

4. CONCLUSION AND SUGGESTIONS

4.1. Conclusion

Roasted coffee antibacterial properties are combined activities of different bioactive compounds, such as chlorogenic acid, trigonelline, melanoidin, caffeine, and other maillard reaction products. Between them, melanoidin is observed as the most effective compound against the growth of bacteria by chelating the stabilizing cation of bacteria outer membrane. Moreover, alfa dicarbonyl compounds as maillard reaction product also exerts strong antibacterial properties with acidity properties. The amount of phenolic acid in roasted coffee are quite low as it is affected by high temperature of roasting. Among the phenolic acid, 5-caffeoylquinic acid is observed as having higher antibacterial activity in comparison to other roasted coffee phenolic compound. Additionally, bioactive compounds such as trigonelline and caffeine are reported with weak antibacterial activity. However, caffeine is able to enhance the antibacterial properties of other compound, such as alfa dicarbonyl compound. Moreover, trigonelline is specifically effective against numerous type of oral bacteria. Overall, roasted coffee is effective toward a wide range of pathogenic bacteria. It is specifically strong toward gram positive bacteria that shown by lower number of minimum inhibition concentration and wider length of inhibition zone.

4.2. Further Study

Further study is suggested to determine the specific interaction of each compounds (the synergism and antagonism) that affecting the use of numerous compounds in the same application. Additionally, as the roasted coffee antibacterial activity had been confirmed, the addition of roasted coffee in other food products may be studied as well to gain better product with longer shelf life with improvement in the flavor as well. The hurdle combination between roasted coffee and functional bacteria, such as lactic acid bacteria is proposed as well. Nowadays, there is a need for a hurdle method to overcome pathogenic bacteria activity with resistance to antibiotics. Lactic acid bacteria which are generally known to exert strong antibacterial activity can be combined with roasted coffee for further evaluation to gain strong antibacterial compounds. Beside from new hurdle combination, the combination of coffee and lactic acid bacteria is expected to act as new functional food thus giving new innovation on the food product.