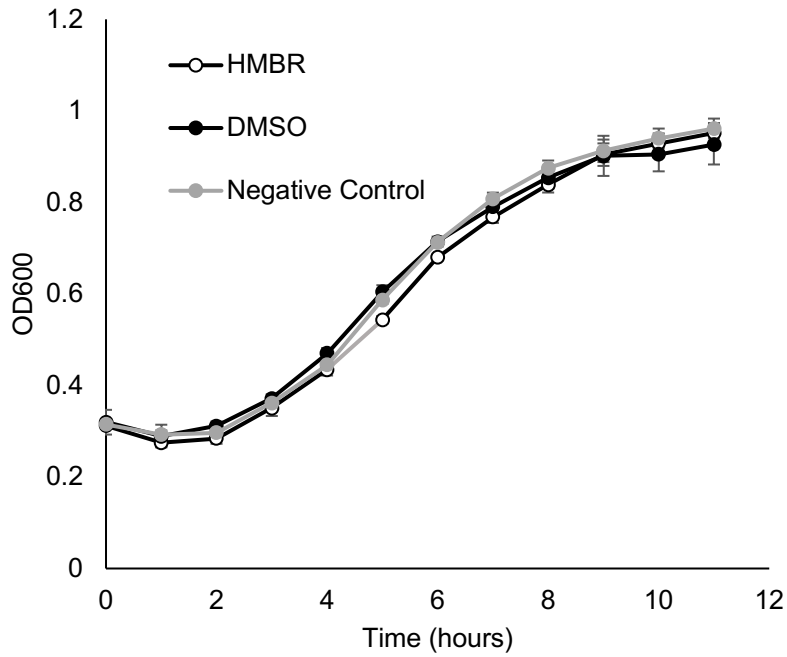**Figure S1**. Autofluorescence of individual cells grown with either H_2 (grey lines) or formate (black lines) as the electron donor. Formate grown cultures tend to reach stationary phase around an OD_{600} of 0.5 to 0.6, and H_2 grown cultures tend to reach stationary phase around an OD_{600} of 0.9 to 1.0.

Figure S2. Growth of *M. maripaludis* expressing FAST1 after a 30-minute exposure to 20 µM HMBR. Data are averages and standard deviations of triplicate cultures.
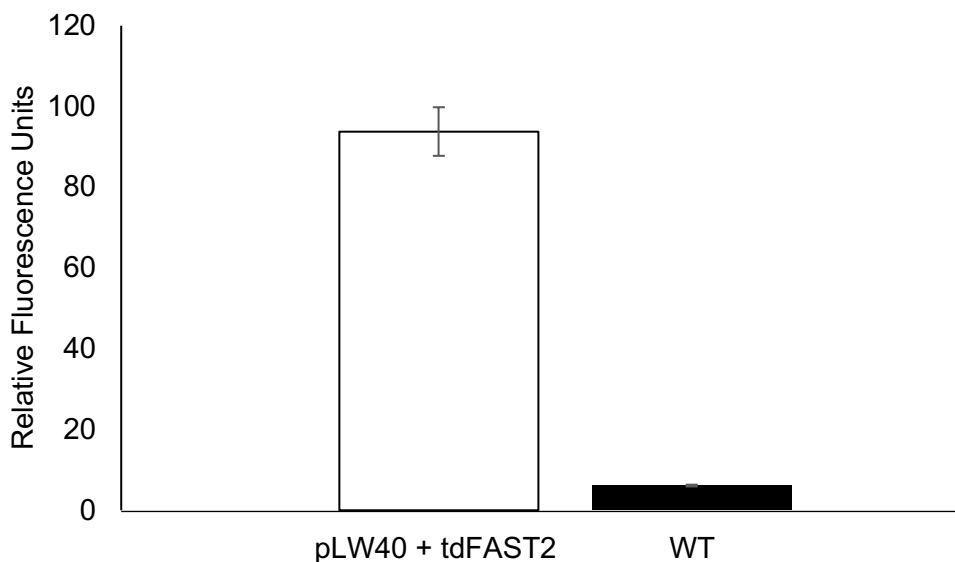
Figure S3. *M. maripaludis* expressing FAST is fluorescent upon HBR-3,5DOM addition. Fluorescence intensities of *M. maripaludis* strains cultivated in McCas medium with H_2 as the electron donor for growth. HBR-3,5DOM was added to a final concentration of 20 µM. Relative fluorescence units were determined by normalizing emission readings from a microplate reader against baseline autofluorescence of the sample without fluorogen. Values were also normalized to the OD_{600} of the culture. Data are averages and standard deviations of triplicate measurements.

Table S1: Strains, plasmids, and primers used in study		
Strain	**Description**	**Reference**
KC13	*M. maripaludis* strain JJ Δupt (MMJJ_RS02980)	1
KC90	KC13 expressing *FAST1* on pLW40neo	This study
KC91	KC13 expressing *fruA* tagged with FAST1 on the C-terminus	This study
KC92	KC13 expressing fruA tagged with FAST1 on the N-terminus	This study
KC93	KC13 expressing *fdh1A* tagged with NFAST at the C-terminus and *fdh1B* tagged with CFAST at the C-terminus	This study
KC94	KC13 expressing *fdh1A* tagged with NFAST at the C-terminus and *mtd* tagged with CFAST at the C-terminus	This study
KC95	KC13 expressing *mtd* tagged with NFAST at the C-terminus and *fdh1B* tagged with CFAST at the C-terminus	This study
KC96	KC13 expressing tdFAST2 on pLW40neo	This study
KC97	KC13 expressing *flaI* tagged with tdFAST2 on pLW40neo	This study
Plasmids		**Reference**
pCRuptneo	pCRprtneo plasmid containing the *upt* gene	2
pLW40	Replicative expression vector containing puromycin and ampicillin resistance genes	3
pLW40neo	pLW40 with neomycin resistance cassettes	3
	Sequence (5' - 3')	**Notes**
Primers used to generate KC90		
MM_co_YFAST-F-Nsi	AAAAATGCATGGAACACGTTGCATTCGG	NsiI
MM_co_YFAST_R-Asc	TTTTGGCGCGCCTTAAATCTTTTAACGAAAAC	AscI
Primers used to generate KC91		
Fru_YF_us_Fg	TGCAGATATCCATCACACTGGCGGCCGCATATTGCACAAACCGCAACAAACCAG	NotI
Fru-YF-us-Rg	CCGAATGCAACGTGTTCCATGAATTCTCTTATTTCAACAACTTTTTTAGTCTG	
YFAST_F	ATGGAACACGTTGCATTCGGATC	
YFAST_R	TTAAACTCTTTTAACGAAAACCCAG	
Fru_YF_ds_Fg	GTTTTCGTTAAAAGAGTTTAATAAATTCCTGAAAAGGAAAGTCTTG	

Fru_YF_ds_Rg	CTATAGGGCGAATTGGGCCCTCTAGAA ACTTTAAAGTCTATTTCACGAG	XbaI
Primers used to generate KC92		
Fru_YF_N_us_Fg	TGCAGATATCCATCACACTGGCGGCCG CAAGGAACTATCGGAAGAAGCCTTGAA G	NotI
Fru_YF_N_us_Rg	CTGATCCGAATGCAACGTGTTCCATTTT ATTCACCTCCAAGGGTAATATGC	
YFAST_Fr_N_Fg	ATGGAACACGTTGCATTCGGATCAG	
YFAST_Fr_N_Rg	TGATCCTCCTCCTCCTGATCCTCCTCCT CCTGAAACTCTTTTAACGAAAACCCAGT ATG	
Fru-YF-N-ds-Fg	TCAGGAGGAGGAGGATCAGGAGGAGG AGGATCAGTGGCAGAACCTGTAACTATC AG	
Fru-YF-N-ds-Rg	CTATAGGGCGAATTGGGCCCTCTAGAG TGATGTTGGTTCTCATTCCACCAAC	XbaI
Primers used to generate KC93		
Fdh1B_CF_us_Fg	TGCAGATATCCATCACACTGGCGGCCG CCTGAAAAAGGTAAGCAGTTACTTG	NotI
Fdh1B_CF_us_Rg	CCTCCTGATCCTCCTCCTCCTGATTGAG TTGGGCATGACCCTCCAAG	
CFAST_10_F	TCAGGAGGAGGAGGATCAGGAGGAGG AGGATCAGGAGACTCATACTGGGTTTTC G	
Fdh1B_CFAST_10_R	CAGAACTAAAAAAATTAAAAAATAAATAA TTAATAAATAATTTATTATCTTTTAACGAA AACCCAG	
Fdh1B_CF_ds_Fg	TAAATTATTTATTAATTATTTATTTTTTAA TTTTTTTAGTTCTG	XbaI
Fdh1B_CF_ds_Rg	TATAGGGCGAATTGGGCCCTCTAGAAC ATAATTCATGTTTTAGGATATGAAG	
Fdh1A_NF_us_Fg	TGCAGATATCCATCACACTGGCGGCCG CAAAGACTTGGTGTAGATGGACT	NotI
Fdh1A_NF_us_Rg	CTCCTCCTGATCCTCCTCCTCCTGATAT TTTTTCCACCTTTGCAGCACATA	
NFAST_Fg	TCAGGAGGAGGAGGATCAGGAGGAGG AGGATCAATGGAACACGTTGCATTCGG ATC	
NFAST_Rg	TGATAATGCTTTTTTCATGTG	
Fdh1A_NF_ds_Fg	CACATGAAAAAAGCATTATCATAATTTTC CCAAAATCGGGATTTTAAACGAG	
Fdh1A_NF_ds_Rg	TATAGGGCGAATTGGGCCCTCTAGAAT CGATTTCTTCTTTTACAACG	XbaI

Primers used to generate KC94		
Fdh1A_NF_us_Fg	TGCAGATATCCATCACACTGGCGGCCG CAAAGACTTGGTGTAGATGGACT	NotI
Fdh1A_NF_us_Rg	CTCCTCCTGATCCTCCTCCTCCTGATAT TTTTTCCACCTTTGCAGCACATA	
NFAST_Fg	TCAGGAGGAGGAGGATCAGGAGGAGG AGGATCAATGGAACACGTTGCATTCGG ATC	
NFAST_Rg	TGATAATGCTTTTTTCATGTG	
Fdh1A_NF_ds_Fg	CACATGAAAAAAGCATTATCATAATTTTC CCAAAATCGGGATTTTAAACGAG	
Fdh1A_NF_ds_Rg	TATAGGGCGAATTGGGCCCTCTAGAAT CGATTTCTTCTTTTACAACG	XbaI
Mtd_CF_us_Fg	TGCAGATATCCATCACACTGGCGGCCG CGATACGTTTTAATCAAATGCGAC	NotI
Mtd_CF_us_Rg	CTCCTGATCCTCCTCCTCCTGATTCTGG TTTTGTCATTAATTTACATTTG	
CFAST_10_F	TCAGGAGGAGGAGGATCAGGAGGAGG AGGATCAGGAGACTCATACTGGGTTTTC G	
Mtd_CFAST_10_R	GGTAAATTTTTTAATTTAAATGTAAATTT ATTATCTTTTAACGAAAACCCAGTATGA G	
Mtd_CF_ds_Fg	TAAATTTACATTTAAATTAAAAAATTTAC C	
Mtd_CF_ds_Rg	TATAGGGCGAATTGGGCCCTCTAGATTA ATTGGAGTATGGTTTGCAATAG	XbaI
Primers used to generate KC95		
Mtd_NF_us_Fg	TGCAGATATCCATCACACTGGCGGCCG CGATACGTTTTAATCAAATGCGAC	
Mtd_NF_us_Rg	CTCCTGATCCTCCTCCTCCTGATTCTGG TTTTGTCATTAATTTAC	
NFAST_Fg	TCAGGAGGAGGAGGATCAGGAGGAGG AGGATCAATGGAACACGTTGCATTCGG ATC	
NFAST_Rg	TGATAATGCTTTTTTCATGTG	
Mtd_NF_ds_Fg	CACATGAAAAAAGCATTATCATAAATTTA CATTTAAATTAAAAAATTTACC	
Mtd-NF-ds-Rg	TATAGGGCGAATTGGGCCCTCTAGATTA ATTGGAGTATGGTTTGCAATAG	
Fdh1A_NF_us_Fg	TGCAGATATCCATCACACTGGCGGCCG CAAAGACTTGGTGTAGATGGACT	NotI
Fdh1A_NF_us_Rg	CTCCTCCTGATCCTCCTCCTCCTGATAT TTTTTCCACCTTTGCAGCACATA	

NFAST_Fg	TCAGGAGGAGGAGGATCAGGAGGAGG AGGATCAATGGAACACGTTGCATTCGG ATC	
NFAST_Rg	TGATAATGCTTTTTTCATGTG	
Fdh1A_NF_ds_Fg	CACATGAAAAAAGCATTATCATAATTTTC CCAAAATCGGGATTTTAAACGAG	
Fdh1A_NF_ds_Rg	TATAGGGCGAATTGGGCCCTCTAGAAT CGATTTCTTCTTTTACAACG	XbaI
Primers used to generate KC96		
Tdf2_plw40_mm_fg_2	GATAACTAATAGGTGAAATGCATGGAAC ACGTTGCATTCGGATCAGAAGACATC	AscI
Tdf2_plw40_mm_rg	CCTCCTCCTGATCCTCCTCCAACTCTTTTAA CGAAAACCCAGTATGAGTCTCCTGATAAT	
Tdf2_plw40_mj_fg	GGAGGAGGATCAGGAGGAGGAGAACACG TTGCTTTTGGATCAGAAGATATTGAAA AT	
Tdf2_plw40_mj_rg	ACAGATCTCCTAGGCGCGCCTTAAACTC TTTTAACAAAAACC	NsiI
Primers used to Generate KC97		
FlaI-tdf2-us-Fg	TGCAGATATCCATCACACTGGCGGCCG CAAGGAGCTGTTGCTTTCCAGGCAATG C	NotI
FlaI-TDF2-us-Rg	CATAGATCCTCCTCCACCTGAACCTCCT CCTCCAGAAACCTGGAATGGCAGTCCT TCC	
tdf2-F	TCTGGAGGAGGAGGTTCAGGTGGAGGA GGATCTATGGAACACGTTGCATTCGGAT CAGAAGACATC	
tdf2-R	TTAAACTCTTTTAACAAAAACCCAATATG AATCTCCTGATAAA	
FlaI-TDF2-ds-Fg	TTCATATTGGGTTTTTGTTAAAAGAGTTT AATAAGGTGTTTCTTATGTTTTTTGATAT AC	
FlaI-YF-ds-Rg	CTATAGGGCGAATTGGGCCCTCTAGATT AATTCCTGACCGCTGTCTATTG	XbaI

Table S2. Nucleotide sequences of FAST1 and tdFAST2 used in this study

>FAST1
ATGGAACACGTTGCATTCGGATCAGAAGACATCGAAAACACATTAGCAAAAATGGACGACG
GACAATTAGACGGATTAGCATTCGGAGCAATCCAATTAGACGGAGACGGAAACATCTTACA
ATACAACGCAGCAGAAGGAGACATCACAGGAAGAGACCCTAAACAAGTTATCGGAAAAAAC
TTCTTCAAAGACGTTGCACCTGGAACAGACTCACCTGAATTCTACGGAAAATTCAAAGAAG
GAGTTGCATCAGGAAACTTAAACACAATGTTCGAATGGATGATCCCTACATCAAGAGGACC
TACAAAAGTTAAAGTTCACATGAAAAAAGCATTATCAGGAGACTCATACTGGGTTTTCGTTA
AAAGAGTTTAA

>tdFAST2
ATGGAACACGTTGCATTCGGATCAGAAGACATCGAAAACACATTAGCAAAAATGGACGACG
GACAATTAGACGGATTAGCATTCGGAGCAATCCAATTAGACGGAGACGGAAACATCTTACA
ATACAACGCAGCAGAAGGAGACATCACAGGAAGAGACCCTAAACAAGTTATCGGAAAAAAC
TTCTTCAAAGACGTTGCACCTGGAACAGACTCACCTGAATTCTACGGAAAATTCAAAGAAG
GAGTTGCATCAGGAAACTTAAACACAATGTTCGAATGGATGATCCCTACATCAAGAGGACC
TACAAAAGTTAAAATCCACATGAAAAAAGCATTATCAGGAGACTCATACTGGGTTTTCGTTA
AAAGAGTTGGAGGAGGATCAGGAGGAGGAGAACACGTTGCTTTTGGATCAGAAGATATTG
AAAATACATTAGCTAAAATGGATGATGGACAATTAGATGGATTAGCTTTTGGAGCTATTCAA
TTAGATGGAGATGGAAATATTTTACAATATAATGCTGCTGAAGGAGATATTACAGGAAGAGA
TCCAAAACAAGTTATTGGAAAAAATTTTTTTAAAGATGTTGCTCCAGGAACAGATTCACCAG
AATTTTATGGAAAATTTAAAGAAGGAGTTGCTTCAGGAAATTTAAATACAATGTTTGAATGGA
TGATTCCAACATCAAGAGGACCAACAAAAGTTAAAATTCACATGAAAAAAGCTTTATCAGGA
GATTCATATTGGGTTTTTGTTAAAAGAGTTTAA

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