

## DAFTAR PUSTAKA

1. Kesehatan K. Situasi kesehatan gigi dan mulut 2019 [Intenet]. 2020.  
Available from:  
<https://www.kemendes.go.id/article/view/20030900005/situasi-kesehatan-gigi-dan-mulut-2019.html>
2. Shukla S, Chug A, Mahesh L, Singh S, Singh K. Optimal management of intrabony defects: Current insights. *Clin Cosmet Investig Dent*. 2019;11:19–25.
3. Crea A, Deli G, Littarru C, Lajolo C, Orgeas GV, Tatakis DN. Intrabony Defects, Open-Flap Debridement, and Decortication: A Randomized Clinical Trial. *J Periodontol*. 2014;85(1):34–42.
4. Misnova, Oktawati S. Aplikasi bone graft dan platelet rich fibrin pada penanganan periodontitis agresif Application of bone graft and platelet rich fibrin on treatment of aggressive periodontitis. *Makassar Dent J*. 2018;7(2):55–60.
5. Matuda Y, Okamura T, Tabata H, Yasui K, Tatsumura M, Kobayashi N, et al. Periodontal regeneration using cultured coral scaffolds in class ii furcation defects in dogs. *J Hard Tissue Biol*. 2019;28(4):329–34.
6. Kumar P, Vinitha B, Fathima G. Bone grafts in dentistry. *J Pharm Bioallied Sci*. 2013;5(SUPPL.1):125–8.
7. Ardhiyanto hengky bowo. Stimulasi osteoblas oleh hidroksiapatit sebagai material. *Stomatognatic (J K G Unej)*. 2012;9(3):163.

8. Balaji V, Manikandan D, Ramsundar A. Bone grafts in periodontics. *Matrix Sci Medica*. 2020;4(3):57.
9. Green DW, Lai WF, Jung HS. Evolving marine biomimetics for regenerative dentistry. *Mar Drugs*. 2014;12(5):2877–912.
10. Gerhard EM, Wang W, Li C, Guo J, Ozbolat IT, Rahn KM, et al. Design strategies and applications of nacre-based biomaterials. *Acta Biomater* [Internet]. 2017;54:21–34. Available from: <http://dx.doi.org/10.1016/j.actbio.2017.03.003>
11. Alakpa E V., Burgess KEV, Chung P, Riehle MO, Gadegaard N, Dalby MJ, et al. Nacre Topography Produces Higher Crystallinity in Bone than Chemically Induced Osteogenesis. *ACS Nano*. 2017;11(7):6717–27.
12. Oliveira D V., Silva TS, Cordeiro OD, Cavaco SI, Simes DC. Identification of proteins with potential osteogenic activity present in the water-soluble matrix proteins from *crassostrea gigas* nacre using a proteomic approach. *Sci World J*. 2012;2012.
13. Susi Rahayu, Dian W. Kurniawidi AG. Pemanfaatan limbah Cangkang Kerang Mutiara (*Pinctada Maxima*) sebagai sumber Hidroksiapatit. *J Chem Inf Model*. 2018;4(2):226–31.
14. Li X, Yang X, Liu X, He W, Huang Q, Li S, et al. Calcium carbonate nanoparticles promote osteogenesis compared to adipogenesis in human bone-marrow mesenchymal stem cells. *Prog Nat Sci Mater Int* [Internet]. 2018;28(5):598–608. Available from: <https://doi.org/10.1016/j.pnsc.2018.09.004>

15. Jangid MR, Rakhewar PS, Nayyar AS, Cholepatil A. Bone Grafts in Periodontal Regeneration : Factors Impacting Treatment Outcome. *Basic Res J Med Clin Sci* [Internet]. 2016;2:106–9. Available from: <http://www.basicresearchjournals.org>
16. Zhang G, Brion A, Willemin AS, Piet MH, Moby V, Bianchi A, et al. Nacre, a natural, multi-use, and timely biomaterial for bone graft substitution. *J Biomed Mater Res - Part A*. 2017;105(2):662–71.
17. Aghaloo TL, Tencati E, Hadaya D. Biomimetic Enhancement of Bone Graft Reconstruction. *Oral Maxillofac Surg Clin North Am* [Internet]. 2019;31(2):193–205. Available from: <https://doi.org/10.1016/j.coms.2018.12.001>
18. Fogelman I, Van Der Wall H, Gnanasegaran G. Radionuclide and hybrid bone imaging. *Radionucl Hybrid Bone Imaging*. 2012;9783642024:1–1046.
19. Chen G, Deng C, Li YP. TGF- $\beta$  and BMP signaling in osteoblast differentiation and bone formation. Vol. 8, *International Journal of Biological Sciences*. 2012. p. 272–88.
20. In-Woong Um, Young-Kyun Kim MM. Demineralized dentin matrix scaffolds for alveolar bone engineering. *J Indian Prosthodont Soc*. 2019;19(1):88–92.
21. Suchetha A, Tanwar E, Sapna N, Bhat D, Spandana A. Alveolar bone in health. *IP Int J Periodontol Implantol*. 2017;2(4):112–6.
22. Ansari M. Bone tissue regeneration: biology, strategies and interface studies. *Prog Biomater* [Internet]. 2019;8(4):223–37. Available from:

<https://doi.org/10.1007/s40204-019-00125-z>

23. Fernandez-Tresguerres Hernandez-Gil I, Alobera Gracia MA, Del Canto Pingarrón M, Blanco Jerez L. Physiological bases of bone regeneration I. Histology and physiology of bone tissue. *Med Oral Patol Oral Cir Bucal*. 2006;11(1):32–6.
24. Florencio-Silva R, Sasso GRDS, Sasso-Cerri E, Simões MJ, Cerri PS. Biology of Bone Tissue: Structure, Function, and Factors That Influence Bone Cells. *Biomed Res Int*. 2015;2015.
25. Noble BS, Reeve J. Osteocyte function, osteocyte death and bone fracture resistance. *Mol Cell Endocrinol*. 2000;159(1–2):7–13.
26. D’Antoni A V. *Gray’s Anatomy, the Anatomical Basis of Clinical Practice, Forty-First Edition*, by Susan Standring, Editor-in-Chief, Elsevier Limited , 2016, 1,562 Pages, Hardcover, \$228.99 (\$171.74), ISBN: 978-0-7020-5230-9. . *Clin Anat*. 2016;29(2):264–5.
27. Soysa NS, Alles N, Aoki K, Ohya K. Osteoclast formation and differentiation: An overview. *J Med Dent Sci*. 2012;59(3):65–74.
28. Desyaningrum H, Epsilawati L, Rusyanti Y. Karakteristik kerusakan tulang alveolar pada penderita periodontitis kronis dan agresif dengan pencitraan Cone Beam Computed Tomography. *Padjadjaran J Dent Res Students*. 2017;1(2):139.
29. Shantipriya Reddy. *Essentials of Clinical Periodontology and Periodontics*. 2008. 494 p.
30. Newman M, Takei H, Klokkevold P, Carranza F. *Carranza Clinical*

- Periodontology 13th ed 2. 13th ed. 2019. 27–33 p.
31. Vandana K, Chandra GNR B. Periodontal Osseous Defects: A Review. *CODS J Dent.* 2017;9(1):22–9.
  32. Patricia A.D dan Michael I. S. 2006. Bone Biology and Clinical Implication for osteoporosis. *Physical Therapy.* 86: 77-91.
  33. M K, H A. Bone Graft Substitutes for Bone Defect Regeneration. A Collective Review. *Int J Dent Oral Sci.* 2016;(April):247–55.
  34. Kilmer PD. Bone Grafts in Periodontal Therapy. *Journal Theory, Pract Crit.* 2010;11(3):369–73.
  35. Gard AK. Bone Biology, Harvesting, Grafting for dental Implant. Vol. 53, *Journal of Chemical Information and Modeling.* 2004. 1689–1699 p.
  36. Shrivats, a R, P Alvarez, L Schutte, and J O Hollinger. 2014. Principles of Tissue Engineering *Chapter 24: Bone Regeneration.* Elsevier Inc. 23.
  37. Siaili M, Chatzopoulou D, Gillam DG. An overview of periodontal regenerative procedures for the general dental practitioner. *Saudi Dent J.* 2018;30(1):26-37. doi:10.1016/j.sdentj.2017.11.001
  38. Rucci N. Molecular Biology of Bone Biology. *Clin Cases Miner Bone Metab.* 2008;5(1):49–56.
  39. Truesdell SL, Saunders MM. Bone remodeling platforms: Understanding the need for multicellular lab-on-a-chip systems and predictive agent-based models. *Math Biosci Eng.* 2020;17(2):1233–52.
  40. Kenkre JS, Bassett JHD. The bone remodelling cycle. *Ann Clin Biochem.* 2018;55(3):308–27.

41. Sheikh Z, Javaid MA, Hamdan N, Hashmi R. Bone regeneration using bone morphogenetic proteins and various biomaterial carriers. *Materials (Basel)*. 2015;8(4):1778–816.
42. Rocha Valadas Marques LA, Costa Júnior EA da, Leitão Lotif MA, Rodrigues Neto EM, Carvalho da Silva FF, Queiroz Martiniano CR de. Application of BMP-2 for bone graft in Dentistry. *Rsbo*. 2014;12(1):88.
43. Himani S, Anamika S. Bone morphogenetic proteins: Revivifying periodontium. *Indian J multidiscip dent* [Internet]. 2019;9(1):58–63. Available from: <https://www.ijmdent.com/text.asp?2019/9/1/58/268987>
44. Wu M, Chen G, Li YP. TGF- $\beta$  and BMP signaling in osteoblast, skeletal development, and bone formation, homeostasis and disease. *Bone Res*. 2016;4(December 2015).
45. Rocha Valadas Marques LA, Costa Júnior EA da, Leitão Lotif MA, Rodrigues Neto EM, Carvalho da Silva FF, Queiroz Martiniano CR de. Application of BMP-2 for bone graft in Dentistry. *Rsbo*. 2016;12(1):88.
46. Santos AA dos, Miranda CDO, Alves MT de S, Faloppa F. The role of bone morphogenetic protein on bone tissue repair. *Acta Ortopédica Bras* [Internet]. 2005;13(4):194–5. Available from: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S1413-78522005000400009&lng=pt&tlng=pt](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1413-78522005000400009&lng=pt&tlng=pt)
47. Wang RN, Green J, Wang Z, Deng Y, Qiao M, Peabody M, et al. Bone Morphogenetic Protein (BMP) signaling in development and human diseases. *Genes Dis* [Internet]. 2014;1(1):87–105. Available from:

<http://dx.doi.org/10.1016/j.gendis.2014.07.005>

48. Giannobile W V., Somerman MJ. Growth and amelogenin-like factors in periodontal wound healing. A systematic review. *Ann Periodontol.* 2003;8(1):193–204.
49. Sykaras N, Opperman LA. Bone morphogenetic proteins (BMPs): how do they function and what can they offer the clinician? *J Oral Sci.* 2003;45(2):57–73.
50. Bashutski JD, Wang H-L. Biologic Agents to Promote Periodontal Regeneration and Bone Augmentation. *Clin Adv Periodontics.* 2011;1(2):80–7.
51. Yan X-Z, Ge S-H, Sun Q-F, Guo H-M, Yang P-S. A Pilot Study Evaluating the Effect of Recombinant Human Bone Morphogenetic Protein-2 and Recombinant Human Beta-Nerve Growth Factor on the Healing of Class III Furcation Defects in Dogs. *J Periodontol.* 2010;81(9):1289–98.
52. Saito A, Saito E, Handa R, Honma Y, Kawanami M. Influence of Residual Bone on Recombinant Human Bone Morphogenetic Protein-2–Induced Periodontal Regeneration in Experimental Periodontitis in Dogs. *J Periodontol.* 2009;80(6):961–8.
53. Tolba E, Müller WEG, Abd El-Hady BM, Neufurth M, Wurm F, Wang S, et al. High biocompatibility and improved osteogenic potential of amorphous calcium carbonate/vaterite. *J Mater Chem B.* 2016;4(3):376–86.
54. Titsinides S, Agrogiannis G, Karatzas T. Bone grafting materials in dentoalveolar reconstruction: A comprehensive review. *Jpn Dent Sci Rev*

- [Internet]. 2019;55(1):26–32. Available from:  
<https://doi.org/10.1016/j.jdsr.2018.09.003>
55. Ramos-Vara JA. Technical aspects of immunohistochemistry. *Vet Pathol.* 2005;42(4):405–26.
56. Verbicaro T, Giovanini AF, Zielak JC, Filho FB, de Araujo MR, Deliberador TM. Osteocalcin immunohistochemical expression during repair of critical- sized bone defects treated with subcutaneous adipose tissue in RAT and rabbit animal model. *Braz Dent J.* 2013;24(6):559–64.
57. Zikri A dkk. Sintesa precipitated calcium carbonate (PCC) dari cangkang kerang darah (anadara granosa) dengan variasi jenis asam dan waktu karbonasi. *JOM FTEKNIK.* 2015;2(2): 1-6.
58. Coringa R et al. Bone substitute made from a Brazilian oyster shell functions asa fast stimulator for bone forming cells in an animal model. *PLoS ONE.* 2018;13(6): e0198697
59. Claes L, Recknagel S, Ignatius A. Fracture healing under healthy and inflammatory conditions. *Nat Rev Rheumatol* [Internet]. 2012;8(3):133–43. Available from: <http://dx.doi.org/10.1038/nrrheum.2012.1>
60. Faßbender M, Minkwitz S, Strobel C, Schmidmaier G, Wildemann B. Stimulation of bone healing by sustained bone morphogenetic protein 2 (BMP-2) delivery. *Int J Mol Sci.* 2014;15(5):8539–52.





REKOMENDASI PERSETUJUAN ETIK  
 Nomor: 0044/PL.09/KEPK FKG-RSGM UNHAS/2021

Tanggal: 17 Mei 2021

Dengan ini menyatakan bahwa protokol dan dokumen yang berhubungan dengan protokol berikut ini telah mendapatkan persetujuan etik:

No. Protokol	UH 1712044S	No Protokol Sponsor	
Peneliti Utama	Drg. Muhammad Yudin	Sponsor	Pribadi
Judul Peneliti	Efektivitas Bone Graft yang Mengandung Cangkang Kerang Mutiara (Pinctada Maxima) terhadap Ekspresi BMP-2 pada Regenerasi Tulang		
No. Versi Protokol	1	Tanggal Versi	05 Mei 2021
No. Versi Protokol		Tanggal Versi	
Tempat Penelitian	1. Laboratorium Politeknik Kimia Unhas 2. Laboratorium Hewan-entomologi FK Unhas 3. Balai Besar Laboratorium Kesehatan Makassar 4. Laboratorium Penelitian dan Pengembangan Science FMIPA Unhas 5. Klinik Hewan Lacoste 6. Laboratorium Patologi Anatomi RSPTN Unhas 7. Laboratorium Biokimia-Biomolekuler FK Universitas Brawijaya		
Dokumen Lain			
Jenis Review	<input type="checkbox"/> Exempted <input checked="" type="checkbox"/> Expedited <input type="checkbox"/> Fullboard	Masa Berlaku 17 Mei 2021-17 Mei 2022	Frekuensi Review Lanjutan
Ketua Komisi Etik Penelitian	Nama: Dr. drg. Marhamah, M.Kes	Tanda Tangan	Tanggal
Sekretaris Komisi Etik Penelitian	Nama: drg. Muhammad Iqbal, Sp.Prost	Tanda Tangan	Tanggal

Kewajiban peneliti utama:

- Menyerahkan Amandemen Protokol untuk persetujuan sebelum diimplementasikan
- Menyerahkan laporan SAE ke Komisi Etik dalam 24 Jam dan dilengkapi dalam 7 hari dan lapor SUSAR dalam 72 jam setelah peneliti utama menerima laporan.
- Menyerahkan laporan kemajuan (*progress report*) setiap 6 bulan untuk penelitian resiko tinggi dan setiap setahun untuk penelitian resiko rendah.
- Menyerahkan laporan akhir setelah penelitian berakhir.
- Melaporkan penyimpangan dari protokol yang disetujui (*protocol deviation/violation*)
- Mematuhi semua aturan yang berlaku.

**LAMPIRAN**  
**FOTO PELAKSANAAN PENELITIAN**

**Pemeliharaan hewan**



Gambar 1. Proses pemeliharaan hewan coba, maksimal  
5 hewan coba satu kandang dan pemberian makanan  
yang cukup

## Pembuatan bone graft cangkang kerang mutiara



Gambar 2. Proses pembersihan dan pengeringan cangkang kerang mutiara dibawah sinar matahari



Gambar 3. Proses cangkang dipecah menjadi ukuran yang lebih kecil dan di-furnace selama 2 jam, disaring dengan ukuran -50+60 mesh.



Gambar 4. Proses presipitasi pembuatan bone graft

### Proses implantasi



Gambar 5. Persiapan alat, bahan dan penimbangan hewan coba



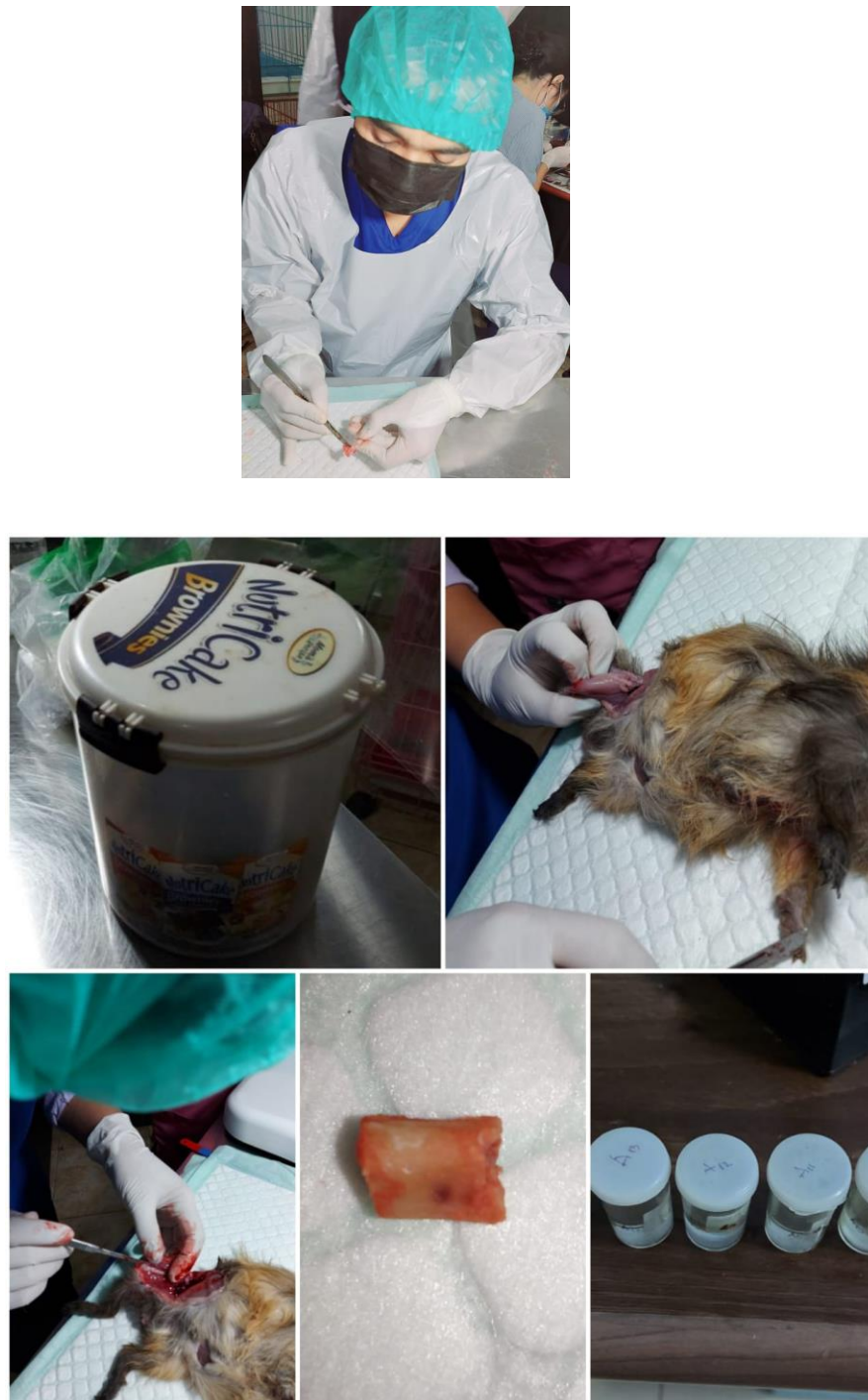


Gambar 6. Anestesi dan cukur bulu pada bagian femur



Gambar 7. Proses bedah Implantasi bahan Bone graft

**Proses sacrificed dan pengambilan jaringan tulang untuk dibawa ke laboratorium PA**



**Gambar 8. Proses Sacrifed dan pengambilan jaringan tulang untuk dibawa ke LAB PA**

## Pembuatan slide





## Pemeriksaan Immunohistokimia







**KEMENTERIAN KESEHATAN RI**  
**DIREKTORAT JENDERAL PELAYANAN KESEHATAN**  
**BALAI BESAR LABORATORIUM KESEHATAN MAKASSAR**  
 Jl. Perintis Kemerdekaan KM. 11 Tamalatea Makassar 90245



**LAPORAN HASIL UJI**

*Report of Analysis*

No : 21008733 / LHU / BBLK-MKS / IV / 2021

Nama Customer : Muhammad Yudin  
 Customer Name :  
 Alamat : Fakultas Kedokteran Gigi / Periodonsia  
 Address :  
 Jenis Sampel : Bubuk Kering  
 Type of Sample (S) :  
 No. Sampel : 21008733  
 No. Sample :  
 Tanggal Penerimaan : 20 April 2021  
 Received Date : April 20, 2021

**HASIL PEMERIKSAAN**

NO.	PARAMETER	SATUAN	HASIL PEMERIKSAAN	SPEKIFIKASI METOOE
1	Kalsium (Ca)	mg/g	321089,92	Atomisasi

**Catatan:**  
 1. Hasil uji hanya untuk sampel yang diuji  
 Note: The analytical result are only valid for the tested sample  
 2. Laporan hasil uji terdiri dari 1 halaman  
 The report of analysis consists of 1 page  
 3. Laporan hasil uji ini tidak boleh digandakan kecuali secara lengkap dan sesuai dengan ketentuan Laboratorium Pengujian Balai Besar Laboratorium Kesehatan Makassar  
 This result of analysis shall not be reproduced (copied) except for the completed one and with their written permission of the testing Laboratory Balai Besar Laboratorium Kesehatan Makassar

6 Mei 2021  
 Labkesmas,  
 ARYANEGARA, S.Farm  
 N.P. 12000121502



ONS-10-BBLK-Mks, Rev 1, 15 Oktober 2012

Telp. 0411 586458, 586457, 586270 Fax. 0411 586270  
 Surat Elektronik : bblk\_makassar@yahoo.com, bblk.mksr@gmail.com

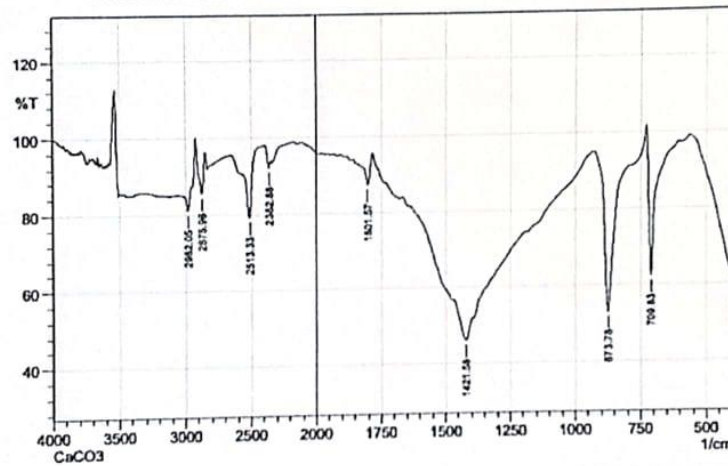




KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN  
**POLITEKNIK NEGERI UJUNG PANDANG**  
 Perintis Kemerdekaan Km. 10 Tamalanrea, Makassar 90245  
 Telepon: (0411)-585365,585367,585368; Faksimili (0411)-586043  
 Website: <http://www.poliupg.ac.id/>  
 E-mail: [pnup@poliupg.ac.id](mailto:pnup@poliupg.ac.id)

**LAPORAN HASIL PENGUJIAN**

**INTERPRETASI SPEKTROSKOPI INFRAMERAH  $\text{CaCO}_3$**



	Peak	Intensity	Corr. Intensity	Base (I)	Base (L)	Area	Corr. Area
1	709.83	62.43	38.71	727.19	603.74	6.72	6.49
2	873.78	53.06	43.97	829.72	727.19	14.95	13.56
3	1421.58	48.1	7.8	1469.61	1394.58	22.33	2.39
4	1801.57	87.48	7.87	1857.51	1782.29	2.75	1.06
5	2362.88	92.23	3.28	2393.74	2345.52	1.14	0.3
6	2513.33	75.35	17.65	2656.07	2393.74	9.33	5.72
7	2875.94	85.78	11.94	2922.25	2850.68	2.95	2.41
8	2982.05	81.36	11.59	3045.7	2922.25	7.87	3.65


Area Frekuensi ( $\text{cm}^{-1}$ )	Gugus Fungsi
1421.58	$\text{CaCO}_3$
873.78	C-O
709.83	C-O

**Kesimpulan:**

Berdasarkan pita spektrum inframerah, senyawa bahan uji mengandung kalsium karbonat murni

Makassar, 3 Juni 2021  
 Koordinator III Teknik Kimia

  
 M. Yasser, S.Si., M.Si.  
 Politeknik Negeri Ujung Pandang  
 Jurusan Teknik Kimia

 <b>LAB. PPS FMIPA</b> <b>UNHAS</b>	<b>FORMULIR NO:</b> <b>FSOP-7.8-LPPS-FMIPAUII-01.1</b>	<b>Tanggal Berlaku : 1 Juni 2021</b>
	<b>LAPORAN HASIL PENGUJIAN</b>	<b>Edisi/Revisi Ke: 1/0</b>
		<b>Halaman : 1/2</b>

**LAPORAN HASIL PENGUJIAN**

*CERTIFICATE OF ANALYSIS*

**Nomor Pekerjaan : LPPS.XJ-2104-10/1**  
*Job Number*

**Dipersembahkan Kepada**  
*Presented To*

<b>Kepada Yth</b>	<b>: Muhammad Yudin, drg</b>	<b>Jabatan</b>	<b>: Peneliti</b>
<i>Attention</i>		<i>Job Title</i>	
<b>Nama Pelanggan</b>	<b>: Muhammad Yudin, drg</b>	<b>Tujuan Pengujian</b>	<b>: Penelitian</b>
<i>Customer Name</i>		<i>Purpose of analysis</i>	
<b>Alamat/Universitas</b>	<b>: FKG UNHAS</b>	<b>No. Faks/ Fax No.</b>	<b>: -</b>
<i>Address/University</i>		<b>No. Telp./ Phone No.</b>	<b>: 085299847737</b>
<b>Tanggal Sampel Diterima</b>	<b>: 25 Mei 2021</b>	<b>Tanggal Sampel Diaalisis</b>	<b>: 26 Mei 2021</b>
<i>Date of Sample Receipt</i>		<i>Date of Sample Analysed</i>	
<b>Email</b>	<b>: muhammadyudin30@gmail.com</b>	<b>Total Halaman</b>	<b>: 2</b>
<b>Nama Pengujian</b>	<b>: Analisis komponen kimia pada</b>		
<i>Name of analysis</i>	<b>Serbuk Cangkang Kerang</b>		

Hasil hanya berhubungan dengan contoh yang diuji dan laporan ini tidak boleh digandakan kecuali seluruhnya.  
*The result relate only to the samples tested and this report shall not be reproduced except in full/*



LABORATORIUM PENELITIAN DAN PENGEMBANGAN SAINS  
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM  
UNIVERSITAS HASANUDDIN

Jl. Perintis Kemerdekaan Km. 10, Tamalanrea, Makassar 90245  
Telepon 0411-586016, Fax. 0411-588551, Email: lpps\_fmipa\_unhas@gmail.com

**LAPORAN PENGUJIAN**

Nomor: LPPS.XJ-2104-10/1

Nama Pelanggan : Muhammad Yudin, drg  
Customer Name  
Alamat : FKG UNHAS  
Address/University  
Jenis Sampel : Serbuk Cangkang Kerang  
Type of Sample (s)  
Tanggal Penerimaan: 25 Mei 2021  
Received Date  
Tanggal Analisis : 26 Mei 2021  
Analysis Date  
Email : muhammadyudin30@gmail.com  
Email

Setelah dilakukan pengujian diperoleh hasil sebagai berikut:


Parameter	Satuan	Hasil
Ca	m/m%	99.66
Si	m/m%	0.26
Nb	m/m%	0.0253
Mo	m/m%	0.0159
Sb	m/m%	0.0089
Ru	m/m%	0.0066
Te	m/m%	0.0059
In	m/m%	0.0059
Sn	m/m%	0.0059

Parameter	Satuan	Hasil
CaO	m/m%	99.49
SiO <sub>2</sub>	m/m%	0.45
Nb <sub>2</sub> O <sub>5</sub>	m/m%	0.0225
MoO <sub>3</sub>	m/m%	0.0148
Sb <sub>2</sub> O <sub>3</sub>	m/m%	0.0071
RuO <sub>4</sub>	m/m%	0.0054

Makassar, 7 Juni 2021  
Muhammad Yudin, drg  
Tanggung Jawab Teknis  
  
Muhammad Yudin, drg, S.Si, M.Si  
508261996012001

Catatan:

- Hasil Uji hanya berlaku untuk contoh tersebut di atas
- Dilarang mengutip/menyalin sebagian isi hasil uji ini

 <b>LAB. PPS FMIPA UNHAS</b>	<b>FORMULIR NO:</b> <b>FSOP-7.8-LPPS-FMIPAUII-01.1</b>	<b>Tanggal Berlaku : 1 Juni 2021</b>
	<b>LAPORAN HASIL PENGUJIAN</b>	<b>Edisi/Revisi Ke: 1/0</b>
		<b>Halaman : 1/2</b>

**LAPORAN HASIL PENGUJIAN**

*CERTIFICATE OF ANALYSIS*

**Nomor Pekerjaan : LPPS.XJ-2104-10/2**  
*Job Number*

**Dipersembahkan Kepada**  
*Presented To*

<b>Kepada Yth</b>	: Muhammad Yudin, drg	<b>Jabatan</b>	: Peneliti
<i>Attention</i>		<i>Job Title</i>	
<b>Nama Pleanggan</b>	: Muhammad Yudin, drg	<b>Tujuan Pengujian</b>	: Penelitian
<i>Customer Name</i>		<i>Purpose of analysis</i>	
<b>Alamat/Universitas</b>	: FKG UNHAS	<b>No. Faks/ Fax No.</b>	: -
<i>Address University</i>		<b>No. Telp/ Phone No.</b>	: 085299847737
<b>Tanggal Sampel Diterima</b>	: 25 Mei 2021	<b>Tanggal Sampel Diaalisis</b>	: 26 Mei 2021
<i>Dale of Sample Receipt</i>		<i>Dale of Sample Analysed</i>	
<b>Email</b>	: muhammadyudin30@gmail.com	<b>Total Halaman</b>	: 2
<b>Nama Pengujian</b>	: Analisis kristalinitas pada		
<i>Name of analysis</i>	Serbuk Cangkang Kerang		

Hasil hanya berhubungan dengan contoh yang diuji dan laporan ini tidak boleh digandakan kecuali seluruhnya.  
*The result relate only to the samples tested and this report shall not be reproduced except in full!*





LABORATORIUM PENELITIAN DAN PENGEMBANGAN SAINS  
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM  
UNIVERSITAS HASANUDDIN

Jl. Perintis Kemerdekaan Km. 10, Tamalanrea, Makassar 90245  
Telepon 0411-586016, Fax. 0411-588551, Email: [lpps\\_fmipa.unhas@gmail.com](mailto:lpps_fmipa.unhas@gmail.com)

**LAPORAN HASIL PENGUJIAN**

Nomor: LPPS.XJ-2104-10/2

**Nama Pelanggan** : Muhammad Yudin, drg  
*Customer Name*  
**Alamat** : FKG UNHAS  
*Address University*  
**Jenis Sampel** : Serbuk Cangkang Kerang  
*Type of Sample (s)*  
**Tanggal Penerimaan** : 25 Mei 2021  
*Received Date*  
**Tanggal Analisis** : 26 Mei 2021  
*Analysis Date*  
**Email** : muhammadyudin30@gmail.com  
*Email*

Setelah dilakukan pengujian diperoleh hasil sebagai berikut:

Group : Standard (Crystallinity)

Data : LPPS.XJ-2104-10/2

# Strongest 3 peaks

No.	Peak No.	2Theta (deg)	d (Å)	I/I1	FWHM (deg)	Intensity (Counts)	Integrated Int (Counts)
1.	2	29.8259	2.99319	100	0.48120	392	10600
2.	7	48.9166	1.86049	29	0.43330	112	2601
3.	6	47.7986	1.90136	25	0.60720	99	3137

Makassar, 7 Juni 2021  
Wakil Penanggung Jawab Teknis  
  
Nuzulita S. Si, M.Si  
7508261996012001

Catatan:

- Hasil Uji hanya berlaku untuk contoh tersebut di atas
- Dilarang mengutip/menyalin sebagian isi hasil uji ini

No. Dok: FSOP-7.8-LPPS-FMIPAUII-01.1  
Contact: 085298785786 (Only WhatsApp)

No.Revisi/Terbit:0/1

Halaman 2 dari 2

## LAMPIRAN ANALISIS BMP-2

### Explore

Notes		
Output Created		01-OCT-2021 09:56:32
Comments		
Input	Active Dataset	DataSet37
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	30
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax		EXAMINE VARIABLES=OPG BMP2 TGFB1 /PLOT BOXPLOT STEMLEAF NPLOT /COMPARE GROUPS /STATISTICS DESCRIPTIVES /INTERVAL 95 /MISSING LISTWISE /NOTOTAL.
Resources	Processor Time	00:00:00.84
	Elapsed Time	00:00:01.00

[DataSet37]

### Case Processing Summary

Cases

	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
BMP2	30	100.0%	0	0.0%	30	100.0%

### Descriptives

		Statistic	Std. Error
BMP2	Mean	8.6000	.68916
95% Confidence Interval for Mean		Lower Bound	7.1905
		Upper Bound	10.0095
5% Trimmed Mean		8.5741	
Median		9.0000	
Variance		14.248	
Std. Deviation		3.77469	
Minimum		2.00	
Maximum		16.00	
Range		14.00	
Interquartile Range		6.00	
Skewness		-.054	.427
Kurtosis		-.757	.833

### Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
BMP2	.109	30	.200 <sup>*</sup>	.971	30	.554

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

## BMP2

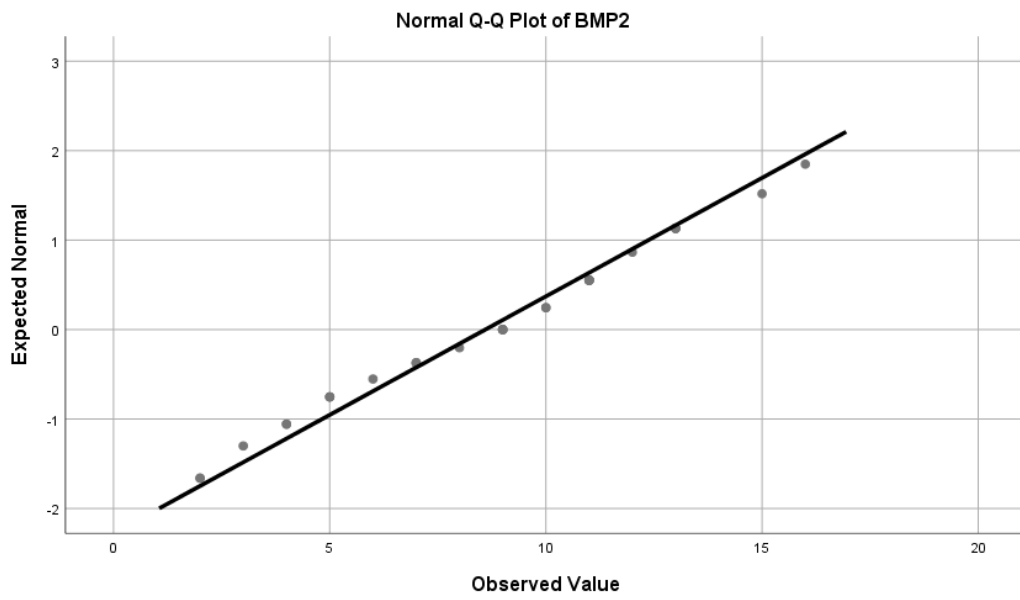
BMP2 Stem-and-Leaf Plot

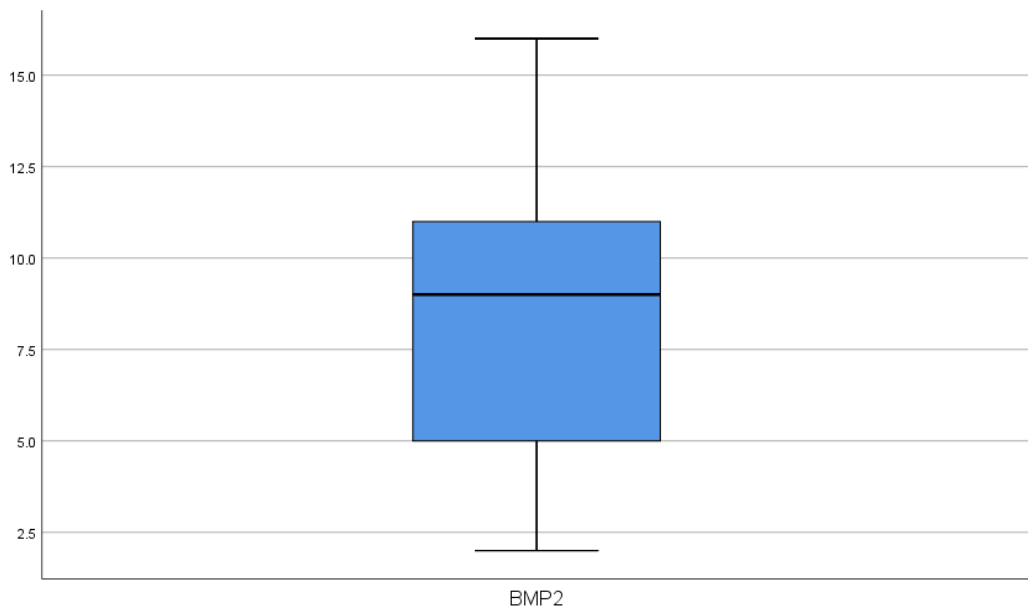
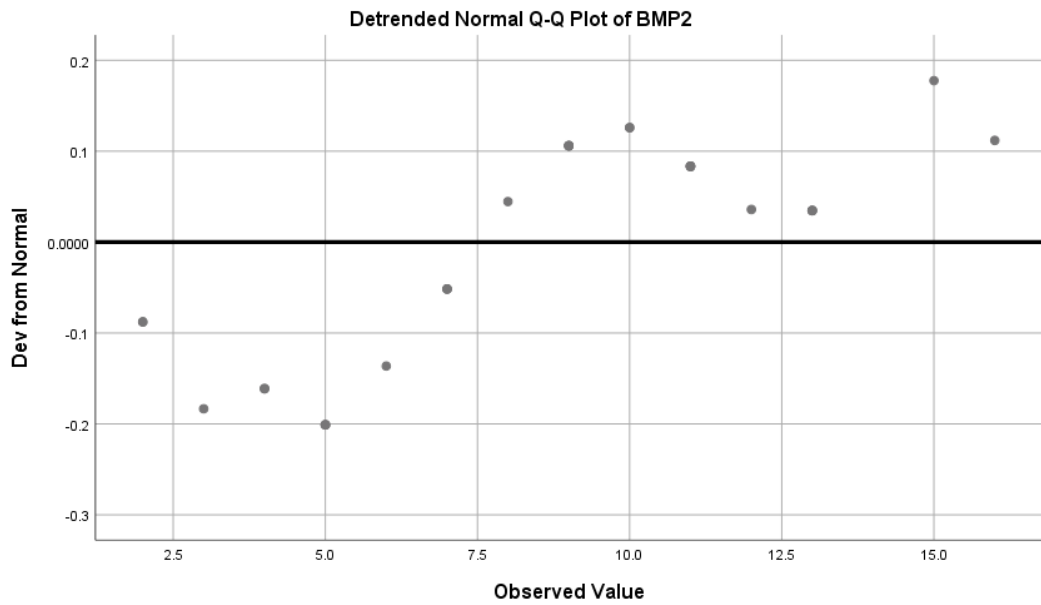
Frequency	Stem & Leaf
.00	0 .
3.00	0 . 223
5.00	0 . 44555
4.00	0 . 6777



5.00	0 .	89999
7.00	1 .	0011111
4.00	1 .	2333
1.00	1 .	5
1.00	1 .	6

Stem width: 10.00  
Each leaf: 1 case(s)





**ANOVA**

		Sum of Squares	df	Mean Square	F	Sig.
BMP2	Between Groups	225.800	2	112.900	16.266	.000
	Within Groups	187.400	27	6.941		

Total	413.200	29			
-------	---------	----	--	--	--

### Multiple Comparisons

LSD

Dependent Variable	(I) Kelompok	(J) Kelompok	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
BMP2	Negatif	Positif	-6.70000*	1.17820	.000	-9.1175	-4.2825
		Perlakuan	-2.90000*	1.17820	.021	-5.3175	-.4825
	Positif	Negatif	6.70000*	1.17820	.000	4.2825	9.1175
		Perlakuan	3.80000*	1.17820	.003	1.3825	6.2175
	Perlakuan	Negatif	2.90000*	1.17820	.021	.4825	5.3175
		Positif	-3.80000*	1.17820	.003	-6.2175	-1.3825

\*. The mean difference is significant at the 0.05 level.

### Post Hoc Tests

```
T-TEST GROUPS=Pengamatan(1 2)
/MISSING=ANALYSIS
/VARIABLES=OPG BMP2 TGFB1
/CRITERIA=CI (.95) .
```

### T-Test

#### Notes

Output Created	01-OCT-2021 09:58:47	
Comments		
Input	Active Dataset	DataSet37
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	30
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.

Cases Used		Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis.
Syntax		T-TEST GROUPS=Pengamatan(1 2) /MISSING=ANALYSIS /VARIABLES=OPG BMP2 TGFB1 /CRITERIA=CI(.95).
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.01

### Group Statistics

	Pengamatan	N	Mean	Std. Deviation	Std. Error Mean
BMP2	H14	15	7.0667	4.00832	1.03494
	H21	15	10.1333	2.89992	.74876

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BMP2	Equal variances assumed	2.417	.131	-2.401	28	.023	-3.06667	1.27740	-5.68330	-.45004
	Equal variances not assumed			-2.401	25.504	.024	-3.06667	1.27740	-5.69488	-.43845

## Means

### Notes

Output Created		01-OCT-2021 10:02:17
Comments		
Input	Active Dataset	DataSet37
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	30
Missing Value Handling	Definition of Missing	For each dependent variable in a table, user-defined missing values for the dependent and all grouping variables are treated as missing.
	Cases Used	Cases used for each table have no missing values in any independent variable, and not all dependent variables have missing values.
Syntax		MEANS TABLES=OPG BMP2 TGFB1 BY Pengamatan BY Kelompok /CELLS=MEAN STDDEV.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00

### Report

Pengamatan	Kelompok		OPG	BMP2	TGFB1
H14	Negatif	Mean	4.0000	3.2000	5.6000
		Std. Deviation	1.58114	1.30384	2.40832
	Positif	Mean	11.4000	11.8000	10.6000
		Std. Deviation	1.81659	2.28035	2.40832
	Perlakuan	Mean	6.6000	6.2000	7.4000
		Std. Deviation	1.34164	1.30384	2.07364

## Case Processing Summary

		Cases					
		Included		Excluded		Total	
		N	Percent	N	Percent	N	Percent
BMP2 * Pengamatan * Kelompok		30	100.0%	0	0.0%	30	100.0%
Total		Mean		7.3333	7.0667	7.8667	
		Std. Deviation		3.49830	4.00832	3.02056	
H21	Negatif	Mean		6.8000	7.6000	8.6000	
		Std. Deviation		.83666	2.60768	3.84708	
	Positif	Mean		10.6000	12.4000	10.8000	
		Std. Deviation		1.51658	2.30217	2.77489	
	Perlakuan	Mean		9.8000	10.4000	10.6000	
		Std. Deviation		2.28035	1.67332	1.67332	
Total	Mean		9.0667	10.1333	10.0000		
	Std. Deviation		2.28244	2.89992	2.87849		
Total	Negatif	Mean		5.4000	5.4000	7.1000	
		Std. Deviation		1.89737	3.02581	3.41402	
	Positif	Mean		11.0000	12.1000	10.7000	
		Std. Deviation		1.63299	2.18327	2.45176	
	Perlakuan	Mean		8.2000	8.3000	9.0000	
		Std. Deviation		2.44040	2.62679	2.44949	
	Total	Mean		8.2000	8.6000	8.9333	
		Std. Deviation		3.03315	3.77469	3.09542	

```

USE ALL.
COMPUTE filter_$=(Pengamatan = 1).
VARIABLE LABELS filter_$ 'Pengamatan = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
EXAMINE VARIABLES=OPG BMP2 TGFB1
  /PLOT BOXPLOT STEMLEAF NPLOT
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.

```

## Explore

## Notes

Output Created		01-OCT-2021 10:23:57
Comments		
Input	Active Dataset	DataSet37
	Filter	Pengamatan = 1 (FILTER)
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	15
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax	EXAMINE VARIABLES=OPG BMP2 TGFB1 /PLOT BOXPLOT STEMLEAF NPLOT /COMPARE GROUPS /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.	
Resources	Processor Time	00:00:00.83
	Elapsed Time	00:00:00.86

### Case Processing Summary

	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
BMP2	15	100.0%	0	0.0%	15	100.0%

### Descriptives

		Statistic	Std. Error
BMP2	Mean	7.0667	1.03494

95% Confidence Interval for	Lower Bound	4.8469	
Mean	Upper Bound	9.2864	
5% Trimmed Mean		6.9074	
Median		6.0000	
Variance		16.067	
Std. Deviation		4.00832	
Minimum		2.00	
Maximum		15.00	
Range		13.00	
Interquartile Range		7.00	
Skewness		.581	.580
Kurtosis		-.606	1.121
Variance		9.124	
Std. Deviation		3.02056	
Minimum		3.00	
Maximum		14.00	
Range		11.00	
Interquartile Range		4.00	
Skewness		.183	.580
Kurtosis		-.058	1.121

### Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
BMP2	.164	15	.200*	.939	15	.373

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

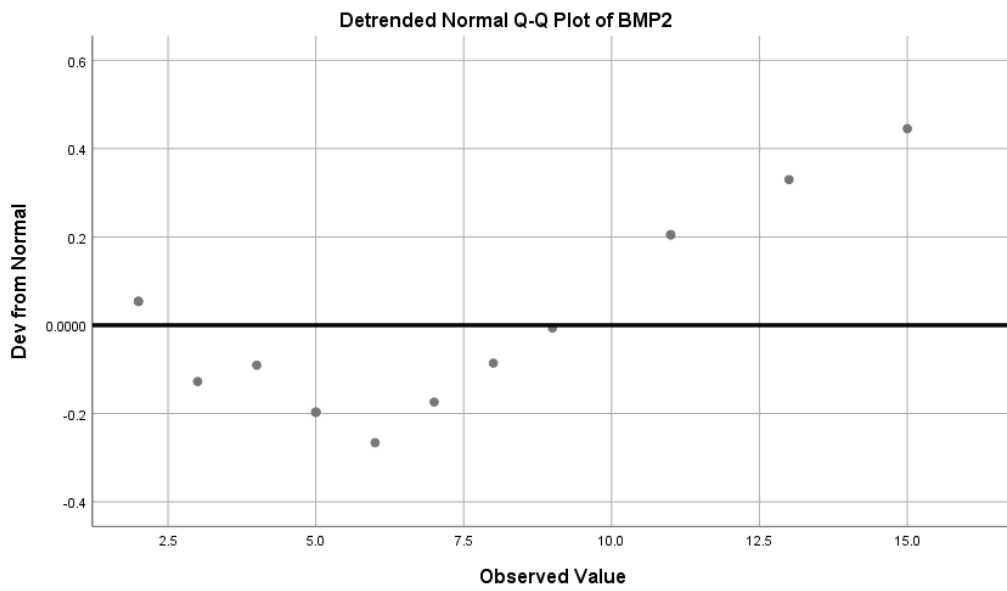
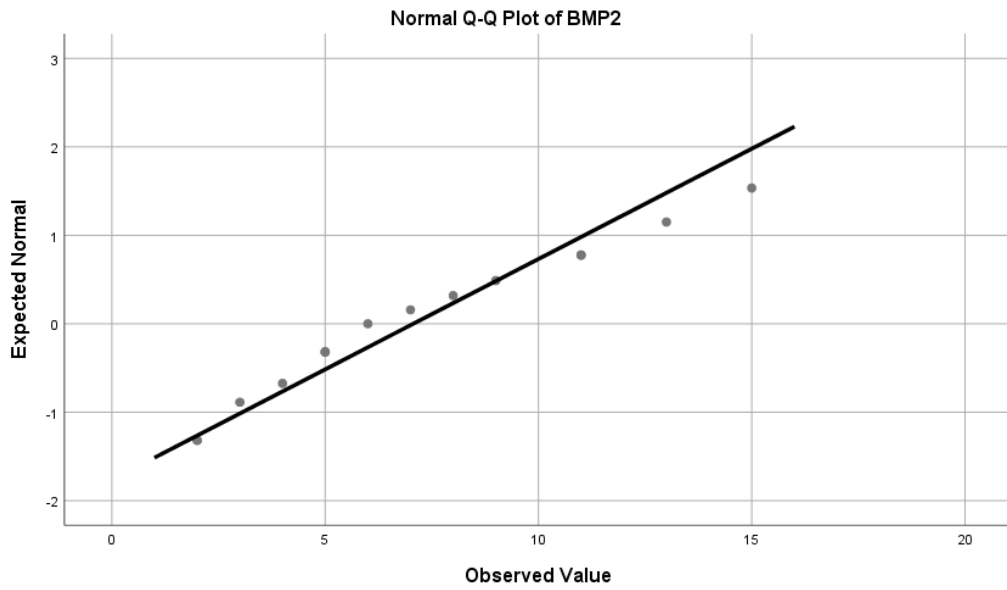
## BMP2

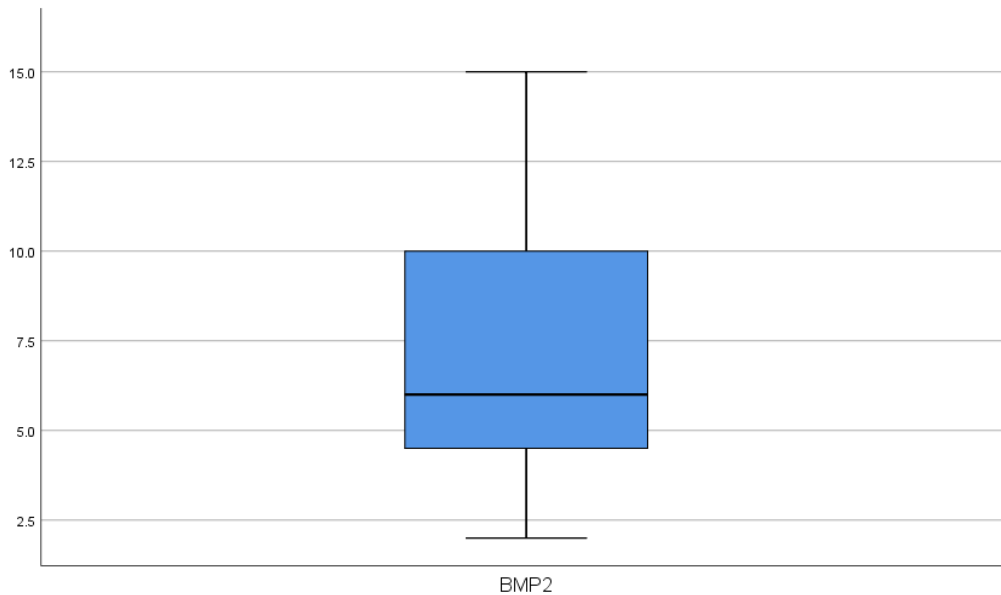
BMP2 Stem-and-Leaf Plot

Frequency	Stem &	Leaf
4.00	0 .	2234
7.00	0 .	5556789
3.00	1 .	113
1.00	1 .	5



Stem width: 10.00  
Each leaf: 1 case(s)





```

ONEWAY OPG BMP2 TGFB1 BY Kelompok
/MISSING ANALYSIS
/POSTHOC=LSD ALPHA(0.05) .

```

## Oneway

### Notes

Output Created		01-OCT-2021 10:24:03
Comments		
Input	Active Dataset	DataSet37
	Filter	Pengamatan = 1 (FILTER)
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	15
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on cases with no missing data for any variable in the analysis.
Syntax	ONEWAY OPG BMP2 TGFB1 BY Kelompok /MISSING ANALYSIS /POSTHOC=LSD ALPHA(0.05).	
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.02

### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
BMP2	Between Groups	190.533	2	95.267	33.233	.000
	Within Groups	34.400	12	2.867		
	Total	224.933	14			

### Post Hoc Tests

#### Multiple Comparisons

LSD

Dependent Variable	(I) Kelompok	(J) Kelompok	Mean Difference			95% Confidence Interval	
			(I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
BMP2	Negatif	Positif	-8.60000*	1.07083	.000	-10.9331	-6.2669
		Perlakuan	-3.00000*	1.07083	.016	-5.3331	-.6669
	Positif	Negatif	8.60000*	1.07083	.000	6.2669	10.9331
		Perlakuan	5.60000*	1.07083	.000	3.2669	7.9331
	Perlakuan	Negatif	3.00000*	1.07083	.016	.6669	5.3331
		Positif	-5.60000*	1.07083	.000	-7.9331	-3.2669

\*. The mean difference is significant at the 0.05 level.

```

USE ALL.
COMPUTE filter_$=(Pengamatan = 2).
VARIABLE LABELS filter_$ 'Pengamatan = 2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
EXAMINE VARIABLES=OPG BMP2 TGFB1
  /PLOT BOXPLOT STEMLEAF NPLOT
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.
    
```

### Explore

### Notes

Output Created		01-OCT-2021 10:24:44
Comments		
Input	Active Dataset	DataSet37
	Filter	Pengamatan = 2 (FILTER)
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	15
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax	EXAMINE VARIABLES=OPG BMP2 TGFB1 /PLOT BOXPLOT STEMLEAF NPLOT /COMPARE GROUPS /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.	
Resources	Processor Time	00:00:00.77
	Elapsed Time	00:00:00.79

### Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
BMP2	15	100.0%	0	0.0%	15	100.0%

### Descriptives

		Statistic	Std. Error
BMP2	Mean	10.1333	.74876
	95% Confidence Interval for Mean	Lower Bound 8.5274	
		Upper Bound 11.7393	
	5% Trimmed Mean	10.1481	
	Median	10.0000	
	Variance	8.410	
	Std. Deviation	2.89992	
	Minimum	4.00	
	Maximum	16.00	
	Range	12.00	
	Interquartile Range	3.00	
	Skewness	-.132	.580
	Kurtosis	.809	1.121
	Maximum	14.00	
	Range	11.00	
	Interquartile Range	4.00	
	Skewness	-.871	.580
	Kurtosis	1.142	1.121

### Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
BMP2	.148	15	.200 <sup>*</sup>	.975	15	.922

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

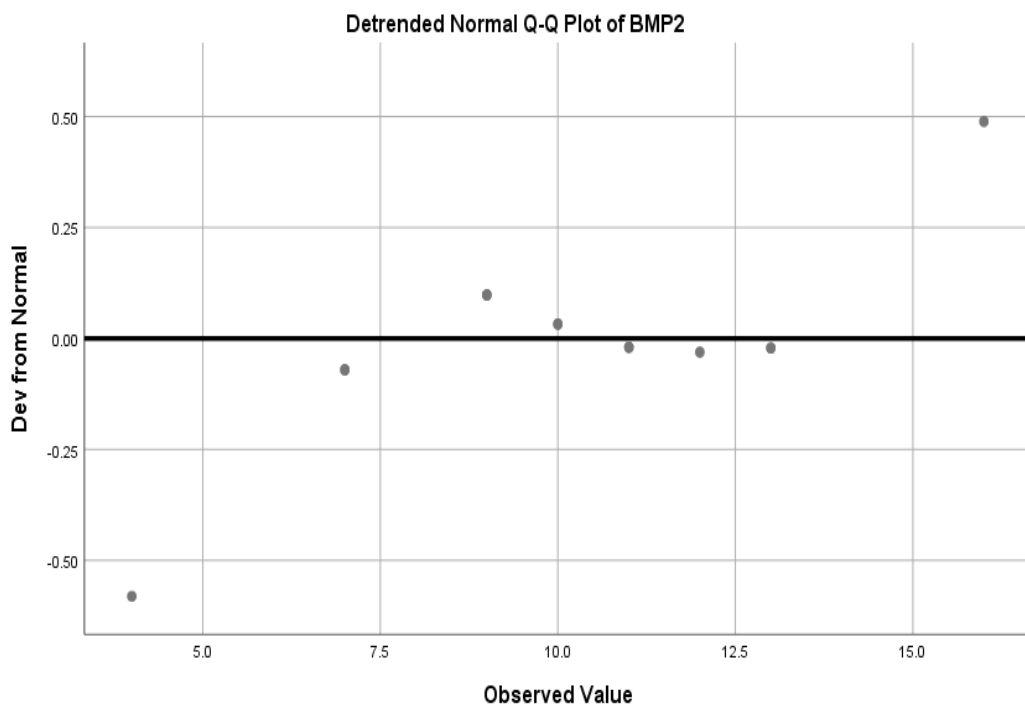
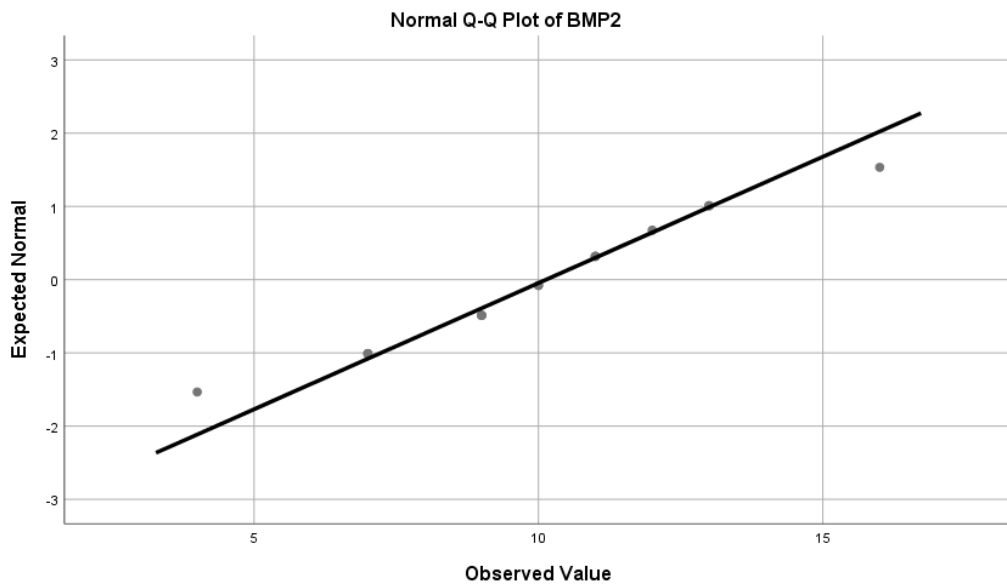
## BMP2

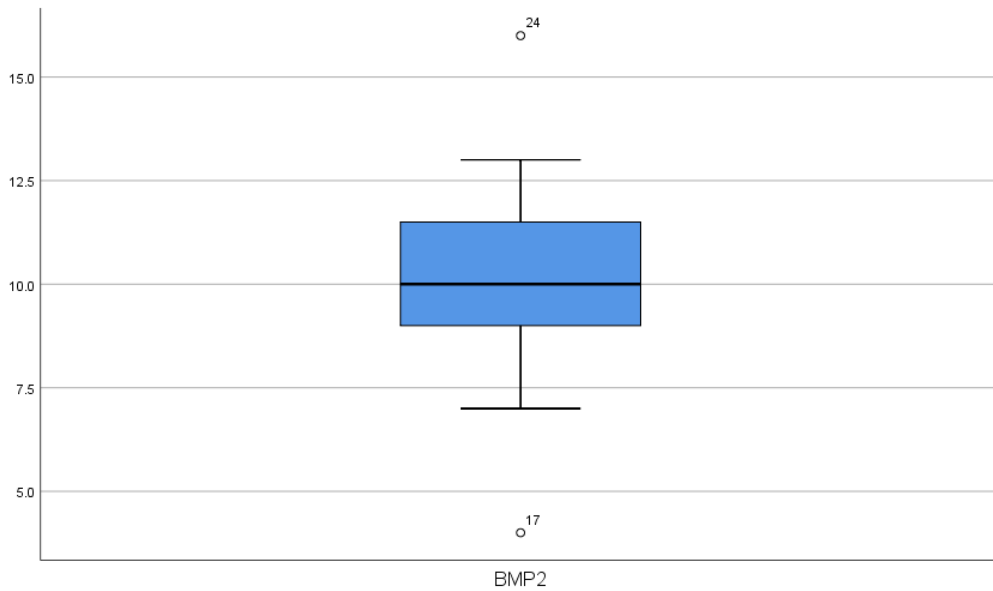
BMP2 Stem-and-Leaf Plot

```

Frequency      Stem & Leaf
1.00 Extremes      (<=4)
5.00           0 .  77999
8.00           1 .  00111233
1.00 Extremes      (>=16)
    
```

Stem width: 10.00  
Each leaf: 1 case(s)





```

ONEWAY OPG BMP2 TGFB1 BY Kelompok
  /MISSING ANALYSIS
  /POSTHOC=LSD ALPHA(0.05) .

```

## Oneway

### Notes

Output Created	01-OCT-2021 10:24:49	
Comments		
Input	Active Dataset	DataSet37
	Filter	Pengamatan = 2 (FILTER)
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	15
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on cases with no missing data for any variable in the analysis.

Syntax	ONEWAY OPG BMP2 TGFB1 BY Kelompok /MISSING ANALYSIS /POSTHOC=LSD ALPHA(0.05).	
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.01

### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
BMP2	Between Groups	58.133	2	29.067	5.852	.017
	Within Groups	59.600	12	4.967		
	Total	117.733	14			

### Post Hoc Tests

#### Multiple Comparisons

LSD

Dependent Variable	(I) Kelompok	(J) Kelompok	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
			(I-J)			Lower Bound	Upper Bound
BMP2	Negatif	Positif	-4.80000*	1.40949	.005	-7.8710	-1.7290
		Perlakuan	-2.80000	1.40949	.070	-5.8710	.2710
	Positif	Negatif	4.80000*	1.40949	.005	1.7290	7.8710
		Perlakuan	2.00000	1.40949	.181	-1.0710	5.0710
	Perlakuan	Negatif	2.80000	1.40949	.070	-.2710	5.8710
		Positif	-2.00000	1.40949	.181	-5.0710	1.0710

\*. The mean difference is significant at the 0.05 level.

MEANS TABLES=OPG BMP2 TGFB1 BY Kelompok BY Pengamatan  
/CELLS=MEAN STDDEV.

### Means

#### Notes

Output Created	01-OCT-2021 10:29:10	
Comments		
Input	Active Dataset	DataSet37
	Filter	<none>



	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	30
Missing Value Handling	Definition of Missing	For each dependent variable in a table, user-defined missing values for the dependent and all grouping variables are treated as missing.
	Cases Used	Cases used for each table have no missing values in any independent variable, and not all dependent variables have missing values.
Syntax		MEANS TABLES=OPG BMP2 TGFB1 BY Kelompok BY Pengamatan /CELLS=MEAN STDDEV.
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.04

### Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
BMP2 * Kelompok * Pengamatan	30	100.0%	0	0.0%	30	100.0%

Kelompok	Pengamatan		BMP2
Negatif	H14	Mean	3.2000
		Std. Deviation	1.30384
	H21	Mean	7.6000
		Std. Deviation	2.60768
	Total	Mean	5.4000
		Std. Deviation	3.02581
Positif	H14	Mean	11.8000
		Std. Deviation	2.28035

	H21	Mean	12.4000
		Std. Deviation	2.30217
	Total	Mean	12.1000
		Std. Deviation	2.18327
Perlakuan	H14	Mean	6.2000
		Std. Deviation	1.30384
	H21	Mean	10.4000
		Std. Deviation	1.67332
	Total	Mean	8.3000
		Std. Deviation	2.62679
Total	H14	Mean	7.0667
		Std. Deviation	4.00832
	H21	Mean	10.1333
		Std. Deviation	2.89992
	Total	Mean	8.6000
		Std. Deviation	3.77469

```

USE ALL.
COMPUTE filter_$=(Kelompok = 1).
VARIABLE LABELS filter_$ 'Kelompok = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
EXAMINE VARIABLES=OPG BMP2 TGFB1
  /PLOT BOXPLOT STEMLEAF NPLOT
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.

```

## Explore

### Notes

Output Created	01-OCT-2021 10:31:20	
Comments		
Input	Active Dataset	DataSet37
	Filter	Kelompok = 1 (FILTER)
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	10

Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax		EXAMINE VARIABLES=OPG BMP2 TGFB1 /PLOT BOXPLOT STEMLEAF NPLOT /COMPARE GROUPS /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.
Resources	Processor Time	00:00:00.86
	Elapsed Time	00:00:00.87

### Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
BMP2	10	100.0%	0	0.0%	10	100.0%

### Descriptives

		Statistic	Std. Error
BMP2	Mean	5.4000	.95685
	95% Confidence Interval for Mean	Lower Bound	3.2355
		Upper Bound	7.5645
	5% Trimmed Mean	5.2778	
	Median	4.5000	
	Variance	9.156	
	Std. Deviation	3.02581	
	Minimum	2.00	
	Maximum	11.00	
	Range	9.00	
	Interquartile Range	4.75	

Skewness	.664	.687
Kurtosis	-.505	1.334

### Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
BMP2	.178	10	.200 <sup>*</sup>	.925	10	.404

\*. This is a lower bound of the true significance.

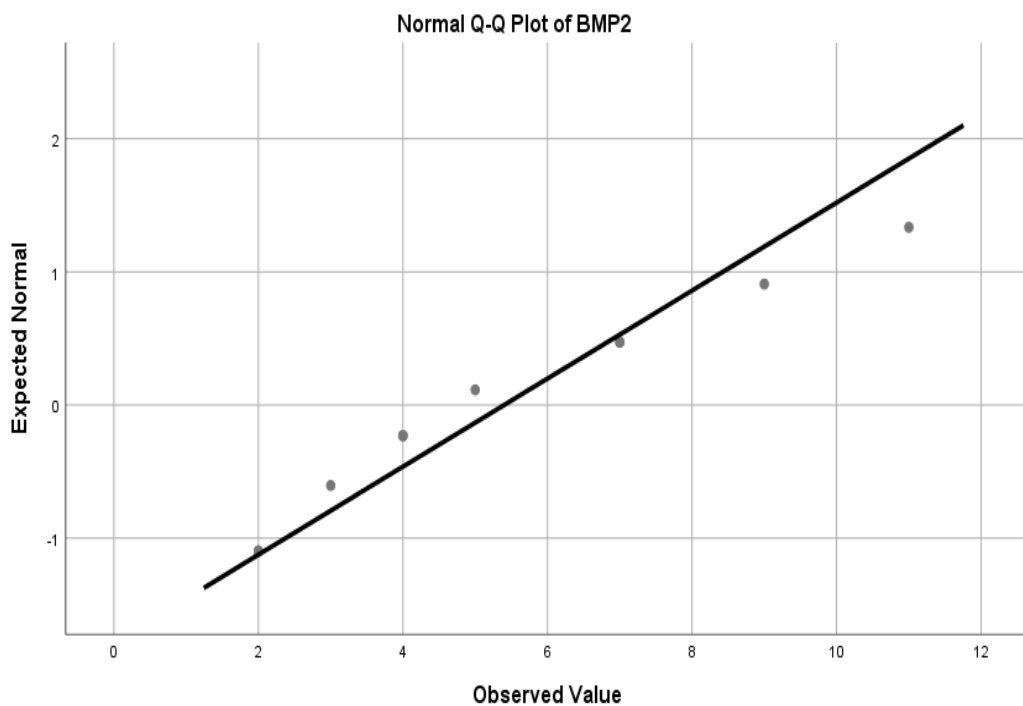
a. Lilliefors Significance Correction

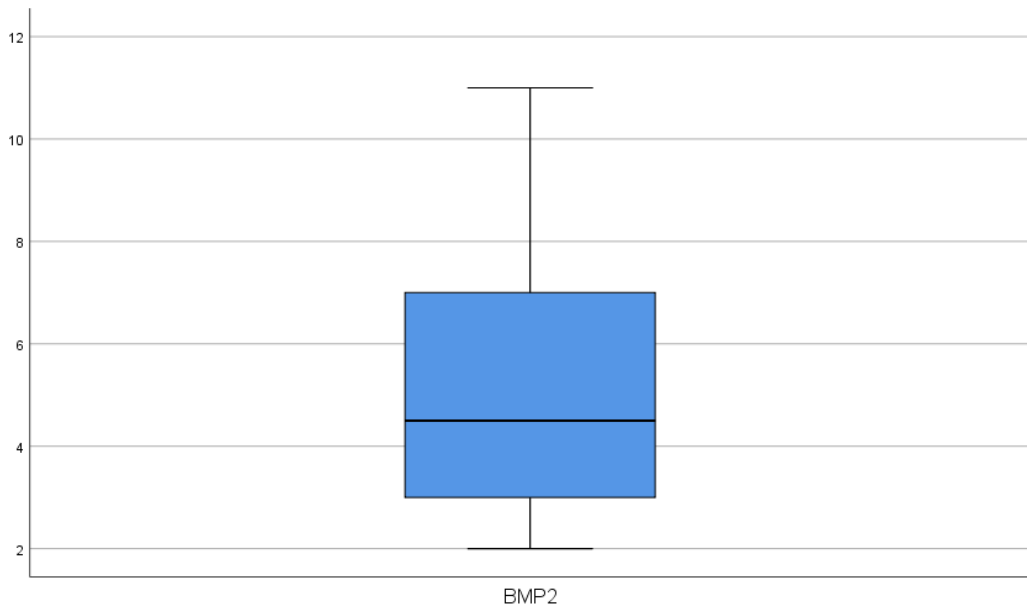
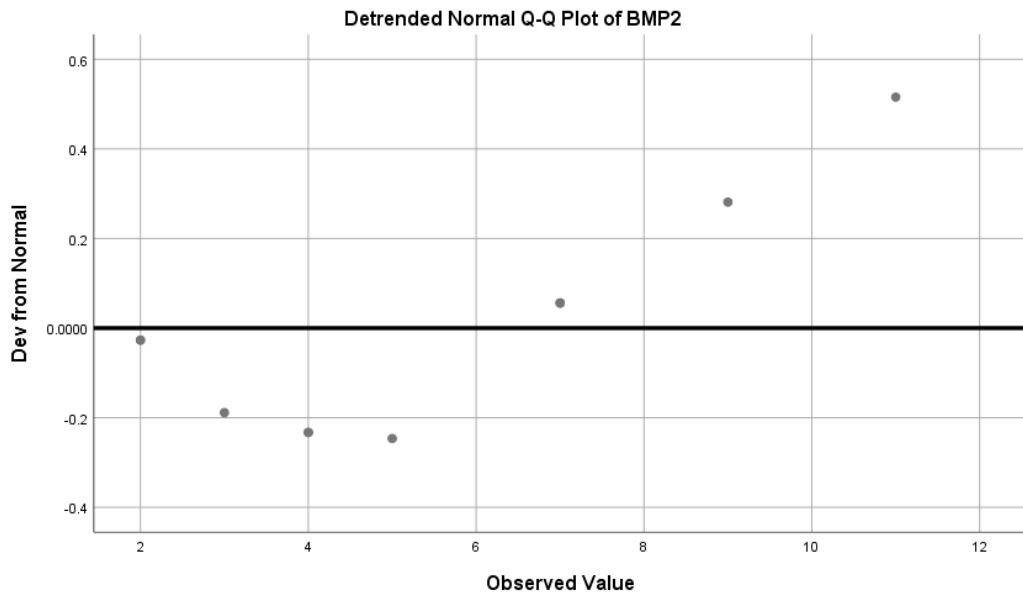
## BMP2

BMP2 Stem-and-Leaf Plot

Frequency	Stem & Leaf
5.00	0 . 22344
4.00	0 . 5779
1.00	1 . 1

Stem width: 10.00  
Each leaf: 1 case(s)





```

T-TEST GROUPS=Pengamatan(1 2)
/MISSING=ANALYSIS
/VARIABLES=OPG BMP2 TGFB1
/CRITERIA=CI (.95) .

```

## T-Test

### Notes

Output Created	01-OCT-2021 10:31:27	
Comments		
Input	Active Dataset	DataSet37
	Filter	Kelompok = 1 (FILTER)
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	10
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis.
Syntax	T-TEST GROUPS=Pengamatan(1 2) /MISSING=ANALYSIS /VARIABLES=OPG BMP2 TGFB1 /CRITERIA=CI(.95).	
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.00

### Group Statistics

	Pengamatan	N	Mean	Std. Deviation	Std. Error Mean
BMP2	H14	5	3.2000	1.30384	.58310
	H21	5	7.6000	2.60768	1.16619

Independent Samples Test											
		Levene's Test for Equality of Variances					t-Test for Equality of Means			95% Confidence Interval of the Difference	
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper	
BMP2	Equal variances assumed	1.524	.252	-3.375	8	.010	-4.40000	1.30384	-7.40666	-1.39334	
	Equal variances not assumed			-3.375	5.882	.015	-4.40000	1.30384	-7.60591	-1.19409	

```

USE ALL.
COMPUTE filter_$=(Kelompok = 2).
VARIABLE LABELS filter_$ 'Kelompok = 2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
EXAMINE VARIABLES=OPG BMP2 TGFB1
  /PLOT BOXPLOT STEMLEAF NPLOT
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.

```

## Explore

### Notes

Output Created	01-OCT-2021 10:31:51	
Comments		
Input	Active Dataset	DataSet37
	Filter	Kelompok = 2 (FILTER)
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	10
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.

Syntax		EXAMINE VARIABLES=OPG BMP2 TGFB1 /PLOT BOXPLOT STEMLEAF NPLOT /COMPARE GROUPS /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.
Resources	Processor Time	00:00:01.30
	Elapsed Time	00:00:00.92

### Case Processing Summary

	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
BMP2	10	100.0%	0	0.0%	10	100.0%

### Descriptives

		Statistic	Std. Error
BMP2	Mean	12.1000	.69041
	95% Confidence Interval for Mean	Lower Bound	10.5382
		Upper Bound	13.6618
	5% Trimmed Mean	12.0556	
	Median	11.5000	
	Variance	4.767	
	Std. Deviation	2.18327	
	Minimum	9.00	
	Maximum	16.00	
	Range	7.00	
	Interquartile Range	2.75	
	Skewness	.562	.687
	Kurtosis	-.309	1.334



### Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
BMP2	.193	10	.200*	.947	10	.638

\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

### BMP2

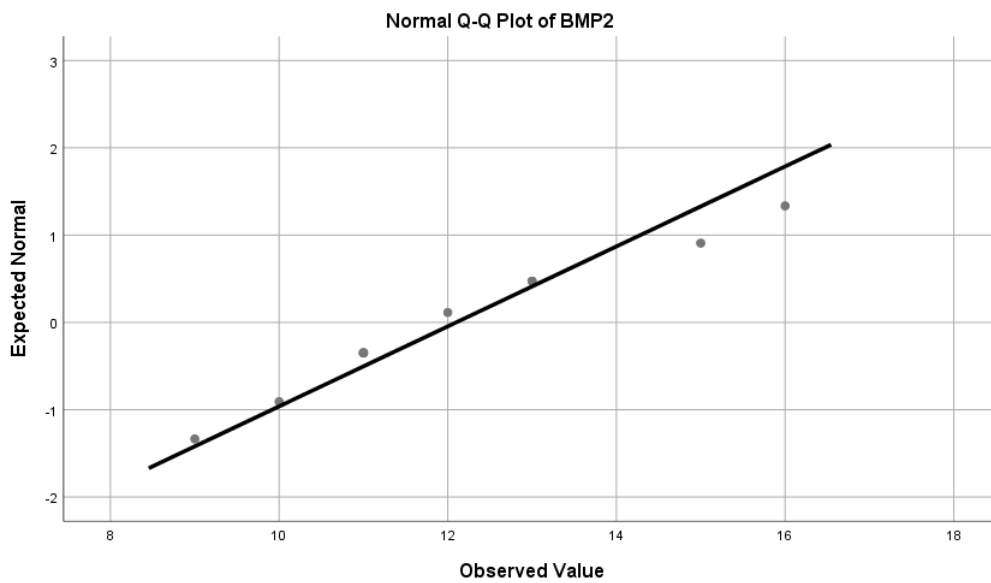
BMP2 Stem-and-Leaf Plot

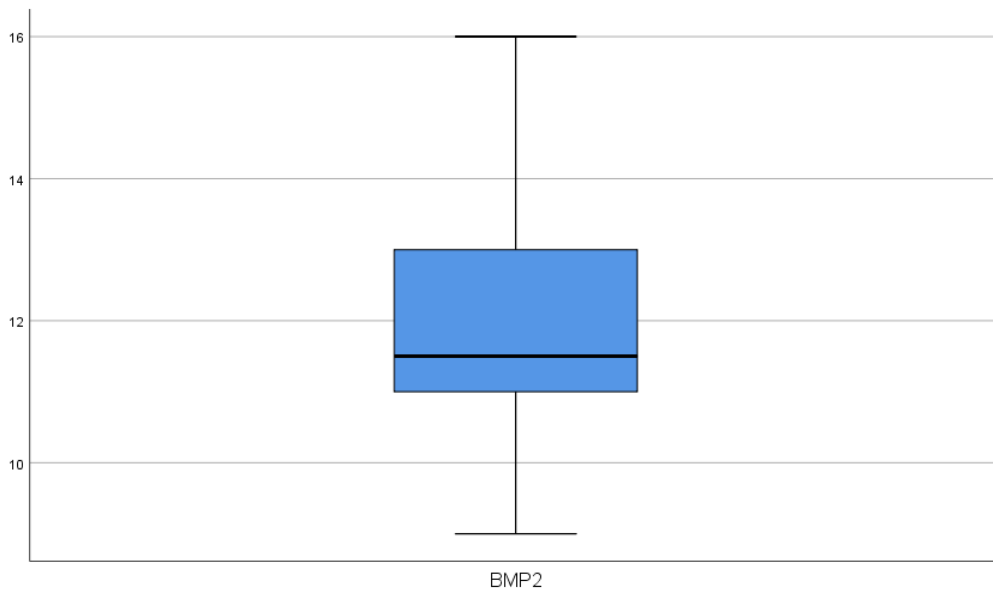
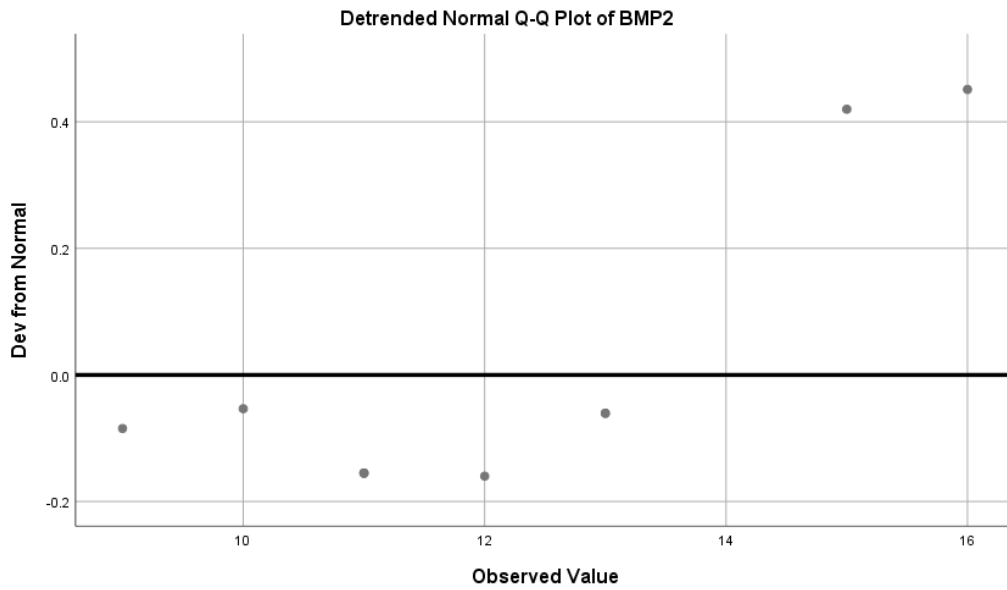
```

Frequency      Stem & Leaf
      1.00      0 . 9
      7.00      1 . 0111233
      2.00      1 . 56
  
```

```

Stem width:    10.00
Each leaf:     1 case(s)
  
```





```
T-TEST GROUPS=Pengamatan(1 2)
/MISSING=ANALYSIS
/VARIABLES=OPG BMP2 TGFB1
/CRITERIA=CI (.95) .
```

## T-Test

### Notes

Output Created	01-OCT-2021 10:31:58	
Comments		
Input	Active Dataset	DataSet37
	Filter	Kelompok = 2 (FILTER)
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	10
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis.
Syntax	T-TEST GROUPS=Pengamatan(1 2) /MISSING=ANALYSIS /VARIABLES=OPG BMP2 TGFB1 /CRITERIA=CI(.95).	
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.01

**Independent Samples Test**

		Levene's Test for Equality of Variances					t-test for Equality of Means		95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BMP2	Equal variances assumed	.010	.922	-.414	8	.690	-.60000	1.44914	-3.94172	2.74172
	Equal variances not assumed			-.414	7.999	.690	-.60000	1.44914	-3.94177	2.74177

### Group Statistics

	Pengamatan	N	Mean	Std. Deviation	Std. Error Mean
BMP2	H14	5	11.8000	2.28035	1.01980
	H21	5	12.4000	2.30217	1.02956

```

USE ALL.
_ $ 'Kelompok = 3 (FILTER)'.
VALUE LABELS filter_ $ 0 'Not Selected' 1 'Selected'.
FORMATS filter_ $ (f1.0).
FILTER BY filter_ $.
EXECUTE.
EXAMINE VARIABLES=OPG BMP2 TGFB1
  /PLOT BOXPLOT STEMLEAF NPLOT
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.

```

## Explore

### Notes

Output Created		01-OCT-2021 10:32:24
Comments		
Input	Active Dataset	DataSet37
	Filter	Kelompok = 3 (FILTER)
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	10
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax	EXAMINE VARIABLES=OPG BMP2 TGFB1 /PLOT BOXPLOT STEMLEAF NPLOT /COMPARE GROUPS /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.	

Resources	Processor Time	00:00:00.81
	Elapsed Time	00:00:00.86

### Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
	BMP2	10	100.0%	0	0.0%	10

### Descriptives

		Statistic	Std. Error	
BMP2	Mean	8.3000	.83066	
	95% Confidence Interval for Mean	Lower Bound	6.4209	
		Upper Bound	10.1791	
	5% Trimmed Mean	8.2222		
	Median	8.5000		
	Variance	6.900		
	Std. Deviation	2.62679		
	Minimum	5.00		
	Maximum	13.00		
	Range	8.00		
	Interquartile Range	4.50		
	Skewness	.328	.687	
	Kurtosis	-.590	1.334	

### Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
BMP2	.109	10	.200*	.956	10	.744

\*. This is a lower bound of the true significance.

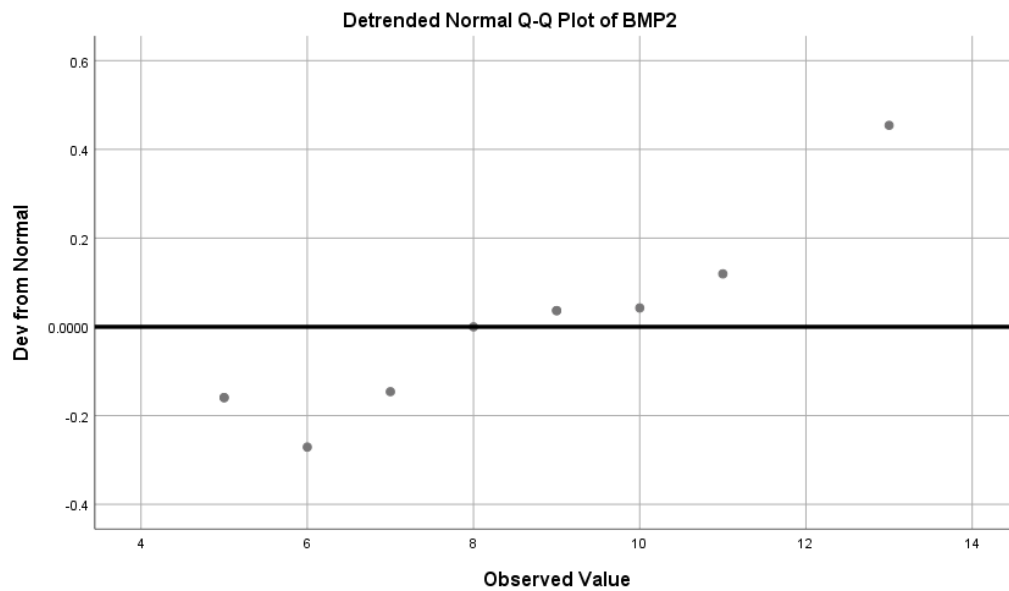
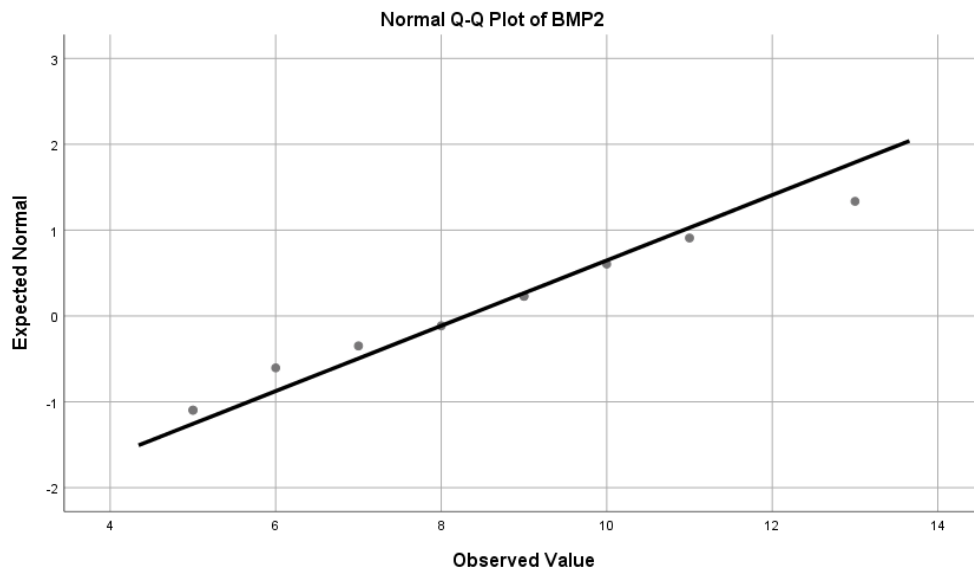
a. Lilliefors Significance Correction

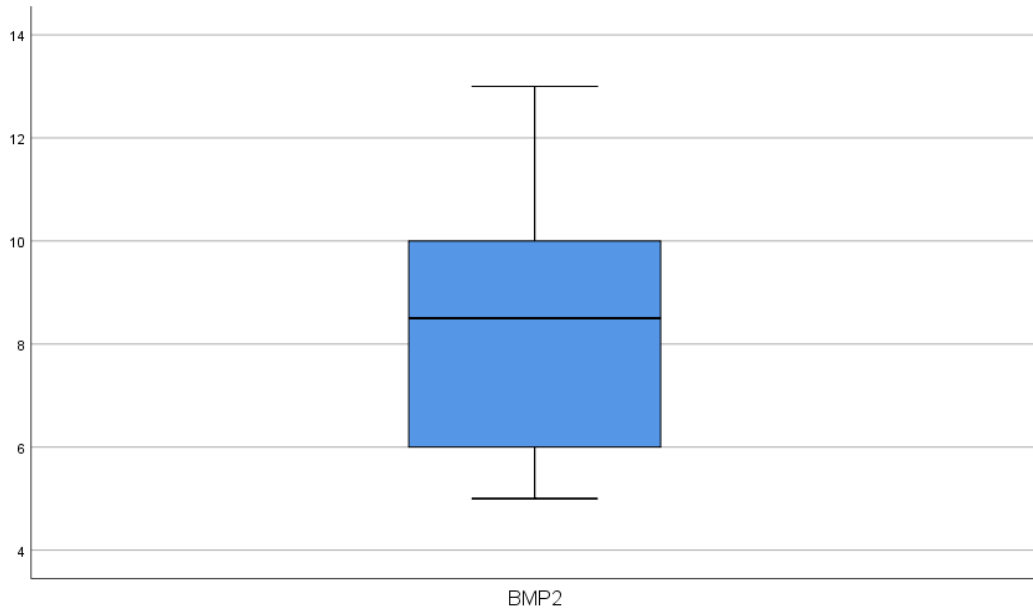
## BMP2

BMP2 Stem-and-Leaf Plot

Frequency	Stem &	Leaf
.00	0 .	
7.00	0 .	5567899
3.00	1 .	013

Stem width: 10.00  
Each leaf: 1 case(s)





```
T-TEST GROUPS=Pengamatan(1 2)
/MISSING=ANALYSIS
/VARIABLES=OPG BMP2 TGFB1
/CRITERIA=CI (.95) .
```

## T-Test

### Notes

Output Created	01-OCT-2021 10:32:30	
Comments		
Input	Active Dataset	DataSet37
	Filter	Kelompok = 3 (FILTER)
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	10
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.

Cases Used		Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis.
Syntax		T-TEST GROUPS=Pengamatan(1 2) /MISSING=ANALYSIS /VARIABLES=OPG BMP2 TGFB1 /CRITERIA=CI(.95).
Resources	Processor Time	00:00:00.02
	Elapsed Time	00:00:00.01

### Group Statistics

	Pengamatan	N	Mean	Std. Deviation	Std. Error Mean
BMP2	H14	5	6.2000	1.30384	.58310
	H21	5	10.4000	1.67332	.74833

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				95% Confidence Interval of the Difference		
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
BMP2	Equal variances assumed	.262	.623	-4.427	8	.002	-4.20000	.94868	-6.38767	-2.01233
	Equal variances not assumed			-4.427	7.549	.003	-4.20000	.94868	-6.41063	-1.98937



