastasis of breast cancer. *Pharmacol. Res.* 155, 104738. <https://doi.org/10.1016/j.phrs.2020.104738>
- Loganayaki, N., Suganya, N., Manian, S., 2012. Evaluation of edible flowers of agathi (*Sesbania grandiflora* L. Fabaceae) for in vivo anti-inflammatory and analgesic, and in vitro antioxidant potential. *Food Sci. Biotechnol.* 21, 509–517. <https://doi.org/10.1007/s10068-012-0065-6>
- Lu, B., Li, M., Yin, R., 2016a. Phytochemical Content, Health Benefits, and Toxicology of Common Edible Flowers: A Review (2000–2015). *Crit. Rev. Food Sci. Nutr.* 56, S130–S148. <https://doi.org/10.1080/10408398.2015.1078276>
- Lu, B., Li, M., Yin, R., 2016b. Phytochemical Content, Health Benefits, and Toxicology of Common Edible Flowers: A Review (2000–2015). *Crit. Rev. Food Sci. Nutr.* 56, S130–S148. <https://doi.org/10.1080/10408398.2015.1078276>
- Lucarini, M., Copetta, A., Durazzo, A., Gabrielli, P., Lombardi-Boccia, G., Lupotto, E., Santini, A., Ruffoni, B., 2020. A snapshot on food allergies: A case study on edible flowers. *Sustain.* 12, 1–24. <https://doi.org/10.3390/su12208709>
- Maciel, L.G., do Carmo, M.A.V., Azevedo, L., Dagher, H., Molognoni, L., de Almeida, M.M., Granato, D., Rosso, N.D., 2018. *Hibiscus sabdariffa* anthocyanins-rich extract: Chemical stability, in vitro antioxidant and



- antiproliferative activities. *Food Chem. Toxicol.* 113, 187–197. <https://doi.org/10.1016/j.fct.2018.01.053>
- Maggi, M.A., Bisti, S., Picco, C., 2020. Saffron: Chemical Composition and Neuroprotective Activity. *Molecules* 25, 5618. <https://doi.org/10.3390/molecules25235618>
- Mahn, A., Reyes, A., 2012. An overview of health-promoting compounds of broccoli (*Brassica oleracea* var. *italica*) and the effect of processing. *Food Sci. Technol. Int.* 18, 503–514. <https://doi.org/10.1177/1082013211433073>
- Maiuolo, J., Oppedisano, F., Gratteri, S., Muscoli, C., Mollace, V., 2016. Regulation of uric acid metabolism and excretion. *Int. J. Cardiol.* 213, 8–14. <https://doi.org/10.1016/j.ijcard.2015.08.109>
- Manach, C., Mazur, A., Scalbert, A., 2005. Polyphenols and prevention of cardiovascular diseases. *Curr. Opin. Lipidol.* 16, 77–84. <https://doi.org/10.1097/00041433-200502000-00013>
- Mao, L.C., Pan, X., Que, F., Fang, X.H., 2006. Antioxidant properties of water and ethanol extracts from hot air-dried and freeze-dried daylily flowers. *Eur. Food Res. Technol.* 222, 236–241. <https://doi.org/10.1007/s00217-005-0007-0>
- Matyjaszczyk, E., Śmiechowska, M., 2019. Edible flowers. Benefits and risks pertaining to their consumption. *Trends Food Sci. Technol.* 91, 670–674. <https://doi.org/10.1016/j.tifs.2019.07.017>
- Mendes, L., De Freitas, V., Baptista, P., Carvalho, M., 2011. Comparative antihemolytic and radical scavenging activities of strawberry tree (*Arbutus unedo* L.) leaf and fruit. *Food Chem. Toxicol.* 49, 2285–2291. <https://doi.org/10.1016/j.fct.2011.06.028>
- Mlcek, J., Rop, O., 2011. Fresh edible flowers of ornamental plants - A new source of nutraceutical foods. *Trends Food Sci. Technol.* 22, 561–569. <https://doi.org/10.1016/j.tifs.2011.04.006>
- Moliner, C., Barros, L., Dias, M.I., Reigada, I., Ferreira, I.C.F.R., López, V., Langa, E., Rincón, C.G., 2019. *Viola cornuta* and *Viola x wittrockiana*: Phenolic compounds, antioxidant and neuroprotective activities on *Caenorhabditis elegans*. *J. Food Drug Anal.* 27, 849–859. <https://doi.org/10.1016/J.JFDA.2019.05.005>
- Morais, S.G.G., da Silva Campelo Borges, G., dos Santos Lima, M., Martín-Belloso, O., Magnani, M., 2019. Effects of probiotics on the content and bioaccessibility of phenolic compounds in red pitaya pulp. *Food Res. Int.* 126, 108681. <https://doi.org/10.1016/j.foodres.2019.108681>
- Nahar, P.P., Driscoll, M. V., Li, L., Slitt, A.L., Seeram, N.P., 2014. Phenolic mediated anti-inflammatory properties of a maple syrup extract in RAW 264.7 murine macrophages. *J. Funct. Foods* 6, 126–136. <https://doi.org/10.1016/j.jff.2013.09.026>
- Navarro-González, I., González-Barrio, R., García-Valverde, V., Bautista-Ortín, A.B., Periago, M.J., 2015. Nutritional composition and antioxidant capacity in edible flowers: Characterisation of phenolic compounds by HPLC-DAD-ESI/MSn. *Int. J. Mol. Sci.* 16, 805–822. <https://doi.org/10.3390/ijms16010805>
- Nga, V.T., Trang, N.T.H., Tuyet, N.T.A., Phung, N.K.P., Duong, N.T.T., Thu, N.T.H., 2020. Ethanol extract of male *Carica papaya* flowers demonstrated



- non-toxic against MCF-7, HEP-G2, HELA, NCI-H460 cancer cell lines .  
Vietnam J. Chem. 58, 86–91. <https://doi.org/10.1002/vjch.2019000142>
- Nguyen, M.T.T., Awale, S., Tezuka, Y., Ueda, J.Y., Le Tran, Q., Kadota, S., 2006. Xanthine oxidase inhibitors from the flowers of *Chrysanthemum sinense*. *Planta Med.* 72, 46–51. <https://doi.org/10.1055/s-2005-873181>
- Nile, S.H., Ko, E.Y., Kim, D.H., Keum, Y.S., 2016. Screening of ferulic acid related compounds as inhibitors of xanthine oxidase and cyclooxygenase-2 with anti-inflammatory activity. *Brazilian J. Pharmacogn.* 26, 50–55. <https://doi.org/10.1016/j.bjp.2015.08.013>
- Nowak, R., Olech, M., Pecio, L., Oleszek, W., Los, R., Malm, A., Rzymowska, J., 2014. Cytotoxic, antioxidant, antimicrobial properties and chemical composition of rose petals. *J. Sci. Food Agric.* 94, 560–567. <https://doi.org/10.1002/jsfa.6294>
- Oh, Y.C., Cho, W.K., Jeong, Y.H., Im, G.Y., Lee, K.J., Yang, H.J., Ma, J.Y., 2013. Anti-inflammatory effect of Sosihotang via inhibition of nuclear factor- $\kappa$ B and mitogen-activated protein kinases signaling pathways in lipopolysaccharide-stimulated RAW 264.7 macrophage cells. *Food Chem. Toxicol.* 53, 343–351. <https://doi.org/10.1016/j.fct.2012.12.006>
- Pinakin, D.J., Kumar, V., Suri, S., Sharma, R., Kaushal, M., 2020a. Nutraceutical potential of tree flowers: A comprehensive review on biochemical profile, health benefits, and utilization. *Food Res. Int.* 127, 108724. <https://doi.org/10.1016/j.foodres.2019.108724>
- Pinakin, D.J., Kumar, V., Suri, S., Sharma, R., Kaushal, M., 2020b. Nutraceutical potential of tree flowers: A comprehensive review on biochemical profile, health benefits, and utilization. *Food Res. Int.* 127, 108724. <https://doi.org/10.1016/j.foodres.2019.108724>
- Piovesana, A., Rodrigues, E., Noreña, C.P.Z., 2019. Composition analysis of carotenoids and phenolic compounds and antioxidant activity from hibiscus calyces (*Hibiscus sabdariffa* L.) by HPLC-DAD-MS/MS. *Phytochem. Anal.* 30, 208–217. <https://doi.org/10.1002/pca.2806>
- Qing, L., Sen, Xue, Y., Zhang, J.G., Zhang, Z.F., Liang, J., Jiang, Y., Liu, Y.M., Liao, X., 2012. Identification of flavonoid glycosides in *Rosa chinensis* flowers by liquid chromatography-tandem mass spectrometry in combination with  $^{13}\text{C}$  nuclear magnetic resonance. *J. Chromatogr. A* 1249, 130–137. <https://doi.org/10.1016/j.chroma.2012.06.013>
- Ramchoun, M., Sellam, K., Harnafi, H., Alem, C., Benlyas, M., Khallouki, F., Amrani, S., 2015. Investigation of antioxidant and antihemolytic properties of *Thymus satureioides* collected from Tafilalet Region, south-east of Morocco. *Asian Pac. J. Trop. Biomed.* 5, 93–100. [https://doi.org/10.1016/S2221-1691\(15\)30151-9](https://doi.org/10.1016/S2221-1691(15)30151-9)
- Renjith, R.S., Chikku, A.M., Rajamohan, T., 2013. Cytoprotective, antihyperglycemic and phytochemical properties of *Cocos nucifera* (L.) inflorescence. *Asian Pac. J. Trop. Med.* 6, 804–810. [https://doi.org/10.1016/S1995-7645\(13\)60142-X](https://doi.org/10.1016/S1995-7645(13)60142-X)
- Rop, O., Jurikova, T., Mlcek, J., Kramarova, D., Sengee, Z., 2009. Antioxidant activity and selected nutritional values of plums (*Prunus domestica* L.) typical



- of the White Carpathian Mountains. *Sci. Hortic. (Amsterdam)*. 122, 545–549. <https://doi.org/10.1016/j.scienta.2009.06.036>
- Sajid, M., Khan, M.R., Ismail, H., Latif, S., Rahim, A.A., Mehboob, R., Shah, S.A., 2020. Antidiabetic and antioxidant potential of *Alnus nitida* leaves in alloxan induced diabetic rats. *J. Ethnopharmacol.* 251. <https://doi.org/10.1016/j.jep.2020.112544>
- Salehi, B., Vlaisavljevic, S., Adetunji, C.O., Adetunji, J.B., Kregiel, D., Antolak, H., Pawlikowska, E., Uprety, Y., Mileski, K.S., Devkota, H.P., Sharifi-Rad, J., Das, G., Patra, J.K., Jugran, A.K., Segura-Carretero, A., Contreras, M. del M., 2019. Plants of the genus *Vitis*: Phenolic compounds, anticancer properties and clinical relevance. *Trends Food Sci. Technol.* 91, 362–379. <https://doi.org/10.1016/j.tifs.2019.07.042>
- Shah, K.G., Idrovo, J.P., Nicastro, J., McMullen, H.F., Molmenti, E.P., Coppa, G., 2009. A retrospective analysis of the incidence of hemolysis in type and screen specimens from trauma patients. *Int. J. Angiol.* 18, 182–183. <https://doi.org/10.1055/s-0031-1278350>
- Shao, J., Li, Y., Wang, Z., Xiao, M., Yin, P., Lu, Y., Qian, X., Xu, Y., Liu, J., 2013. 7b, a novel naphthalimide derivative exhibited anti-inflammatory effects via targeted-inhibiting TAK1 following down-regulation of ERK1/2- and p38 MAPK-mediated activation of NF- $\kappa$ B in LPS-stimulated RAW264.7 macrophages. *Int. Immunopharmacol.* 17, 216–228. <https://doi.org/10.1016/j.intimp.2013.06.008>
- Shimmyo, Y., Kihara, T., Akaike, A., Niidome, T., Sugimoto, H., 2008. Flavonols and flavones as BACE-1 inhibitors: Structure-activity relationship in cell-free, cell-based and in silico studies reveal novel pharmacophore features. *Biochim. Biophys. Acta - Gen. Subj.* 1780, 819–825. <https://doi.org/10.1016/j.bbagen.2008.01.017>
- Siti Azima, A.M., Noriham, A., Manshoor, N., 2017a. Phenolics, antioxidants and color properties of aqueous pigmented plant extracts: *Ardisia colorata* var. *elliptica*, *Clitoria ternatea*, *Garcinia mangostana* and *Syzygium cumini*. *J. Funct. Foods* 38, 232–241. <https://doi.org/10.1016/j.jff.2017.09.018>
- Siti Azima, A.M., Noriham, A., Manshoor, N., 2017b. Phenolics, antioxidants and color properties of aqueous pigmented plant extracts: *Ardisia colorata* var. *elliptica*, *Clitoria ternatea*, *Garcinia mangostana* and *Syzygium cumini*. *J. Funct. Foods* 38, 232–241. <https://doi.org/10.1016/j.jff.2017.09.018>
- Sitthiya, K., Devkota, L., Sadiq, M.B., Anal, A.K., 2018. Extraction and characterization of proteins from banana (*Musa Sapientum* L) flower and evaluation of antimicrobial activities. *J. Food Sci. Technol.* 55, 658–666. <https://doi.org/10.1007/s13197-017-2975-z>
- Sogo, T., Terahara, N., Hisanaga, A., Kumamoto, T., Yamashiro, T., Wu, S., Sakao, K., Hou, D.X., 2015. Anti-inflammatory activity and molecular mechanism of delphinidin 3-sambubioside, a *Hibiscus* anthocyanin. *BioFactors* 41, 58–65. <https://doi.org/10.1002/biof.1201>
- Solanki, I., Parihar, P., Parihar, M.S., 2016. Neurodegenerative diseases: From available treatments to prospective herbal therapy. *Neurochem. Int.* 95, 100–108. <https://doi.org/10.1016/j.neuint.2015.11.001>



- Sommano, S., Kerdongmee, P., Chompoo, M., Nisoa, M., 2015. Fabrication and characteristics of phase control microwave power for jasmine volatile oil extraction. *J. Essent. Oil Res.* 27, 316–323. <https://doi.org/10.1080/10412905.2015.1023904>
- Sood, S., Nagar, P.K., 2005. Alterations in endogenous polyamines in bulbs of tuberose (*Polianthes tuberosa* L.) during dormancy. *Sci. Hortic. (Amsterdam)*. 105, 483–490. <https://doi.org/10.1016/j.scienta.2005.02.010>
- Takahashi, J.A., Rezende, F.A.G.G., Moura, M.A.F., Dominguet, L.C.B., Sande, D., 2020. Edible flowers: Bioactive profile and its potential to be used in food development. *Food Res. Int.* 129. <https://doi.org/10.1016/j.foodres.2019.108868>
- Tang, X., Olatunji, O.J., Zhou, Y., Hou, X., 2017. *Allium tuberosum*: Antidiabetic and hepatoprotective activities. *Food Res. Int.* 102, 681–689. <https://doi.org/10.1016/j.foodres.2017.08.034>
- Tarhan, L., Kayali, H.A., Urek, R.O., 2007. In vitro antioxidant properties of Cucurbita Pepo L. male and female flowers extracts. *Plant Foods Hum. Nutr.* 62, 49–51. <https://doi.org/10.1007/s11130-006-0038-0>
- Taslimi, P., Köksal, E., Gören, A.C., Bursal, E., Aras, A., Kılıç, Ö., Alwasel, S., Gülçin, İ., 2019. Anti-Alzheimer, antidiabetic and antioxidant potential of *Satureja cuneifolia* and analysis of its phenolic contents by LC-MS/MS. *Arab. J. Chem.* <https://doi.org/10.1016/j.arabjc.2019.10.002>
- Timsina, B., Nadumane, V.K., 2014. Anti-cancer potential of banana flower extract: An in vitro study. *Bangladesh J. Pharmacol.* 9, 628–635. <https://doi.org/10.3329/bjp.v9i4.20610>
- Tsai, H.Y., Wu, L.Y., Hwang, L.S., 2008. Effect of a proanthocyanidin-rich extract from longan flower on markers of metabolic syndrome in fructose-fed rats. *J. Agric. Food Chem.* 56, 11018–11024. <https://doi.org/10.1021/jf801966y>
- Tursun, X., Zhao, Y., Alat, Z., Xin, X., Tursun, A., Abdulla, R., Akber Aisa, H., 2016. Anti-inflammatory effect of *Rosa rugosa* flower extract in lipopolysaccharide-stimulated RAW264.7 macrophages. *Biomol. Ther.* 24, 184–190. <https://doi.org/10.4062/biomolther.2015.090>
- Uysal, S., Aktumsek, A., Picot-Allain, C.M.N., Unuvar, H., Mollica, A., Georgiev, M.I., Zengin, G., Mahomoodally, M.F., 2018. Biological, chemical and in silico fingerprints of *Dianthus calocephalus* Boiss.: A novel source for rutin. *Food Chem. Toxicol.* 113, 179–186. <https://doi.org/10.1016/j.fct.2018.01.049>
- Vajrabhaya, L. ongthong, Korsuwannawong, S., 2018. Cytotoxicity evaluation of a Thai herb using tetrazolium (MTT) and sulforhodamine B (SRB) assays. *J. Anal. Sci. Technol.* 9, 15. <https://doi.org/10.1186/s40543-018-0146-0>
- Valsalam, S., Agastian, P., Esmail, G.A., Ghilan, A.K.M., Al-Dhabi, N.A., Arasu, M.V., 2019. Biosynthesis of silver and gold nanoparticles using *Musa acuminata* colla flower and its pharmaceutical activity against bacteria and anticancer efficacy. *J. Photochem. Photobiol. B Biol.* 201, 111670. <https://doi.org/10.1016/j.jphotobiol.2019.111670>
- Vauzour, D., Vafeiadou, K., Rodriguez-Mateos, A., Rendeiro, C., Spencer, J.P.E., 2008. The neuroprotective potential of flavonoids: A multiplicity of effects. *Genes Nutr.* 3, 115–126. <https://doi.org/10.1007/s12263-008-0091-4>



- Wang, S., Zhu, F., 2016. Antidiabetic dietary materials and animal models. *Food Res. Int.* 85, 315–331. <https://doi.org/10.1016/j.foodres.2016.04.028>
- Wathoni, N., Haerani, A.N.I., Yuniarsih, N.I.A., Haryanti, R., 2018. *Soap* 10, 18–21.
- Wetwitayaklung, P., Limmatvapirat, C., Phaechamud, T., Keokitichai, S., 2008. The study of antioxidant activities of edible flower extracts. *Acta Hort.* 786, 185–192. <https://doi.org/10.17660/ActaHortic.2008.786.20>
- Wu, C.R., Huang, M.Y., Lin, Y.T., Ju, H.Y., Ching, H., 2007. Antioxidant properties of Cortex Fraxini and its simple coumarins. *Food Chem.* 104, 1464–1471. <https://doi.org/10.1016/j.foodchem.2007.02.023>
- Wu, L., Sun, Z., Chen, A., Guo, X., Wang, J., 2019. Effect of astaxanthin and exercise on antioxidant capacity of human body, blood lactic acid and blood uric acid metabolism. *Sci. Sport.* 34, 348–352. <https://doi.org/10.1016/j.scispo.2018.12.008>
- Wu, S.J., Ng, L.T., 2008. Antioxidant and free radical scavenging activities of wild bitter melon (*Momordica charantia* Linn. var. *abbreviata* Ser.) in Taiwan. *LWT - Food Sci. Technol.* 41, 323–330. <https://doi.org/10.1016/j.lwt.2007.03.003>
- Wu, W.S., 2006. The signaling mechanism of ROS in tumor progression. *Cancer Metastasis Rev.* 25, 695–705. <https://doi.org/10.1007/s10555-006-9037-8>
- Yamamoto, J., Tadaishi, M., Yamane, T., Oishi, Y., Shimizu, M., Kobayashi-Hattori, K., 2015. Hot water extracts of edible *Chrysanthemum morifolium* Ramat. Exert antidiabetic effects in obese diabetic KK-Ay mice. *Biosci. Biotechnol. Biochem.* 79, 1147–1154. <https://doi.org/10.1080/09168451.2015.1008975>
- Yang, C.S., Landau, J.M., Huang, M., Newmark, H.L., 2001. Inhibition of Carcinogenesis by Dietary Polyphenolic Compounds. *Annu. Rev. Nutr.* 21, 381–406.
- Yang, J., Liu, X., Zhang, X., Jin, Q., Li, J., 2016. Phenolic Profiles, Antioxidant Activities, and Neuroprotective Properties of Mulberry (*Morus atropurpurea* Roxb.) Fruit Extracts from Different Ripening Stages. *J. Food Sci.* 81, C2439–C2446. <https://doi.org/10.1111/1750-3841.13426>
- Zakaria, N.N.A., Okello, E.J., Howes, M.J., Birch-Machin, M.A., Bowman, A., 2018. In vitro protective effects of an aqueous extract of *Clitoria ternatea* L. flower against hydrogen peroxide-induced cytotoxicity and UV-induced mtDNA damage in human keratinocytes. *Phyther. Res.* 32, 1064–1072. <https://doi.org/10.1002/ptr.6045>
- Zan, C.H., Rahmat, A., Akim, A.M., Alitheen, N.B.M., Othman, F., Lian, G.E.C., 2011. Anti-proliferative effects of pandan leaves (*Pandanus amaryllifolius*), kantan flower (*Etilingera elatior*) and turmeric leaves (*Curcuma longa*). *Nutr. Food Sci.* 41, 238–241. <https://doi.org/10.1108/00346651111151366>
- Zhang, L., Santos, J.S., Cruz, T.M., Marques, M.B., do Carmo, M.A.V., Azevedo, L., Wang, Y., Granato, D., 2019. Multivariate effects of Chinese keemun black tea grades (*Camellia sinensis* var. *sinensis*) on the phenolic composition, antioxidant, antihemolytic and cytotoxic/cytoprotection activities. *Food Res. Int.* 125, 108516. <https://doi.org/10.1016/j.foodres.2019.108516>



- Zhao, L., Fan, H., Zhang, M., Chitrakar, B., Bhandari, B., Wang, B., 2019. Edible flowers: Review of flower processing and extraction of bioactive compounds by novel technologies. *Food Res. Int.* 126. <https://doi.org/10.1016/j.foodres.2019.108660>
- Zheng, J., Lu, B., Xu, B., 2021. An update on the health benefits promoted by edible flowers and involved mechanisms. *Food Chem.* 340, 127940. <https://doi.org/10.1016/j.foodchem.2020.127940>
- Zheng, J., Meenu, M., Xu, B., 2019. A systematic investigation on free phenolic acids and flavonoids profiles of commonly consumed edible flowers in China. *J. Pharm. Biomed. Anal.* 172, 268–277. <https://doi.org/10.1016/j.jpba.2019.05.007>