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| **Table S1. Carbon substrate absorbance unitsa of stromatolitic microbial mats.** |
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| **Carbon Substrates (n=190)** | **Type 1 Matb ± SEM** | **Type 3 Matb ± SEM** | **P-value** |
| L-Arabinose | 58.3 ± 6.3 | 123.0 ±28.7 | 0.07 |
| N-Acetyl-D-Glucosamine | 31.7 ± 4.6 | 34.3 ± 2.9 | 0.33 |
| D-Saccharic Acid | 17.3 ± 9.4 | 109.0 ± 40.8 | 0.07 |
| Succinic Acid | 1.7 ± 1.67 | 38.7 ± 4.48 | 0.00 |
| D-Galactose | 57.3 ± 17.1 | 142.0 ± 12.5 | 0.01 |
| L-Aspartic Acid | 32.3 ± 13.9 | 43.3 ± 3.9 | 0.26 |
| L-Proline | 49.3 ± 16.9 | 43.0 ± 4.2 | 0.37 |
| D-Alanine | 11.3 ± 4.4 | 20.3 ± 5.6 | 0.14 |
| D-Trehalose | 27.7 ± 7.8 | 53.3 ± 7.1 | 0.04 |
| D-Mannose | 42.3 ± 3.5 | 75.3 ± 7.9 | 0.02 |
| Dulcitol | 63.0 ± 11.6 | 71.0 ± 10.1 | 0.32 |
| D-Serine | 19.7 ± 3.0 | 21.0 ± 4.0 | 0.40 |
| D-Sorbitol | 9.7 ± 4.7 | 17.0 ± 4.5 | 0.16 |
| Glycerol | 97.7 ± 95.7 | 68.3 ± 6.7 | 0.39 |
| L-Fucose | 41.0 ± 4.5 | 67.0 ± 7.2 | 0.02 |
| D-Glucuronic Acid | 17.3 ± 5.4 | 75.3 ± 16.6 | 0.03 |
| D-Gluconic Acid | 83.3 ± 41.5 | 164.3 ± 8.4 | 0.09 |
| D,L-a-Glycerol Phosphate | 3.3 ± 1.9 | 13.7 ± 3.2 | 0.03 |
| D-Xylose | 197.7 ± 43.9 | 203.0 ± 73.5 | 0.48 |
| D,L-Lactic acid | 58.7 ± 29.4 | 57.0 ± 27.6 | 0.48 |
| Formic Acid | 7.0 ± 3.5 | 29.3 ± 10.3 | 0.08 |
| D-Mannitol | 24.7 ± 5.2 | 53.0 ± 14.0 | 0.09 |
| L-Glutamic Acid | 46.3 ± 10.7 | 64.3 ± 5.6 | 0.12 |
| D-Glucose-6-Phosphate | 25.3 ± 4.4 | 31.7 ± 4.3 | 0.18 |
| D-Galactonic Acid-g-Lactone | 2.3 ± 1.2 | 17.7 ± 3.0 | 0.01 |
| D,L-Malic Acid | 143.7 ± 37.9 | 200.0 ± 18.5 | 0.14 |
| D-Ribose | 152.3 ± 8.5 | 155.3 ± 41.5 | 0.47 |
| Tween 20 | 36.0 ± 6.7 | 58.7 ± 7.5 | 0.04 |
| L-Rhamnose | 35.0 ± 8.9 | 34.0 ± 3.1 | 0.46 |
| D-Fructose | 20.7 ± 4.7 | 50.0 ± 11.4 | 0.05 |
| Acetic Acid | 59.3 ± 1.5 | 71.3 ± 3.3 | 0.03 |
| a-D-Glucose | 41.3 ± 16.6 | 75.7 ± 14.7 | 0.10 |
| Maltose | 19.3 ± 3.8 | 67.3 ± 5.2 | 0.00 |
| D-Melibiose | 22.3 ± 2.9 | 59.3 ± 10.8 | 0.03 |
| Thymidine | 56.3 ± 4.3 | 53.0 ± 3.0 | 0.28 |
| L-Asparagine | 23.0 ± 5.2 | 29.0 ± 4.5 | 0.22 |
| D-Aspartic Acid | 9.0 ± 4.6 | 24.3 ± 3.8 | 0.03 |
| D-Glucosaminic Acid | 15.0 ± 2.9 | 23.0 ± 2.5 | 0.05 |
| 1,2-Propanediol | 16.7 ± 2.2 | 31.0 ± 3.6 | 0.02 |
| Tween 40 | 26.0 ± 4.0 | 33.7 ± 8.1 | 0.23 |
| a-Ketoglutaric Acid | 13.3 ± 3.3 | 147.7 ± 33.6 | 0.03 |
| a-Ketobutyric Acid | 14.0 ± 7.0 | 39.3 ± 13.0 | 0.09 |
| a-Methyl-D-Galactoside | 12.7 ± 1.9 | 38.3 ± 6.7 | 0.03 |
| a-D-Lactose | 25.0 ± 6.7 | 36.3 ± 11.2 | 0.22 |
| Lactulose | 22.3 ± 4.0 | 39.3 ± 5.2 | 0.03 |
| Sucrose | 31.3 ± 11.4 | 45.0 ± 10.6 | 0.21 |
| Uridine | 44.0 ± 3.0 | 47.3 ± 1.2 | 0.19 |
| L-Glutamine | 9.7 ± 0.9 | 29.0 ± 4.2 | 0.02 |
| m-Tartaric Acid | 3.7 ± 3.18 | 78.0 ± 35.1 | 0.08 |
| D-Glucose-1-Phosphate | 15.7 ± 6.12 | 22.0 ± 2.1 | 0.21 |
| D-Fructose-6-Phosphate | 24.0 ± 5.51 | 114.3 ± 75.3 | 0.18 |
| Tween 80 | 22.0 ± 2.89 | 31.7 ± 3.53 | 0.05 |
| a-Hydroxyglutaric Acid-g-Lactone | 1.7 ± 0.88 | 5.0 ± 2.52 | 0.16 |
| a-Hydroxybutyric Acid | 3.7 ± 2.33 | 40.3 ± 8.0 | 0.02 |
| b-Methyl-D-Glucoside | 21.0 ± 5.03 | 37.0 ± 5.0 | 0.04 |
| Adonitol | 9.7 ± 1.76 | 23.3 ± 6.4 | 0.08 |
| Maltotriose | 14.0 ± 1.73 | 41.0 ± 5.7 | 0.02 |
| 2'-Deoxyadenosine | 24.0 ± 1.53 | 21.0 ± 1.5 | 0.12 |
| Adenosine | 41.7 ± 20.70 | 41.0 ± 13.8 | 0.49 |
| Gly-Asp | 15.3 ± 3.76 | 24.7 ± 3.2 | 0.07 |
| Citric Acid | 119.7 ± 55.4 | 209.3 ± 45.9 | 0.14 |
| m-Inositol | 21.0 ± 2.5 | 33.0 ± 4.6 | 0.05 |
| D-Threonine | 13.7 ± 0.9 | 16.7 ± 0.3 | 0.03 |
| Fumaric Acid | 69.3 ± 35.0 | 37.3 ± 19.1 | 0.24 |
| Bromosuccinic Acid | 116.3 ± 31.7 | 162.7 ± 5.2 | 0.14 |
| Propionic Acid | 15.7 ± 2.9 | 16.0 ± 5.2 | 0.48 |
| Mucic Acid | 15.7 ± 6.2 | 90.3 ± 38.7 | 0.10 |
| Glycolic Acid | 5.0 ± 3.2 | 12.3 ± 1.2 | 0.07 |
| Glyoxylic Acid | 21.0 ± 2.5 | 21.7 ± 5.4 | 0.46 |
| D-Cellobiose | 33.7 ± 3.7 | 60.7 ± 4.9 | 0.01 |
| Inosine | 48.7 ± 2.4 | 66.0 ± 15.6 | 0.19 |
| Gly-Glu | 13.7 ± 1.8 | 21.3 ± 6.2 | 0.17 |
| Tricarballylic Acid | 0.0 ± 0 | 3.3 ± 1.7 | 0.09 |
| L-Serine | 26.3 ± 10.4 | 27.3 ± 3.3 | 0.47 |
| L-Threonine | 20.3 ± 11.4 | 43.7 ± 4.6 | 0.08 |
| L-Alanine | 14.7 ± 9.3 | 54.7 ± 14.2 | 0.04 |
| Ala-Gly | 26.7 ± 13.4 | 63.3 ± 17.7 | 0.09 |
| Acetoacetic Acid | 66.7 ± 6.5 | 62.7 ± 7.3 | 0.35 |
| N-Acetyl-D-Mannosamine | 19.3 ± 0.7 | 26.3 ± 7.2 | 0.22 |
| Mono-Methylsuccinate | 16.7 ± 13.3 | 21.3 ± 11.9 | 0.40 |
| Methylpyruvate | 104.7 ± 52.3 | 167.7 ± 1.8 | 0.18 |
| D-Malic Acid | 40.0 ± 27.0 | 123.7 ± 16.8 | 0.03 |
| L-Malic Acid | 253.7 ± 13.2 | 202.7 ± 43.8 | 0.18 |
| Gly-Pro | 14.0 ± 2.0 | 29.7 ± 2.0 | 0.00 |
| p-Hydroxyphenyl Acetic Acid | 20.6 ± 2.6 | 29.0 ± 3.8 | 0.08 |
| m-Hydroxyphenyl Acetic Acid | 31.3 ± 1.9 | 29.7 ± 3.8 | 0.36 |
| Tyramine | 27.3 ± 1.3 | 35.7 ± 8.1 | 0.21 |
| D-Psicose | 20.7 ± 5.0 | 27.7 ± 1.5 | 0.14 |
| L-Lyxose | 95.7 ± 5.5 | 99.0 ± 11.0 | 0.40 |
| Glucuronamide | 35.0 ± 4.6 | 41.7 ± 1.8 | 0.14 |
| Pyruvic Acid | 198.7 ± 79.9 | 155.3 ± 65.8 | 0.35 |
| L-Galactonic Acid-g-Lactone | 8.0 ± 4.0 | 17.7 ± 4.3 | 0.09 |
| D-Galacturonic Acid | 85.7 ± 30.0 | 122.3 ± 45.0 | 0.27 |
| b-Phenylethylamine | 25.0 ± 6.0 | 29.7 ± 3.5 | 0.28 |
| 2-Aminoethanol | 34.7 ± 3.8 | 39.3 ± 6.6 | 0.29 |
| Chondroitin Sulfate C | 26.3 ± 1.9 | 32.0 ± 0.6 | 0.04 |
| a-Cyclodextrin | 43.3 ± 4.3 | 44.7 ± 4.3 | 0.42 |
| b-Cyclodextrin | 41.3 ± 5.4 | 47.3 ± 5.0 | 0.23 |
| g-Cyclodextrin | 33.7 ± 6.7 | 43.3 ± 8.1 | 0.21 |
| Dextrin | 40.0 ± 7.6 | 43.7 ± 5.9 | 0.36 |
| Gelatin | 38.0 ± 4.1 | 68.0 ± 4.9 | 0.01 |
| Glycogen | 35.3 ± 4.9 | 39.3 ± 5.5 | 0.31 |
| Inulin | 37.3 ± 7.8 | 44.3 ± 6.2 | 0.26 |
| Laminarin | 48.7 ± 5.6 | 50.0 ± 10.4 | 0.46 |
| Mannan | 51.7 ± 7.7 | 56.0 ± 6.9 | 0.35 |
| Pectin | 168.3 ± 12.0 | 159.3 ± 41.0 | 0.43 |
| N-Acetyl-D-Galactosamine | 43.3 ± 1.8 | 44.3 ± 0.3 | 0.32 |
| N-Acetyl-Neuraminic Acid | 2.7 ± 2.7 | 88.3 ± 81.9 | 0.20 |
| b-D-Allose | 50.3 ± 5.2 | 61.3 ± 9.0 | 0.18 |
| Amygdalin | 46.3 ± 3.9 | 44.3 ± 4.8 | 0.38 |
| D-Arabinose | 81.7 ± 2.9 | 99.0 ± 4.0 | 0.01 |
| D-Arabitol | 32.7 ± 2.7 | 37.7 ± 2.7 | 0.13 |
| L-Arabitol | 31.0 ± 2.9 | 37.0 ± 2.5 | 0.10 |
| Arbutin | 32.7 ± 2.2 | 39.7 ± 2.7 | 0.06 |
| 2-Deoxy-D-Ribose | 107.0 ± 2.1 | 106.7 ± 0.7 | 0.45 |
| i-Erythritol | 33.7 ± 1.9 | 35.7 ± 2.2 | 0.26 |
| D-Fucose | 49.0 ± 4.5 | 49.7 ± 5.0 | 0.46 |
| 3-0-b-D-Galactopyranosyl-D-Arabinose | 80.7 ± 8.7 | 82.7 ± 7.5 | 0.43 |
| Gentiobiose | 39.7 ± 1.9 | 47.3 ± 0.3 | 0.02 |
| L-Glucose | 34.3 ± 1.5 | 38.7 ± 3.4 | 0.17 |
| D-Lactitol | 41.3 ± 3.4 | 40.0 ± 1.0 | 0.37 |
| D-Melezitose | 46.3 ± 1.8 | 42.7 ± 2.7 | 0.17 |
| Maltitol | 35.3 ± 3.5 | 37.0 ± 2.1 | 0.35 |
| a-Methyl-D-Galactoside | 39.0 ± 2.7 | 39.7 ± 1.5 | 0.42 |
| b-Methyl-D-Galactoside | 30.0 ± 2.7 | 34.3 ± 1.8 | 0.13 |
| 3-Methylglucose | 29.0 ± 1.0 | 38.3 ± 0.3 | 0.00 |
| b-Methyl-D-Glucuronic Acid | 27.0 ± 0.1 | 29.0 ± 2.1 | 0.22 |
| a-Methyl-D-Mannoside | 29.7 ± 1.5 | 32.7 ± 1.2 | 0.09 |
| b-Methyl-D-Xyloside | 37.3 ± 1.8 | 39.7 ± 1.2 | 0.17 |
| Palatinose | 67.0 ± 4.2 | 67.3 ± 1.2 | 0.47 |
| D-Raffinose | 43.0 ± 3.1 | 44.3 ± 2.9 | 0.38 |
| Salicin | 33.7 ± 1.5 | 33.7 ± 1.5 | 0.50 |
| Sedoheptulosan | 43.0 ± 2.0 | 37.7 ± 0.7 | 0.05 |
| L-Sorbose | 45.7 ± 6.3 | 42.3 ± 5.2 | 0.35 |
| Stachyose | 36.0 ± 1.5 | 37.7 ± 3.9 | 0.36 |
| D-Tagatose | 47.7 ± 0.9 | 51.3 ± 1.3 | 0.05 |
| Turanose | 37.3 ± 2.2 | 40.0 ± 1.7 | 0.20 |
| Xylitol | 27.7 ± 1.5 | 29.3 ± 1.2 | 0.21 |
| N-Acetyl-D-glucosaminitol | 38.3 ± 1.9 | 41.7 ± 1.2 | 0.11 |
| g-Amino-N-Butyric Acid | 27.0 ± 3.6 | 34.3 ± 0.9 | 0.09 |
| d-Amino Valeric Acid | 39.0 ± 1.0 | 40.7 ± 3.4 | 0.34 |
| Butyric Acid | 75.7 ± 5.5 | 82.0 ± 2.7 | 0.19 |
| Capric Acid | 28.0 ± 1.0 | 33.3 ± 3.8 | 0.14 |
| Caproic Acid | 39.7 ± 4.9 | 45.7 ± 4.0 | 0.20 |
| Citraconic Acid | 7.7 ± 4.1 | 9.0 ± 1.7 | 0.39 |
| D,L-Citramalic Acid | 24.7 ± 4.4 | 22.0 ± 0.6 | 0.30 |
| D-Glucosamine | 164.3 ± 10.9 | 217.3 ± 35.7 | 0.14 |
| 2-Hydroxybenzoic acid | 30.7 ± 0.7 | 32.3 ± 1.3 | 0.17 |
| 4-Hydroxybenzoic Acid | 33.0 ± 2.9 | 40.7 ± 9.5 | 0.25 |
| b-Hydroxybutyric Acid | 19.0 ± 0.6 | 22.3 ± 1.5 | 0.07 |
| g-Hydroxybutyric Acid | 34.7 ± 1.3 | 39.0 ± 1.5 | 0.05 |
| 2-Oxovaleric acid | 27.0 ± 2.1 | 32.7 ± 3.0 | 0.10 |
| Itaconic Acid | 44.0 ± 8.5 | 51.0 ± 11.6 | 0.33 |
| 5-Keto-D-Gluconic Acid | 108.0 ± 2.1 | 136.7 ± 12.6 | 0.07 |
| D-Lactic Acid Methyl Ester | 40.3 ± 2.7 | 47.3 ± 3.1 | 0.09 |
| Malonic Acid | 20.0 ± 2.7 | 21.3 ± 0.7 | 0.33 |
| Melibionic Acid | 40.3 ± 1.3 | 41.3 ± 3.0 | 0.39 |
| Oxalic Acid | 38.7 ± 7.5 | 45.7 ± 4.3 | 0.24 |
| Oxalomalic Acid | 109.7 ± 2.4 | 109.3 ± 13.0 | 0.49 |
| Quinic Acid | 32.3 ± 2.3 | 45.3 ± 2.9 | 0.01 |
| D-Ribono-1,4-Lactone | 2.3 ± 1.5 | 8.0 ± 2.7 | 0.08 |
| Sebacic Acid | 26.3 ± 0.9 | 28.3 ± 0.9 | 0.09 |
| Sorbic Acid | 72.0 ± 1.2 | 71.7 ± 0.9 | 0.42 |
| Succinamic Acid | 15.0 ± 2.1 | 20.7 ± 3.0 | 0.10 |
| D-Tartaric Acid | 26.7 ± 1.5 | 32.7 ± 3.4 | 0.11 |
| L-Tartaric Acid | 50.0 ± 2.0 | 61.0 ± 4.0 | 0.05 |
| Acetamide | 39.7 ± 3.2 | 46.7 ± 2.4 | 0.08 |
| L-Alaninamide | 43.3 ± 1.5 | 46.7 ± 1.5 | 0.09 |
| N-Acetyl-L-Glutamic Acid | 29.3 ± 1.2 | 29.7 ± 2.3 | 0.45 |
| L-Arginine | 38.3 ± 2.9 | 37.7 ± 1.2 | 0.42 |
| Glycine | 36.0 ± 3.6 | 35.7 ± 2.2 | 0.47 |
| L-Histidine | 43.3 ± 9.7 | 54.0 ± 6.1 | 0.21 |
| L-Homoserine | 32.7 ± 1.3 | 32.3 ± 0.7 | 0.42 |
| Hydroxy-L-Proline | 34.3 ± 0.9 | 38.0 ± 0.6 | 0.02 |
| L-Isoleucine | 31.3 ± 2.2 | 36.7 ± 2.2 | 0.08 |
| L-Leucine | 42.0 ± 5.2 | 50.0 ± 2.7 | 0.13 |
| L-Lysine | 44.3 ± 5.7 | 50.3 ± 4.4 | 0.23 |
| L-Methionine | 41.0 ± 9.6 | 43.7 ± 12.0 | 0.44 |
| L-Ornithine | 39.7 ± 5.2 | 43.7 ± 2.4 | 0.27 |
| L-Phenylalanine | 24.7 ± 3.7 | 32.7 ± 3.8 | 0.10 |
| L-Pyroglutamic Acid | 44.7 ± 2.3 | 46.7 ± 2.9 | 0.31 |
| L-Valine | 47.3 ± 2.2 | 49.7 ± 1.9 | 0.23 |
| D,L-Carnitine | 47.0 ± 3.5 | 50.3 ± 2.9 | 0.25 |
| Sec-Butylamine | 7.7 ± 2.3 | 15.3 ± 9.4 | 0.25 |
| D,L-Octopamine | 47.3 ± 4.3 | 48.0 ± 2.5 | 0.45 |
| Putrescine | 44.3 ± 5.2 | 44.0 ± 4.9 | 0.48 |
| Dihydroxyacetone | 178.3 ± 9.1 | 194.7 ± 8.8 | 0.13 |
| 2,3-Butanediol | 47.7 ± 6.8 | 54.7 ± 3.7 | 0.22 |
| 2,3-Butanone | 62.0 ± 4.0 | 66.0 ± 4.4 | 0.27 |
| 3-Hydroxy 2-Butanone | 61.0 ± 6.5 | 63.7 ± 6.9 | 0.40 |
| asubstrates were considered utilized if absorbance readings were above threshold of 50 units |
| bvalues represent mean absorbance unit for three replicate phenotypic microarrays |