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Isolation and Characterization of Nuruk Bacteria from Andong-Soju

Kyung-Hwa Bae^{1,3}, Hee Young Ryu¹, Jong-Sik Kim², Kee Sun Shin⁴ and Ho-Yong Sohn^{1*}¹Dept of Food and Nutrition, and ²Dept. of Biological Science, Andong National University, Andong 760-749³MinSokJu Andong-Soju, Andong, 760-749⁴Biological Resource Center, KRIBB, Daejeon 305-600, Korea

Andong-Soju, which was designated as an intangible cultural asset of Gyung-sangbukdo province from 1987, has been brewed by traditional methods, mixing steamed rice with naturally produced nuruk. To understand the role of nuruk bacteria during the production of Andong-Soju, different bacteria in nuruk and Andong-Soju fermentation broth were isolated. Based on morphology and characteristics of colonies, 7 different bacteria, ADS-1, -2, -3, -4, -5, -8, and ADS-L1, were selected. Among the isolated bacteria, ADS-2, -3, -5 showed minor fermentation activity determined by Durham tube and fermentation-bung method in 10% glucose medium. Based on physiological characteristics and BBL-crystal identification, ADS-1, -2, -3, -4, -5, -8, and ADS-L1 was assessed as *Acinetobacter iwoffii*, *Bacillus pumilus*, *Bacillus cereus*, *Bacillus pumilus*, *Enterobacter cloacae*, *Bacillus amyloliquefaciens*, and *Lactococcus* sp., respectively. Therefore, it was suggested that *Bacillus* sp. may play a role in starch hydrolysis and *Lactobacillus* sp. and *Acinetobacter* sp. may be linked with prevention of contamination and metabiosis. The analysis of starch saccharifying activity showed that ADS-8 has superior amylase activity than other bacteria. The saccharifying activity of ADS-8 was optimal at 50~55°C and pH 4~8, and not observed at pH 3. Our results suggest that *Bacillus amyloliquefaciens* ADS-8 is a major starch saccharifying bacterium during Andong-Soju fermentation.

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Isolation and Characterization of Nuruk Fungi from Andong-Soju

Kyung-Hwa Bae^{1,2}, Hee Young Ryu¹, Jong-Sik Kim³, In-Sook Kwun¹ and Ho-Yong Sohn^{1*}¹Dept of Food and Nutrition, and ³Dept. of Biological Science, Andong National University, Andong 760-749²MinSokJu Andong-Soju, Andong, 760-749

Andong-Soju, which was designated as an intangible cultural asset of Gyung-sangbukdo province from 1987, has been brewed by traditional methods, mixing steamed rice with naturally produced nuruk. To understand the role of nuruk fungi during the production of Andong-Soju, different fungi were isolated from traditionally foot-molded nuruk in Andong-Soju factory. Five fungi, named as ADS-M1, -M2, -M3, -M4, and -M5 were selected based on morphology and characteristics of colonies, and the ADS-M3 was most popular in Andong-Soju nuruk. On the basis of 5.8S rDNA sequencing results, ADS-M3 was assigned to *Aspergillus oryzae* ADS-M3. All of the isolated fungi showed good starch saccharifying and dextrogenic activity, and the superior activities were observed in ADS-M3. The minor activities of CMCase, poly galacturonidase and xylanase, which were related to nuruk production and rice fermentation, were also observed. The starch saccharifying activity of ADS-M3 was optimal at 50~55°C and pH 3~6, respectively. Considering the low pH below 3.5 of fermentation broth during the Andong-Soju brewing, the major saccharification of rice was proceeded by nuruk fungi, especially ADS-M3, rather than nuruk bacteria. Further researches on production of nuruk by selected fungi and bacteria may contribute the quality improvement and consistency of Andong-Soju.