

**NOTE****Bye-products of Alcohol Industry from Spent Wash**

P.A. LIMAYE and M.S. NIMSE  
*Poona School of Sciences*  
339, Sadashiv Peth, Pune-411 030, India

Only one nonacid aminoacid, asparagine, present in sugarcane juice, seems to be present in spent wash. Pressure treatment of spent wash concentrate with adjusted acidity and further lime treatment afterwards may much reduce the colour of the biogas effluent or secondary spent wash, which is posing a problem and may increase biogas quantity.

Spent wash has been studied as a source of potash and carbon<sup>1,2</sup>. It has now been studied for the presence of ammonia, aminoacids and pentosans. Attempt has been made to study the effect of pressure treatment on the spent wash concentrate.

Spent wash is being studied at Poona School of Sciences for 5-6 years. While studying the low temperature carbonisation of spent wash at ambient pressure, presence of ammonia, aminoacids and pentosans was suspected. An attempt has been made here to detect and find out wherever possible the per day availability of the same and the effect of higher pressure on the concentrate of spent wash with adjusted acidity.

**Ammonia**

Spent wash (100 mL) was diluted with water (250 mL) and slaked lime (15 g) was added rapidly, distilled ammonia being absorbed in HCl (0.2 N). Back titration using methylred as indicator showed ammonia 800 mg per litre. Daily ammonia (400 kg approx.) may be recovered without making much changes in the process.

**Amino Acids**

Spent wash (100.0 mL) was just neutralised with precipitated calcium carbonate (10 g) and filtered. The filtrate was concentrated and dried. The dried mass was extracted with isopropanol (50 mL) by refluxing for 4 h. The solvent was decanted and the residue was dried. The dried residue was dissolved in water (30 mL) and extracted with butanol (50 mL). Butanol layer was separated and boiled till the temperature reached 112° and cooled. Both extracts were spotted on paper and run in butanol (butanol, acetic acid and water, 4:1:5). Both the extracts of the nonacid fraction referred showed the presence of only one aminoacid with  $R_f$  value 0.24. It may be *asparagine* or arginine.

## Pentosans

Pentosans were determined by the method of Schorger<sup>3</sup>. Spent wash (125 mL) was added to concentrated hydrochloric acid (100 mL) and the solution was slowly distilled. The distillate (110 mL) was collected and hydrochloric acid 12% (100 mL) was added to the residue. Distillate (100 mL) was collected, mixed and the total distillate (210 mL) was treated with phloroglucin in hydrochloric acid (12%) and set aside for one day. The precipitate was filtered, dried and washed (with alcohol). Phloroglucin showed the quantity of pentosans as arabans to be 1.8 g per litre. The daily availability in 5 lakh litres of normal distillery will be 0.8 ton; or in other words daily 0.8 ton of arabans will be poured in soil if not attacked by microbes or incinerated.

## Pressure treatment

Spent wash (one litre) was concentrated after adjusting its pH (acid) (150 mL). The concentrate was heated in pressure kler at 118°C (1.8 atmospheres) for 4 h and cooled and set aside for one day. The solid settled was filtered and dried. Part of the dark coloured filtrate (50 mL) was treated with slaked lime (10 g) and boiled, concentrated and dried to remove all ammonia. The dried residue was made to 100 mL with water and filtered. The filtrate was concentrated (25 mL). Though the concentration was double the original (50 mL), it showed reduction in colour 80%. The solution when dried up on a water bath gave a clear brownish residue. The residue being very hygroscopic is not very suitable for storing. The saccharide pattern is being studied for the change after the above treatment to utilise the spent wash to its maximum for biogas whereas it appears dark coloured brackish water formed is posing another problem or easy incineration the gummy material giving surface carbonisation<sup>1</sup> being reduced.

Lime treatment is attempted to make the process more akin to nature for proper disposal, after taking due care and with minimum disturbance to soil composition and the environment.

## REFERENCES

1. P.A. Limaye, 42nd Annual Convention, Deccan Sugar Technologists Association, B-30 (1992).
2. P.A. Limaye, *Asian J. Chem.*, **3**, 659 (1992).
3. A.W. Schorger, *Ind. Eng. Chem.*, **15**, 748 (1923).

(Received: 8 January 1996; Accepted: 27 February 1996)

AJC-1095