

CHAPTER 6

COMPARISON OF DIFFERENT ELISA REAGENT KITS FOR DIAGNOSIS OF TOMATO BROWN RUGOSE FRUIT VIRUS IN TOMATO PLANT

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1. INTRODUCTION

Tomato is one of the most important vegetables produced and consumed in different ways in the world and in our country. Total tomato production in the world was 186.821.216 tons on an area of 5.051.983 ha. (FAO, 2020). Tomatoes are produced mostly in China. Türkiye meets 7% of the world tomato production with a production of 13.204.015 tons (FAO, 2020). With these rates, Türkiye ranks third in the world in tomato production. Our country has an important place in the world's total tomato export. According to UN-Comtrade's 2019 data, Mexico ranks first in world tomato exports, followed by the Netherlands and Spain. Ranking fifth in world tomato exports, Türkiye share in exports increased by 1% from 525 thousand tons to 535 thousand tons in 2019. Türkiye exported 551 thousand tons of tomatoes to the Russian Federation, Ukraine, Syria, Iraq and Romania, respectively, in the 2019-2020 period. Tomatoes are also exported to Bulgaria and Belarus.

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ACKNOWLEDGEMENTS

This work was supported by Republic of Türkiye Ministry of Agriculture and Forestry General Directorate of Agricultural Research and Policies (Project No: TAGEM/BSAD/Ü/21/A2/P1/2564).

REFERENCES

- Adams, M.J., Antoniw, J.F., Kreuze, J., 2009. Virgaviridae: a new family of rod-shaped plant viruses. *Arch Virol* 154:1967–1972.
- Alkowni, R., Alabdallah, O., and Fadda, Z., 2019. Molecular identification of tomato brown rugose fruit virus in tomato in Palestine. *Journal of Plant Pathology*, Volume 101, Issue 3, pp 719–723.
- Bernabé-Orts, J.M., Torre, C., Méndez-López, E., Hernando, Y., Aranda, M.A., 2021. New Resources for the Specific and Sensitive Detection of the Emerging Tomato Brown Rugose Fruit Virus. *Viruses*, 13, 1680.
- Broadbent, L., 1976. Epidemiology and control of tomato mosaic virus. *Annu Rev Phytopathol* 14:75–96.
- Hanssen IM, Lapidot M, Thomma BPHJ, 2010. Emerging viral diseases of tomato crops. *Mol Plant Microbe Interact* 23:539–548.
- Cambrón-Crisantos, J.M., Rodríguez-Mendoza, J., Valencia-Luna, J.B., Alcasio-Rangel, S., García-Ávila, C.J., López-Buenfil, J.A., and Ochoa-Martínez, D.L., 2018. First report of Tomato brown rugose fruit virus (ToBRFV) in Michoacan, Mexico. *Mexican Journal of Phytopathology*, 37(1): 185-192.
- Chitambar, J., 2018. California pest rating for *Tomato brown rugose fruit virus*. Pest Rating:A, 1-8 <https://blogs.cdfa.ca.gov/Section3162/?p=5843>
- Clark, M.F., Adams, A.N., 1977. Characteristics of the microplate method of enzyme linked immunosorbent assay for detection of plant viruses J. of Gen. Virol. 34:475-483.
- Celik, N., Özalp, R., Celik, I., 2010. Bazı Biber Hat ve Çeşitlerinin *Tobacco mosaic tobamovirus* (TMV)'E Dayanıklılığının Mekanik İnokulasyon ve Elisa Testleri İle Belirlenmesi. *Batı Akdeniz Tarımsal Araştırma Enstitüsü Derim Dergisi*, 27(2):1-9.
- Deom, C. M., Quan, S. and He, X.Z., 1997. Replicase proteins as determinants of phloem-dependent long-distance movement of tobamoviruses in tobacco. *Protoplasma*, 199:1-8
- Dombrovsky, A., Smith, E., 2017. Seed Transmission of Tobamoviruses: Aspects of Global Disease Distribution. pp: 234-260. In: Jose C. Jimenez-Lopez (ed.). *Seed Bio-logy*. IntechOpen. 233-260p. <http://doi.org/10.5772/intechopen.70244>.
- FAO, 2020. Food and Agriculture Organization of the United Nations -FAO. <https://www.fao.org/faostat/en/#data/QCL/visualize>.

- Fidan, H., Sarikaya, P., Calis, O., 2019. First report of *Tomato brown rugose fruit virus* on tomato in Turkey. *New Disease Reports* 39, 18.
- Hanssen, Im., Lapidot, M., Thomma, BP, 2010. Emerging viral diseases of tomato crops. *Mol Plant Microbe Interact.* 23(5):539±48. doi: 10.1094/MPMI-23-5-0539 PMID: 20367462.
- Luria, N., Smith, E., Reingold, V., Bekelman, I., Lapidot, M., Levin, I., Elad, N., Tam, Y., Sela, Abu-Ras, A., Ezra, N., Haberman, A., Yitzhak, L., Lachman, O., Dombrovsky, A., 2017. A new Israeli *Tobamovirus* isolate infects tomato plants harboring Tm-2² resistance genes. *PLoS ONE* 12 (1):e0170429. doi:10.1371/journal.pone.0170429:p1-19.
- Menzel, W., Knierim, D., Winter, S., Hamacher, J., Heupel, M., 2019. First report of *Tomato brown rugose fruit virus* infecting tomato in Germany. *New Disease Reports* 39, 1.
- Pagan, I., Firth, C., Holmes, Ec., 2010. Phylogenetic analysis reveals rapid evolutionary dynamics in the plant RNA virus genus *Tobamovirus*. *J Mol Evol* 71:298–307.
- Panno, S., Caruso, A. G., Davino, S., 2019. First Report of Tomato Brown Rugose Fruit Virus on Tomato Crops in Italy. *The American Phytopathological Society (APS)*, <https://doi.org/10.1094/PDIS-12-18-2254-PDN>
- Salem, N., Mansou, R A., Ciuffo, M., Falk, B. W., Turina, M., 2016. A new tobamovirus infecting tomato crops in Jordan. *Archives of Virology*, 161(2):503–506.
- Skelton, A., Buxton-Kirk, A., Ward R., Harju, V., Frew, L., Fowkes, A., Long, M., Negus, A., Forde, S., Adams, I.P., Pufal H, Mcgreig S., Weekes R. and Fox A., 2019. First report of Tomato brown rugose fruit virus in tomato in the United Kingdom, *New Disease Reports* 40, 12. [<http://dx.doi.org/10.5197/j.2044-0588.2019.040.012>]
- Yan, Z-Y., Ma, H-Y., Han, S-L., Geng, C., Tian, Y-P, Li, X-D., 2019. First report of *Tomato brown rugose fruit virus* infecting tomato in China. *Plant Disease* (early view). DOI: 10.1094/PDIS-05-19-1045-PDN.