

Abstract

The aim of this study was to standardize the fermentation parameters for the production of wine from a black rice variety named *Poietron* cultivated in Manipur, India. In the first step, conditions for the saccharification of rice starch by enzymes produced by the organisms *Aspergillus oryzae* ATCC10124 and *Bacillus subtilis* ATCC11774 were optimized by using response surface methodology (RSM) based on a Box–Behnken design (BBD). The estimated optimum conditions were found to be pH of 7.37, time of 63.92 h and temperature of 43.09 °C, under which conditions the experimental values for the responses were 3.27 mg/mL reducing sugars, 438.57 µg/mL total phenol content (TPC), 3.75 mg/mL free amino nitrogen (FAN) and 0.18% acidity, which correlated with the predicted values. In the second step, the conditions for the fermentation of black rice wort by *Saccharomyces cerevisiae* ATCC9763 were optimized by using RSM and central composite rotatable design (CCRD). The model predicted that a time period of 74 h, temperature of 26.19 °C and pH 6.96 would give a maximum ethanol production of 12.30% and the experimental value for the same was found to be 11.08%. In another study a technology was developed through the combination of ultrasound assisted extraction (UAE) technology and microwave-assisted extraction (MAE) for the extraction of phenolic compounds from the husk of milled black. The extraction parameters were optimized by RSM according to a BBD. The optimal conditions obtained for the factors were 10.02 min sonication time, 49.46 °C sonication temperature, 1/40.79 (g/mL) solute solvent ratio, 67.34% ethanol concentration, and 31.11 sec microwave time. Under the given solutions, the experimental values for the extraction of phenolics from black rice husk were found to be 1.72 mg/g GAE of TPC, 3.01 mg/100 g of flavonoids, 3.36 mg/100 g of anthocyanins and 100% of radical scavenging activity (RSA). Hence black rice was found to be a good substrate for the production of wine as well as the extraction of phenolic compounds. In wine detection of volatile aromatic compound by GC-MS compound detected 1-methyl-2-pyrrolidine ethanol and propanoic acid, 3-mercapto-, ethyl ester have retention time 1.604 and 1.884. HPLC for phenolic compound in black rice and after fermentation of black rice maximum polyphenol are quinic acid 1486.16 ppm and in after fermentation salicylic acid 677.003 ppm. HPLC for phenolic compound in black rice husk and after optimal condition maximum polyphenol are quinic acid 2682.37 ppm in black rice husk and optimal condition salicylic acid 2052.247 ppm.