

ABSTRACT

The current research work deals with the utilization of fruit waste for sustainable production of *Saccharomyces cerevisiae* biomass, known as Baker's yeast. This study includes formulation of sustainable media, optimization of baker's yeast production, consumption of produced baker's yeast, and evaluation of its kinetic parameters. The baker's yeast samples of two different companies were purchased from commercial market, Lahore and the strain having excellent potential based on preliminary, biochemical profiling and on analysis of growth pattern was selected for optimized production of baker's yeast. The selected strain was optimized for various parameters viz. medium (sustainable media formulation; orange peels), temperature (33°C), initial pH (5), inoculum age (24 h), inoculum size (8% v/v), and agitation rate (170 rpm). Maximum wet biomass production (152.02±2.21g/l) of baker's yeast was achieved under optimized conditions. On analysis of time course comparison of optimized and un-optimized condition it was found that almost 2.2-fold higher biomass of baker's yeast produced on utilizing orange peels as substrate, relatively to un-optimized conditions at 32 h of incubation, respectively. However, 24 h time of incubation was also found to be encouraging ($p \leq 0.05$) in producing biomass of baker's yeast. Moreover, application of Pirt model (1970) was used for the determination of kinetic growth parameters such as specific growth rate, yield coefficient, volumetric rate, and specific rate constants related to baker's yeast biomass production. Almost 6.5-fold higher yield of baker's yeast was produced under optimized conditions at 32 h time of fermentation, than un-optimized condition, comparatively.