

| Substrate  | Glucan loading % | Enz Loading (mg/g glucan) | Additive/condition     | Vessel Type              | Reaction Volume (ml) | Shaking (rpm) | Cellulose Conversions % |               |               |
|--|------------------|---------------------------|------------------------|--------------------------|----------------------|---------------|-------------------------|---------------|---------------|
|  |                  |                           |                        |                          |                      |               | After 5 days            | After 11 days | After 17 days |
| <b>Fig. 1 Comparison of cellulosic substrates</b>    |                  |                           |                        |                          |                      |               |                         |               |               |
| Avicel   | 1                | 5                         | None                   | Erlenmeyer 125 ml        | 50                   | 150           | 48                      | 54            | 60            |
| Avicel   | 1                | 5                         | 5 mg Tween co-addition | Erlenmeyer 125 ml        | 50                   | 150           | 71                      | 85            | 89            |
| Avicel   | 1                | 5                         | None                   | Erlenmeyer 125 ml        | 50                   | 0             | 61                      | 83            | 93            |
| Cotton   | 1                | 5                         | None                   | Erlenmeyer 125 ml        | 50                   | 150           | 30                      | 39            | 41            |
| Cotton   | 1                | 5                         | 5 mg Tween co-addition | Erlenmeyer 125 ml        | 50                   | 150           | 38                      | 49            | 53            |
| Cotton   | 1                | 5                         | None                   | Erlenmeyer 125 ml        | 50                   | 0             | 29                      | 43            | 50            |
| Sigmacell  | 1                | 5                         | None                   | Erlenmeyer 125 ml        | 50                   | 150           | 44                      | 52            | 57            |
| Sigmacell  | 1                | 5                         | 5 mg Tween co-addition | Erlenmeyer 125 ml        | 50                   | 150           | 57                      | 71            | 75            |
| Sigmacell  | 1                | 5                         | None                   | Erlenmeyer 125 ml        | 50                   | 0             | 50                      | 71            | 81            |
| Alpha-Cellulose                                      | 1                | 5                         | None                   | Erlenmeyer 125 ml        | 50                   | 150           | 49                      | 58            | 62            |
| Alpha-Cellulose                                      | 1                | 5                         | 5 mg Tween co-addition | Erlenmeyer 125 ml        | 50                   | 150           | 61                      | 75            | 80            |
| Alpha-Cellulose                                      | 1                | 5                         | None                   | Erlenmeyer 125 ml        | 50                   | 0             | 50                      | 74            | 82            |
| Whatman paper  | 1                | 5                         | None                   | Erlenmeyer 125 ml        | 50                   | 150           | 34                      | 39            | 41            |
| Whatman paper  | 1                | 5                         | 5 mg Tween co-addition | Erlenmeyer 125 ml        | 50                   | 150           | 44                      | 56            | 59            |
| Whatman paper  | 1                | 5                         | None                   | Erlenmeyer 125 ml        | 50                   | 0             | 38                      | 51            | 58            |
| Whatman milled                                       | 1                | 5                         | None                   | Erlenmeyer 125 ml        | 50                   | 150           | 62                      | 74            | 80            |
| Whatman milled                                       | 1                | 5                         | 5 mg Tween co-addition | Erlenmeyer 125 ml        | 50                   | 150           | 74                      | 87            | 91            |
| <b>Fig. 2 Effect of baffles in Erlenmeyer flasks</b> |                  |                           |                        |                          |                      |               |                         |               |               |
| Avicel   | 1                | 5                         | None                   | Erlenmeyer 250 ml Baffle | 50                   | 150           | 12                      | 13            | 13            |
| Avicel   | 1                | 5                         | 5 mg Tween co-addition | Erlenmeyer 250 ml Baffle | 50                   | 150           | 31                      | 37            | 39            |
| Avicel   | 1                | 5                         | None                   | Erlenmeyer 500 ml Baffle | 50                   | 150           | 9                       |               |               |
| Avicel   | 1                | 5                         | 5 mg Tween co-addition | Erlenmeyer 500 ml Baffle | 50                   | 150           | 32                      |               |               |
| <b>Fig. 3 Cotton vs. Avicel at high enz loading</b>  |                  |                           |                        |                          |                      |               |                         |               |               |
| Avicel   | 1                | 30                        | None                   | Erlenmeyer 125 ml        | 50                   | 150           | 97                      | 100           |               |

|        |   |    |                          |                   |    |     |     |    |    |
|--------|---|----|--------------------------|-------------------|----|-----|-----|----|----|
| Avicel | 1 | 30 | 100 mg Tween co-addition | Erlenmeyer 125 ml | 50 | 150 | 101 |    |    |
| Avicel | 1 | 30 | None                     | Erlenmeyer 125 ml | 50 | 0   | 82  | 96 | 99 |
| Cotton | 1 | 30 | None                     | Erlenmeyer 125 ml | 50 | 150 | 53  | 68 | 72 |
| Cotton | 1 | 30 | 100 mg Tween co-addition | Erlenmeyer 125 ml | 50 | 150 | 57  | 70 | 74 |
| Cotton | 1 | 30 | None                     | Erlenmeyer 125 ml | 50 | 0   | 50  | 72 | 82 |

**Fig. 4 Shaking vs stirring**

|        |   |    |                               |                   |    |     |     |     |     |
|--------|---|----|-------------------------------|-------------------|----|-----|-----|-----|-----|
| Avicel | 1 | 5  | None                          | Erlenmeyer 125 ml | 50 | 150 | 48  | 54  | 60  |
| Avicel | 1 | 5  | 5 mg Tween co-addition        | Erlenmeyer 125 ml | 50 | 150 | 71  | 85  | 89  |
| Avicel | 1 | 30 | None                          | Erlenmeyer 125 ml | 50 | 150 | 97  | 100 |     |
| Avicel | 1 | 30 | 100 mg Tween co-addition      | Erlenmeyer 125 ml | 50 | 150 | 101 |     |     |
| Avicel | 1 | 5  | None Stir                     | Erlenmeyer 125 ml | 50 | 150 | 57  | 66  | 69  |
| Avicel | 1 | 5  | 5 mg Tween co-addition Stir   | Erlenmeyer 125 ml | 50 | 150 | 71  | 84  | 86  |
| Avicel | 1 | 30 | None Stir                     | Erlenmeyer 125 ml | 50 | 150 | 93  | 100 | 100 |
| Avicel | 1 | 30 | 100 mg Tween co-addition Stir | Erlenmeyer 125 ml | 50 | 150 | 96  | 100 | 100 |

**Fig. 5 10 mg enz or 5 mg enz + 5 mg xyl**

|        |   |    |                        |                   |    |     |    |    |    |
|--------|---|----|------------------------|-------------------|----|-----|----|----|----|
| Avicel | 1 | 10 | None                   | Erlenmeyer 125 ml | 50 | 150 | 78 | 87 | 91 |
| Avicel | 1 | 10 | 5 mg Tween co-addition | Erlenmeyer 125 ml | 50 | 150 | 82 | 91 | 94 |
| Avicel | 1 | 10 | None                   | Erlenmeyer 125 ml | 50 | 0   | 66 | 89 | 96 |
| Avicel | 1 | 5  | 5 mg xyl               | Erlenmeyer 125 ml | 50 | 150 | 61 | 75 | 80 |
| Avicel | 1 | 5  | 5 mg xyl+5mg tween     | Erlenmeyer 125 ml | 50 | 150 | 66 | 79 | 84 |
| Avicel | 1 | 5  | 5 Xyl                  | Erlenmeyer 125 ml | 50 | 0   | 56 | 80 | 88 |

**Fig. 6 Filling of reactor and tubes**

|        |   |   |  |                   |     |     |    |    |    |
|--------|---|---|--|-------------------|-----|-----|----|----|----|
| Avicel | 1 | 5 | Fill reactor 146 ml reac. vol.           | Erlenmeyer 125 ml | 50  | 150 | 20 | 35 | 50 |
| Avicel | 1 | 5 | Fill reactor 146 ml reac. vol. + 5 Tween | Erlenmeyer 125 ml | 50  | 150 | 19 | 34 | 51 |
| Avicel | 1 | 5 | 140 ml Horizontal                        | Long              | 140 | 150 | 53 | 74 | 80 |
| Avicel | 1 | 5 | 140 ml Horizontal + 5 mg Tween           | Long              | 140 | 150 | 54 | 73 | 79 |
| Avicel | 1 | 5 | 10 ml Horizontal                         | Long              | 10  | 150 | 43 | 53 | 56 |
| Avicel | 1 | 5 | 10 ml Horizontal + 5 mg Tween            | Long              | 10  | 150 | 61 | 78 | 82 |

**Fig. 7 High solids loading**

|        |    |   |                        |                   |    |     |    |    |    |
|--------|----|---|------------------------|-------------------|----|-----|----|----|----|
| Avicel | 15 | 5 | No                     | Erlenmeyer 125 ml | 50 | 150 | 25 | 30 | 32 |
| Avicel | 15 | 5 | 5 mg Tween co-addition | Erlenmeyer 125 ml | 50 | 150 | 57 | 59 | 66 |
| Avicel | 15 | 5 | None                   | Erlenmeyer 125 ml | 50 | 0   |    |    | 61 |
| Avicel | 15 | 5 | 5 mg Tween co-addition | Erlenmeyer 125 ml | 50 | 0   |    |    | 62 |

**Fig. 8 Increasing Tween  
20 concentration**

|        |   |   |                          |                   |    |     |    |    |    |
|--------|---|---|--------------------------|-------------------|----|-----|----|----|----|
| Avicel | 1 | 5 | 5 mg Tween co-addition   | Erlenmeyer 125 ml | 50 | 150 | 71 | 85 | 89 |
| Avicel | 1 | 5 | 100 mg Tween co-addition | Erlenmeyer 125 ml | 50 | 150 | 66 | 81 | 86 |
| Avicel | 1 | 5 | 500 mg Tween co-addition | Erlenmeyer 125 ml | 50 | 150 | 64 | 0  | 75 |

**Fig. S1 Comparison of  
Accellerase 1500 vs.  
Cellic Ctec 2**

|        |   |   |  |                   |    |     |    |    |    |
|--------|---|---|--|-------------------|----|-----|----|----|----|
| Avicel | 1 | 5 | None   | Erlenmeyer 125 ml | 50 | 150 | 48 | 54 | 60 |
| Avicel | 1 | 5 | 5 mg Tween co-addition                             | Erlenmeyer 125 ml | 50 | 150 | 71 | 85 | 89 |
| Avicel | 1 | 5 | None   | Erlenmeyer 125 ml | 50 | 0   | 61 | 83 | 93 |
| Avicel | 1 | 5 | Acc1500 Replaced w/ CTec2                          | Erlenmeyer 125 ml | 50 | 150 | 35 | 39 | 41 |
| Avicel | 1 | 5 | Acc1500 Replaced w/ CTec2 + 5 Tween<br>co-addition | Erlenmeyer 125 ml | 50 | 150 | 53 | 72 | 82 |
| Avicel | 1 | 5 | CTec2  | Erlenmeyer 125 ml | 50 | 0   | 43 | 68 | 78 |

**Fig S2. Changing  
interfacial area in  
unshaken flasks**

|        |   |   |                        |                   |    |   |    |    |    |
|--------|---|---|------------------------|-------------------|----|---|----|----|----|
| Avicel | 1 | 5 | None                   | Erlenmeyer 25 ml  | 10 | 0 | 57 | 77 | 87 |
| Avicel | 1 | 5 | 5 mg Tween co-addition | Erlenmeyer 25 ml  | 10 | 0 | 52 | 75 | 85 |
| Avicel | 1 | 5 | None                   | Erlenmeyer 125 ml | 10 | 0 | 55 | 80 | 91 |
| Avicel | 1 | 5 | 5 mg Tween co-addition | Erlenmeyer 125 ml | 10 | 0 | 59 | 84 | 93 |
| Avicel | 1 | 5 | None                   | Erlenmeyer 500 ml | 10 | 0 | 60 | 80 | 87 |
| Avicel | 1 | 5 | 5 mg Tween co-addition | Erlenmeyer 500 ml | 10 | 0 | 61 | 81 | 90 |

**Fig. S3 Isolated xylan  
hydrolysis with xylanase**

|       |   |   |  |                   |    |     |    |    |    |
|-------|---|---|--|-------------------|----|-----|----|----|----|
| Xylan | 1 | 5 | Xylanase Only                          | Erlenmeyer 125 ml | 50 | 150 | 72 | 80 | 81 |
| Xylan | 1 | 5 | Xylanase Only + 5 mg Tween co-addition | Erlenmeyer 125 ml | 50 | 150 | 74 | 81 | 81 |
| Xylan | 1 | 5 | None                                   | Erlenmeyer 125 ml | 50 | 0   | 74 | 82 | 83 |

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