B.R.A.I.N.

Aerobic preservation of brewer´s grains with a blend of chemical substances

Acosta Aragón, Y.[1]; Kreici, A.[2]; Roth, N.[1]; Klimitsch, F.[2]; Pasteiner, S.[1]
[1]: Biomin Holding GmbH, Herzogenburg, Austria
[2]: Biomin Research Center, Tulln, Austria
yunior.acostaaragon@biomin.net

INTRODUCTION

One of the by- products with high potential for feeding of cattle above all is brewer´s grain (BG). An estimation of its production could be done on the basis of the world beer production (in 2005, 1 598 088 000 hl (1)) multiplied by the amount of brewer´s grain produced per hl beer (20 kg brewer´s grain per hl beer (2)). This way calculated, the worldwide BG production could be estimated in 32 million tons per year.
The aim of this study was to find the right dosage of **Biomin® CleanGrain liquid** (blend of propionic acid, Na propionate and Na benzoate, PNB) to stabilize BG under aerobic conditions for a week.

MATERIALS AND METHODS

A trial was conducted to determine the needed dosage to stabilize fresh brewer´s grains under aerobic conditions for a week using a blend of propionic acid and sodium benzoate (PNB). The fresh material was transported to the laboratory and divided into two parts. One half of the material was preserved with its natural dry matter (DM) content (20- 22 %), the other one was dried up to 30 % of DM. Treatments for preservation in each DM range were 0, 2, 3, 4, 5 and 6 l PNB/ ton. Samples were stored at 25 °C for 1 week in opened containers. The parameters evaluated were DM, pH value, temperature and colony count of yeasts and moulds (only in the treatments with 0, 3 and 6 l PNB/ ton). Each treatment was done in 3 replicates.

RESULTS AND DISCUSSION

The DM content as well as temperature in the different treatments did not vary markedly during the experimental week.
pH development was very different and depending on DM level. The higher the inclusion of PNB, the deeper the acidification (Figure 1, example with 30 % DM)

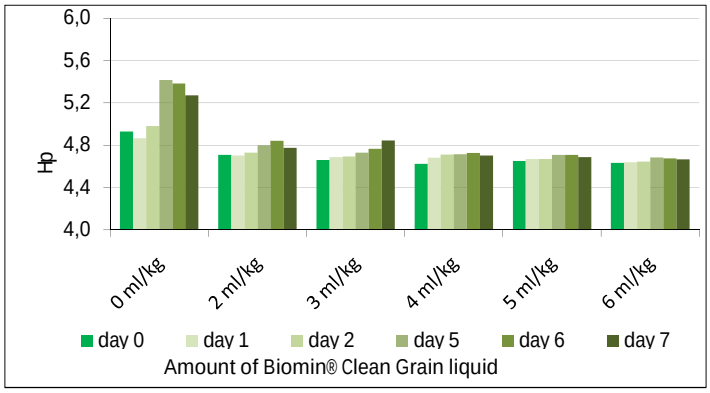

Figure 1: *Dynamic of the pH values in the storage time of 7 days by 30 % DM*

After 3 days pH levels in treatments with 20 % of DM increased considerably to 5.5, indicating instability and favorable conditions for the growth of bacteria mainly. pH values in treatments with 30 % DM content never exceeded 4.7.

Moulds are clearly inhibited by using higher amounts of PNB and by increasing DM (Figure 2).

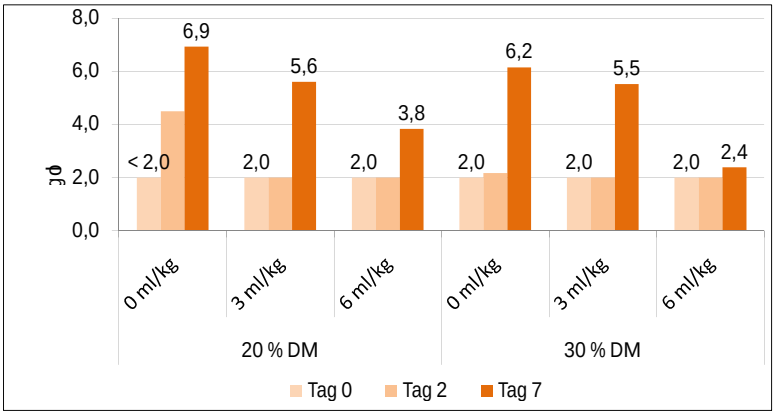

Figure 2: *Mould count in storage time of 7 days by different dosages of* ***Biomin® CleanGrain liquid***

In Figure 5 the yeast counts in 3 different storage times (0, 2 and 7 days) are presented.

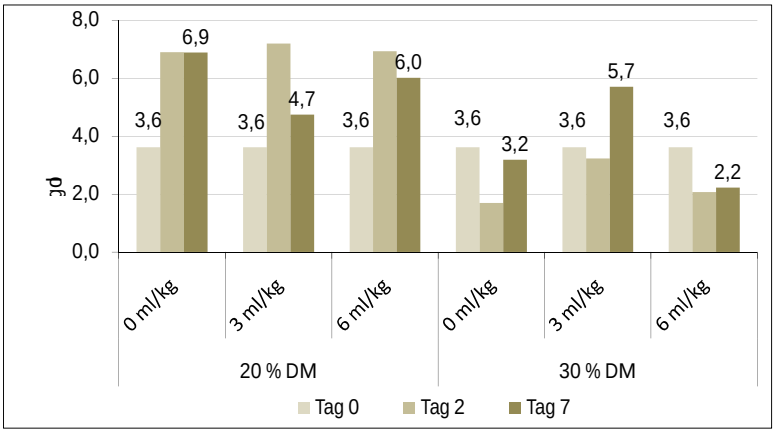

Figure 3: *Yeast count in storage time of 7 days by different dosages of* ***Biomin® CleanGrain liquid***

Results regarding yeasts are not clear enough and must be further discussed/ tested.

CONCLUSIONS

Ø The DM content, the storage time and the dosages do not influence the temperatures inside the preserved material
Ø The rise of pH value is higher when the DM content is lower, meaning less stability
Ø The higher the dosage of Biomin® CleanGrain liquid and the DM content, the better inhibition of moulds
Ø Suggestion based on the recent trial (l/ ton):
Dosage at 20% DM: min. 5
Dosage at 30% DM: min. 3

REFERENCES

(1): Available at: http://www.barthhaasgroup.com/cmsdk/content/bhg/news/report2/keydata.pdf
(2): Available at: http://www.brauunion.at/ASP/ContentScripts/htmlPage.asp?MOID=416429&MVER=DE&UID-=182719160616092008