An Efficient Method to Extract Antimicrobial Saponins from Agave americana and their Application in Fruit Preservation

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Saponins are foaming glycosides, consisting of a polycyclic aglycone that is either a choline steroid or triterpenoid attached to one or more sugar side chains. Saponins have received a number of industrial and commercial applications, ranging from their use as a source of raw materials for the production of steroid hormones in the pharmaceutical industry, to their use as food additives and ingredients in other industrial applications. Saponins have strong surface active properties, and they act like natural fruit preservative products. The separation of saponins from plants is challenging because of their surface active properties. The separation process requires high energy and solvent consumption. This research has been done to find out an efficient way (gel-formation method) to extract saponins from the Agave americana leaf juice with low cost and high purity. The juice liquid is obtained as a discarded product from Agave fiber making process which causes harm to the environment. The fungal inhibition tests showed inhibitory activity on two fungi Fusarium oxysporum and Rhizoctonia solani after applying the obtained saponins. The bacterial inhibition tests on 4 bacteria B. subtilis ATCC 6633, E. coli ATCC 11105, S. lutea, and P. auroginosa showed inhibitory activity on E. coli ATCC 11105. The antibacterial and antifungal activity of obtained saponins shows great potential for fruit preservation. The results of our study show that a solution of 2g/L saponins prevents growth of fungi on tomato and banana. The aqueous solution of 4g/L saponins also effectively protected the Chinese cabbage from grey aphids.

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