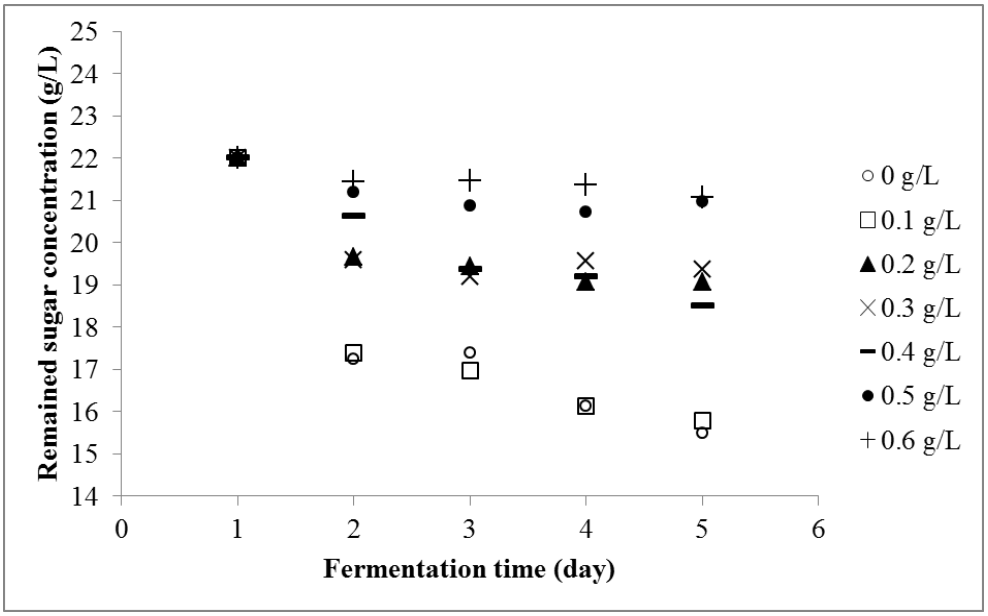

Image 3. Effects of furfural on sugar fermentation of *S. kudriavzevii* ATCC 2601

Yeast strain *S. kudriavzevii* ATCC 2601 had the similar performance with *S.cerevisiae* ATCC 9080, when furfural concentration of 0.4 g/L began to inhibit yeast's activity. At furfural concentration higher than 0.5 g/L, yeast performance reduced remarkably.

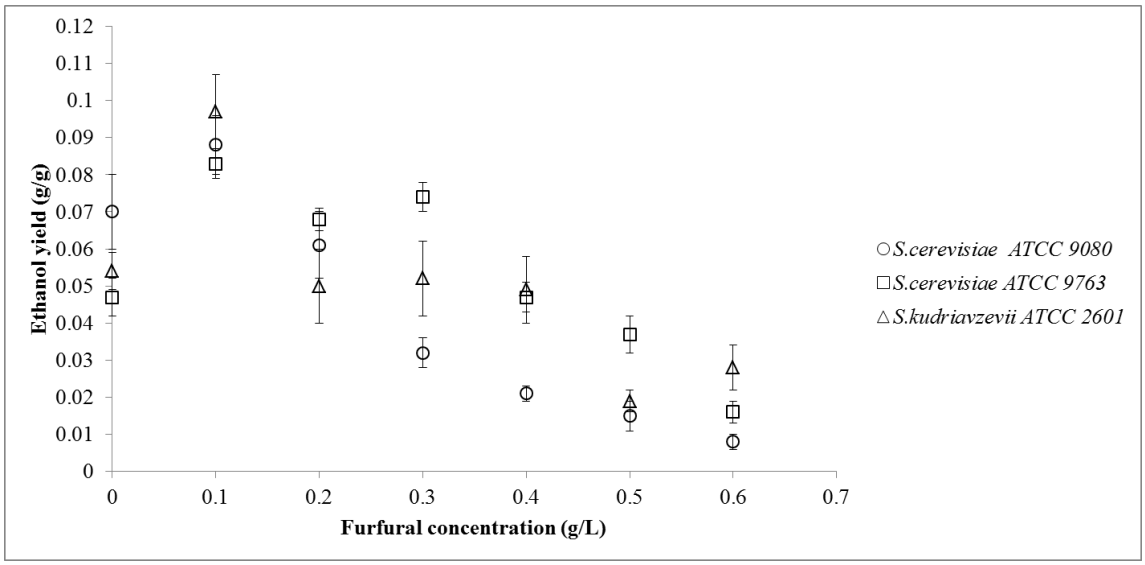

Image 4. Effect of furfural concentration on ethanol yield

With three used strains of Saccharomyces, ethanol yields were highest with furfural concentration of 0.1 g/L, *S.cerevisiae* ATCC 9080 (0.088 ± 0.008 g/g); *S.cerevisiae* ATCC 9763 (0.083 ± 0.004 g/g) and *S.kudriavzevii* ATCC 2601 (0.097 ± 0.01 g/g), higher than hydrolyzate without furfural, with ethanol yield of 0.070 ± 0.010; 0.047 ± 0.005 and 0.054 ± 0.005 g/g for *S.cerevisiae* ATCC 9080; *S.cerevisiae* ATCC 9763 and *S.kudriavzevii* 2601, respectively. This was suitable with the result of Palmqvist et al. (1999), with furfural concentration of 29 mmol/L, ethanol yield was higher than in hydrolyzate without this inhibitor [6]. However, when furfural concentrations increased, ethanol yield decreased, reached 0.008 ± 0.002 g/g; 0.016 ± 0.003 g/g and 0.028 ± 0.006 g/g for *S.cerevisiae* ATCC 9080, *S.cerevisiae* ATCC 9763 and *S. kudriavzevii 2601*, respectively. In the research of Delgenes et al. (1996), when furfural concentration increased from 0.5 to 2 g/L, ethanol yield decreased from 57 to 11% [10].

4. Conclusions

Since three strains of yeast, *S.cerevisiae* ATCC 9080, *S.cerevisiae* ATCC 9763 and *S. kudriavzevii* ATCC 2601, consumed xylose, they can be used for bioethanol production from lignocellulosic hydrolyzate. Focusing on furfural's effect, this study determined lowest furfural concentration of 0.1 g/L, which was not harmful for strains applied. Because methods applied for detoxification can lead to sugar loss, this information can be useful for determining limit of removing inhibitor from lignocellulosic hydrolyzate solution.

5. References

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