Annals of Plant and Soil Research 22(1): 110-111 (2020)
Short Communication

Antioxidant and antibacterial efficacy of short chain fatty acid extracted from grapes seed oil

ARAJA[1], P.GAJALKSHMI[2] AND G.MANIGANDAN

Department of Microbiology, Dhanalakshmi Srinivasan College of Arts and Science for Women (Autonomous), Perambalur, Tamilnadu, India

Received: November, 2019; Revised accepted: January, 2020

The berries of grapes (*Vitis vinifera* L. ssp. Sativa) have been of interest worldwide due to the nutritional properties of the natural product for making wine and the pharmaceutical properties of derivatives, such as peel and seed extracts. Grape seed oil also called grapeseed oil or grape oil is pressed from the seeds of grapes, and is thus an abundant by-product of winemaking. Grape seed contains 10-20% oil along with fibre, protein and phenolic antioxidants. The importance of grape seed use is mainly due to the fact that it is rich in lipids and bioactive compounds, such as vitamin E, phytosterol and phenolic compounds, among other components with biological activity, which are important for food, pharmaceutical and cosmetic industries. The oil extracted from grape seeds is used in cosmetic, culinary, pharmaceutical and medical purposes. Also, ß-glucan and antioxidant in grape seed oil provides defense against cardiovascular disease (Lutterodt *et al.*, 2011). Presence of phenols and polyphenols in grape seed which act as bactericidal through disruption of the bacterial cell wall (ElZainy *et al.*, 2016).

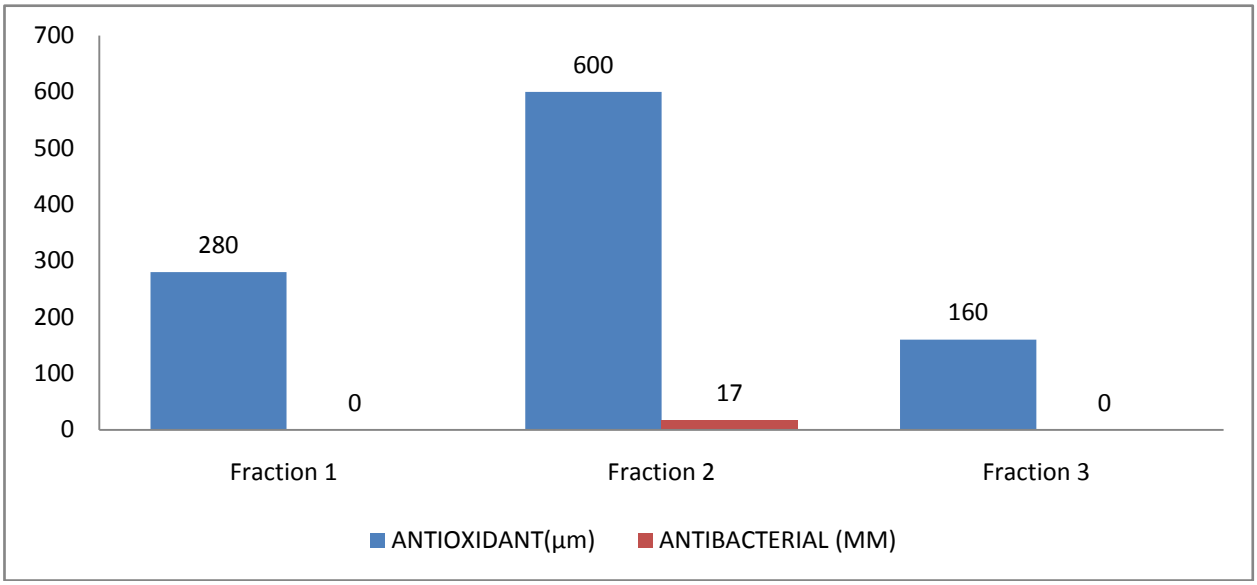

Figure 1: Antibacterial and Antioxidant activity of nonpolar lipid extract

The grape seed oil of a standard food grade was purchased from the local market. According to the Standard IUPAC Method, 1 g of oil ether dissolved in elution solvent is a mixture of light petroleum and diethyl ether 87:13 (v/v). Elution of nonpolar compounds is carried out with a mixture of light petroleum, diethyl ether and acetic acid 70:30:2 (v/v/v) as developing solvent are used. After plate development and solvent evaporation, the plate is sprayed with a phosphomolybdic acid solution and heated at 120-130°C to visualize spots. Estimation of Triglycerides was done by using semi auto analyzer Free fatty acids were estimated by titration usingphenolphthalein indicator against 0.1N potassium hydroxide and acid value was calculated. Acid value= Vx0.00561x1000/weight of oil(g). Antimicrobial activities of the sample were tested by Kirby Bauer disc diffusion and broth micro dilution tests according to the

Corresponding author: rajajmcmicro@yahoo.co.in
[3]Department of Biotechnology, JJ college of Arts and Science (Autonomous), Pudukkottai, Tamilnadu

recommendations of Clinical and Laboratory Standards Institute. About 100 µl of each fraction were loaded on sterile disc and bio assayed against met^{R}*S.aureus*on Muller Hinton agar platesalong with negative control. Total - antioxidant activity of active antibacterial fractions are measured by ferric reducing antioxidant power (FRAP). The following concentration of ferrous chloride in the tubes will be 1,000, 500, 250, 125, 62.5, and 31.25 µM used as standard.

Grape seed oil free fatty acid was estimated as 0.68% and the triglycride value was calculated as 140mg/mL.oil non polar compounds eluted by column separation. Presence of non polar compound fractions reacted with posphomolybdic acid and the $R_f$value of fractions (F1,F2, F3)were 0.07, 0.08 and 0.14 and none of the polar compounds were detected. The level of polar compounds is a good indicator of the quality of fats and oils. The zone of inhibition of TLC fractions and its bioassay was 17mm in diameter on F2. The increasing concentration of active fraction further showed enhanced antibacterial activity of active Fatty acid fraction with 20 mm zone of inhibition. The antimicrobial activity of short-chain fatty acids against pathogenic bacteria is depend on the type of fatty acid, exposure time, types of pathogens, and quantity used (Molva and Baysal, 2015). Butyric acid, a short-chain fatty acid; has been shown to be effective on single strains of *Salmonella typhimirium* from chickens and *Pseudomanas aeruginosa* from a patient (Adamez *et al.*, 2012). Grape seed oil has beneficial properties for health that are mainly detected by in vitro studies, such as anti-inflammatory, cardioprotective, antimicrobial (Zhu *et al.*, 2015) and anticancer properties, and may interact with cellular and molecular pathways.Silvan *et al.*(2013),evaluated the antibacterial activity of a grape seed extract (GSE) against different Campylobacter strains. FRAP antioxidant assay of grape seed oil fraction II with antibacterial activity and it was found to be having free radical scavenger activity of 600 µM followed by 280 and 160 µM by FI and FIII. The anti oxidant activity of standard ascorbic acid was 400 µM at 500 mg/ml. Grape seed polyphenols have been reported to exhibit a lot of biological and food applications (Peng *et al.*, 2010). Grape seed extract is derived from the grape seeds that is extracted, dried, and purified to produce polyphenolic compound-rich extract that also has well documented antioxidant, antimicrobial, and anti-inflammatory properties.

From the results, it may be concluded that the grape seed fatty acid had potent antioxidant and antibacterial activity.

REFERENSE

Adamez, J., Samino, E., Sanchez, E. and Gomez, D. (2012) In vitro estimation of the antibacterial activity and antioxidant capacity of aqueous extracts from grape-seeds (*Vitis vinifera* L.).Food Control **24**:136-141.

El-Zainy, A.R., Morsy, A.E., Sedki, A.G., and Mosa, N.M. (2016) Polyphenols grape seeds extract as antioxidant and antimicrobial in Beef sausage.International Journal of Current Science 19(2):112-121.

Lutterodt, H., Slavin, M., Whent, M., Turner E., and Yu, L. (2011) Fatty acid composition, oxidative stability, antioxidant and antiproliferative properties of selected cold-pressed grape seed oils and flours. Food Chem **128**: 391-399.

Molva, C. and Baysal, A.H. (2015) Antimicrobial activity of grape seed extract on *Alicyclobacillus acidoterrestris* DSM 3922 vegetative cells and spores in apple juice.LWT-Food Science and Technology **60**(1):238-245.

Peng, X., Ma, J., Wing Cheng, K., Jiang, Y., Chen, F., and Wang M. (2010) The effects of grape seed extract fortification on the antioxidant activity and quality attributes of bread. Food Chemistry **119**(1):49-53.

Silvan, MJ., Mingo, E., Hidalgo, M., Teresa, S., and Carrascosa V., Martinez-Rodriguez J. (2013) Antibacterial activity of a grape seed extract and its fractions against Campylobacter spp. Food Control **29**(1):25-31.

Zhu, M.J., Olsen, SA., Sheng, L., Xue, Y., and Yue, W. (2015) Antimicrobial efficacy of grape seed extract against *Escherichia coli* O157:H7 growth, motility and Shiga toxin production. Food Control **51**:177-182.