Almost complete disintegration of paper strips was obtained within 14 days after 3 transfers during enrichment studies.

Out of the total 20 different isolates obtained by enrichment, 14 isolates were selected during primary screening.

9 isolates were selected during first screening with liquid broth.

Isolates N/B, Mt-3, Mt-5, Mt-6, Mt-8 and Mt-12 were selected for further studies after second screening.

From morphology and cultural characteristics, isolate Mt 3 and isolate Mt 5 has been identified as actinomycetes.

Isolate N/B and isolate 12 has been identified as *Aspergillus niger* and *Aspergillus versicolor* on the basis of cultural and morphological characteristics.

By molecular identification based on 18S rRNA homology, isolate Mt-8 and isolate Mt-6 has been identified as *Galactomyces geotrichum* and *Emericella nidulans* respectively.

All cultures gave gradual increase in soluble sugar concentration up to 13 days, which declined after 13 days with the exception of isolates Mt-6, Mt-8 and N/B.

For *Emericella nidulans*, *Aspergillus niger*, *Galactomyces geotrichum* and isolate 5; pH 4, 5, 6 and 7 were found to be optimum respectively, whereas for isolate 3 and 12 optimum pH was found to be 4 and 5 respectively.

Temperature 20, 30 and 40°C were found to be optimum for *Aspergillus niger*, *Emericella nidulans* and isolate 3 respectively. For isolate 5, *Galactomyces geotrichum* and isolate 12; 30°C was optimum for cellulose bioconversion.

Optimum substrate concentration was 10% for all isolates.
• Sterile system with inoculum and paper waste paper gave maximum of 1608µg/ml sugar on 10th day.
• Carboxy methyl cellulose was used up faster by all the studied organisms giving more sugar production as compared to paper pulp.
• UV exposure for 240 seconds and 360 seconds gave increased activity in terms of sugar by *Emericella nidulans*, *Aspergillus niger* and *Galactomyces geotrichum* respectively, on the other hand isolate 12, increased sugar production was recorded with UV exposure for 120 seconds.
• Agitation was proved beneficial for *Aspergillus niger*, isolate 3 and isolate 5 while *Emericella nidulans*, *Galactomyces geotrichum* and isolate 12 gave better cellulose degradation at static condition.
• Tryptone was best nitrogen source for *Aspergillus niger* and ammonium sulfate was best for *Emericella nidulans* and *Galactomyces geotrichum*.
• Broth pH dropped to 3.8 with tryptone as nitrogen source.
• Use of urea as source of nitrogen gave decreased production of soluble sugar and pH of the medium was increased to 8.2.
• Total protein content of the filtrate was in direct proportional to amount of sugar production during the fermentation study.
• Maximum protein 564.88µg/ml was detected in the filtrate of *Aspergillus niger*.
• TLC for sugar showed presence of two sugars viz. glucose and fructose due to activity of *Aspergillus niger* and only glucose was detected from filtrate having *Galactomyces geotrichum* as inocumum.
• Total organic acid yield was 89.09% from filtrate of *Aspergillus niger*.
• *Aspergillus niger* showed 2.134 IU/ml FPase and 0.796 IU/ml CMCase activity.
• For CMCase activity of *Aspergillus niger*, the optimum pH, temperature, substrate concentration and enzyme concentration was found to be 5.0, 20°C, 1% and 1 ml respectively.

• FPase and CMCase activity was 1.254 and 0.015, and 0.356 and 0.214 IU/ml for *Galactomyces geotrichum* and *Emericella nidulans* respectively.

• HPLC analysis for organic acids from hydrolysate of paper waste degradation by *Aspergillus niger* detected the presence of citric acid and oxalic acid where as from filtrate of *Galactomyces geotrichum* only oxalic acid was detected.

• Among all the isolates *Aspergillus niger* was found to be most efficient in terms of both sugar and organic acid production. It gave consolidated bio processing of cellulosic waste to organic acid.

**Future plan of work**

• To design strain improvement for increased sugar production from cellulosic waste

• To scale up the degradation of paper waste into organic acids

• To optimize parameters for organic acid production from paper waste