SPENT GRAIN AS ALTERNATIVE CARBON SOURCE ON THE *RHODOCOCCUS ERYTHROPOLIS* DSM 44534 CULTIVATION

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Introduction. Brewer's spent grain (SG) represents a waste material during beer production and consists of carbohydrates, proteins, and lignin. SG has been used to support the growth of yeast and mold. Bacteria of the genus Rhodococcus are unusually rich sources of biological compounds such as maleyl acetate [1], γ-butyrolactone (from transformation of bis-(4-chloro-n-butyl) ether [2]) as well as biosurfactants [3].
Considering the utilization of brewery waste material and the large array of enzyme from R. erythropolis, we present the utilization of SG as alternative carbon source for *Rhodococcus erythropolis* DSM 44534 cultivation and formation of heteropolysacchrides.

Methods. *R. erythropolis* was separately incubated in congress wort (SG01) as well as pilot plant wort (SG02) at final concentration of 2% with or without ethanol as co-substrate in minimal medium. 2ml sample were taken every day to determine free glucose and protein concentration with Miller [4] and Bradford method [5], respectively. After 7 days at 28°C incubation, the fermentation was stopped and the culture broth was filtrated. The resulting pellet was dry at 60°C during 24h and then the weight was determined. Polysaccharide formation was determined measuring the sugar content on the culture filtrate which was precipitated by adding 2vol% of ethanol. The precipitate was washed twice with a small amount of 30% ethanol, dissolved in water again and analyzed for sugar.

Results. The cells dry weight and yield of heteropolysaccharide (HPS) produced by *R. erythropolis* are shown in the Table 1. After 5 days incubation, both SG01 and SG02 amount was reduced up to 50% and the biomasses of the cultures were different. Free glucose was used as carbon source as well as protein. *R. erythropolis* produced low concentration of HPS, when ethanol is the only carbon source. Although, the SP 02 with ethanol fermentation showed the highest HPS concentration, no significant difference was observed between SG01 and SG02 according to the HPS yield.

Table 1. Determination of Herepolysaccharide (HPS) in culture from *R. erythropolis* DSM 44534 in different growing conditions: congress wort (SG01), pilot wort (SG02) and 20mM Ethanol as carbon source

Sample	Cell dry weight (mg/mL)	Heteropolysaccharide (mg/mL)
20mM ethanol	1.5±0.05	0.020±0.005
SG01	2.1±0.07	0.085±0.002
SG01+20mM ethanol	5.2±0.24	0.15±0.015
SG02	2.6±0.15	0.075±0.012
SG02+20mM ethanol	8.7±0.15	0.19±0.008

Conclusions. Our finding suggests that *R. erythropolis* has the ability to produce extracellular heteropolysacchrides which have various industrial, pharmaceutical and medical applications. This will be reported in a forthcoming paper. In addition, the present study recommends using brewer's SG as carbon source for *R. erythropolis* cultivation and isolation of high valuable compounds. Write your conclusions precisely, based on your results.

References

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