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Synergism activity of some selected microbial species for effective fermentation

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Various types of micro-organisms can be used for fermentation. Interaction between microbes can be of different types and can be either detrimental or beneficial. There are many of types of relationships between microbial types. These are synergism, neutralism, commensalism, mutualism, amensalism and parasitism. In fermentation, synergism of microbes is considered to obtain higher yields. In synergism, both parties benefit from the relationship because each member can produce its own food. One microbial type can be replaced by another microorganism therefore it is a loose relationship. It allows the microbial population to perform functions which it may not produce individually. One microbial type may be able to utilize polysaccharides and digest it to give disaccharides, but it may not proceed beyond this stage. However, another microbial type may breakdown disaccharides to monosaccharides. At the end both microbial types can utilize monosaccharides to produce energy and carbon dioxide, i.e., fermentation. In this research, *Saccharomyces cerevisiae, Aspergillus niger*, and an unknown bacterium which was isolated from sugar cane sap were used. As the substrate three types of over-ripe banana were used. They were over-ripe Seeni, Anamaalu and Embul. Spec of inoculums were added to homogenized over-ripe banana and allowed to ferment for 10 days. Using Gas Chromatography (GC), the ethanol concentration was determined. To determine the synergistic activity of microbes, various combinations of inoculum types were used. As the negative control individual inoculums were added under the same condition. The highest yield of 17.7 ± 0.14% (V/V) was obtained by over-ripe Seeni variety with the unknown bacterium isolated from sugar cane sap and *Saccharomyces cerevisiae* on the 5th day of fermentation. According to the results, ethanol yield is high when two inoculums are used rather than individual microorganisms. A higher ethanol yield was obtained from all microbial combinations compared to the negative control. It represents the synergistic activity of above microbial types. The unknown bacterium isolated from sugar cane sap and *Saccharomyces cerevisiae* showed the highest synergistic activity among the tested combinations. Thus combination of microbial types can be used for effective fermentation.
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