

Supplementary Table S1: Summary of the microbial mats observations and minerals precipitated within the experiments

Sample	Year	Salar	Coord. (Longitude)	Coord. (Latitude)	Subst.	Water	Check-ups					
							Day 0	Day 7	Day 30	Day 60	Day 90	Day 300
GOR-1	2018	GOR	-68.690186	-25.42855	CG	Gor 1	NP	Grey UCM: PSB	Grey UCM: NC	Grey UCM: pGp, EPS-rich	Grey UCM: NC	Grey UCM: NC
CGOR-1*	2018	GOR	-68.690186	-25.42855	NS	Gor 1	NP	NP	NP	NP	pGp (Fig. 11)	NC
GOR-2	2018	GOR	-68.64022	-25.359822	CG	Gor 2	NP	White UCM: Dia, Cya	White UCM: Dia, hbGp (Fig. 9A)	White UCM: hbGp, Dia, Baccilli (Fig. 6L)	Grey UCM: NC	Black UCM: NC
CGOR-2	2018	GOR	-68.64022	-25.359822	NS	Gor 2	NP	NP	NP	NP	NP	NP
PAJ-1	2018	PAJ	-68.81904	-25.16855	CG	Paj 1	NP	White UCM: Dia, PSB	White UCM: IGp, pGp, Dia	Grey UCM: NC	Grey UCM: NC	Grey Brown UCM: NC
PAJ-2.1	2018	PAJ	-68.832301	-25.192691	FG	Paj 1	NP	Dark Grey NMD: NP	Dark Grey NMD: NC	Green Grey UCM: pGp, bSi, Dia (Fig. 10C)	Grey UCM: NC	Dark Grey UCM: NC
PAJ-2.2	2018	PAJ	-68.832301	-25.192691	NS	Paj 1	NP	Dark Grey NMD: Dia	Dark Grey NMD: Dia	Dark Grey NMD:NC	Dark Grey NMD:NC	Dark Grey NMD:NC
CPAJ-1	2018	PAJ	-68.81904	-25.16855	NS	Paj 1	NP	NP	NP	NP	NP	NP
PAJ-3	2018	PAJ	-68.84722	-25.1588	CG	Paj 3	NP	White UCM: Dccpss, Dia	White UCM: Dccpss, Dia, IGp	Yellow UCM: NC	Yellow UCM: NC	Orange UCM: NC
PAJ-4.1	2018	PAJ	-68.84924	-25.155087	NS	Paj 3	NP	White NMD: NP	White NMD: NC	White NMD: NC	White NMD: NC	Orange NMD: NC
PAJ-4.2	2018	PAJ	-68.84924	-25.155087	CG	Paj 3	NP	White UCM: NP	White UCM: NC	White UCM: NC	White UCM: NC	Yellow UCM: NC

\*Evaporated control.

(Fig. X) refers to the corresponding figure. Abbreviations: GOR/PAJ=Microbial mat incubation from Salar de Gorbea and Salar de Pajonales, respectively. CGOR/CPAJ=Just-water control from Salar de Gorbea and Salar de Pajonales, respectively. Coord. = Coordinates. Subst.= Substrate. FG = Fine Gypsum. CG = Coarse Gypsum. NS = No Substrate. UCM = Unconsolidated Microbial Mat. CM = Consolidated Microbial Mat. SGM = Slimy Gelatinous Microbial Mat (appearance of CM mat but filled with bubbles: Fig. 6I). NMD = No Microbial Mat Developed. NP = No Precipitates. NC = No Changes Observed. PSB = Purple Sulfur Bacteria. FSB = Filamentous Sulfur Bacteria. Dia = Diatom. Cya = Cyanobacteria. Dccpss = Dactylococcopsis. Chccpss = Chroococcidiopsis. Fil = Filaments. EPS = Extracellular Polymeric Substances. pGp = Prismatic Gypsum. IGp = Lenticular Gypsum. hbGp = Hemibipyramidal Gypsum. eHl = Euhedral Halite. nHl = Nodular Halite. sCc = Subhedral Calcite. pCc = Prismatic Calcite. bCc = Botryoidal calcite. bSi = Botryoidal Silicate. pClays = Protoclays.

Sample	Year	Salar	Coord. (Longitude)	Coord. (Latitude)	Subst.	Water	Check-ups					
							Day 0	Day 7	Day 30	Day 60	Day 90	Day 300
PAJ-5.1	2018	PAJ	-68.81904	-25.16855	FG	Paj 3	NP	White UCM: NP	White UCM: NC	White UCM: NC	White UCM: NC	White UCM: NC
PAJ-5.2	2018	PAJ	-68.81904	-25.16855	NS	Paj 3	NP	NMD: NP	NMD: NC	NMD: NC	NMD: NC	NMD: NC
CPAJ-4	2018	PAJ	-68.8354	-25.14506	NS	Paj 3	NP	NP	NP	NP	NP	NP
PAJ-6.1	2018	PAJ	-68.8354	-25.14506	FG	Paj 6	NP	White UCM: NP	White UCM: NC	Grey UCM: NC	Grey UCM: NC	Grey UCM: NC
PAJ-6.2	2018	PAJ	-68.8354	-25.14506	NS	Paj 6	NP	White UCM: NP	White UCM: NC	White UCM: NC	White UCM: NC	Orange UCM: NC
CPAJ-6	2018	PAJ	-68.82651	-25.14593	NS	Paj 6	NP	NP	NP	NP	NP	NP
PAJ-7.1	2018	PAJ	-68.85393	-25.15765	FG	Paj 7	NP	White UCM: NP	White UCM: pGp	White UCM: NC	Green, Yellow UCM: NC	Green, Yellow UCM: NC
PAJ-7.2	2018	PAJ	-68.85393	-25.15765	NS	Paj 7	NP	Grey UCM: NP	Grey UCM: Fil, PSB	Grey UCM: NC	Grey UCM: NC	Orange UCM: NC
PAJ-7.3	2018	PAJ	-68.85393	-25.15765	CG	Paj 7	NP	Grey UCM: NP	Grey UCM: IGp	Grey UCM: NC	Yellow, Brown UCM: NC	Yellow, Brown UCM: NC
CPAJ-7	2018	PAJ	-68.85393	-25.15765	NS	Paj 7	NP	NP	NP	NP	NP	NP
PAJ-10	2019	PAJ	-68.83371	-25.19301	NS	Paj 10	NP	Light Green UCM: Fig. 6A	Light Green UCM: NC	Light Green: pGp, IGp, sCc (Fig, 10A), Dia	Green, Orange UCM: NC	Orange CM: NC
PAJ-11	2019	PAJ	-68.83071	-25.19198	NS	Paj 11	NP	Dark Green UCM: NP	Dark Green UCM: NC	Dark Green UCM: pGp (Fig. 9B), IGp (Fig. 9E), Dia	Green, Orange UCM: NC	Orange, Green CM: NC (Fig. 6M)

(Supplementary Table Continuation)

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Sample	Year	Salar	Coord. (Longitude)	Coord. (Latitude)	Subst.	Water	Check-ups					
							Day 0	Day 7	Day 30	Day 60	Day 90	Day 300
PAJ-12	2019	PAJ	-68.84586	-25.15591	NS	Paj 12	NP	Dark Purple UCM: NP	Light Grey UCM: Chccpss (Fig. 6H)	Light Grey UCM: IGp (Fig. 9D), pGp, eHI, Chccpss, Cyan fil, Dia (Fig. 6F-G)	Dark Grey UCM: IGp, pGp, bSi, EPS-rich, Dia (Fig. 6P), Chccpss, PSB	Dark Grey CM: NC
PAJ-13	2019	PAJ	-68.847395	-25.154823	CG	Paj 13	NP	White UCM: NP	White UCM: NC	White Yellow UCM: NC	Yellow UCM: NC	Yellow UCM: NC
PAJ-14	2019	PAJ	-68.819037	-25.168545	NS	Paj 14	NP	Black UCM: Cyan fil (Fig. 6D)	Green UCM: NC	Green, Brown UCM: pGp, Cyan fil, Dia, EPS-rich	Brown, Orange UCM: NC	Brown, Orange CM: NC
PAJ-15	2019	PAJ	-68.83371	-25.19301	NS	Paj 15	NP	Dark Grey UCM: NP	Green, Yellow UCM: Cyan	Green, Yellow UCM: bSi, bCc (Fig. 10B), pClays (Fig. 10D), Dia, EPS-rich, PSB, Cyan Fil	Green CM: NC	Black, Brown CM: NC
PAJ-16	2019	PAJ	-68.83716	-25.14552	FG	Paj 16	NP	White UCM: Dia (Fig. 6B)	Light Yellow UCM: Fig. 6E	Grey Orange UCM: NC	Grey Orange UCM: NC	Grey Orange SGM: NC
PAJ-17	2019	PAJ	-68.82789	-25.14455	NS	Paj 17	NP	Orange SGM: Dccpss (Fig., 6C)	Orange SGM: Dccpss	Orange SGM: Dia, Dccpss, PSB, Cyan Fil (Fig. 6I,J,K), EPS-rich, pGp (Fig. 9C), eHI (Fig. 9H), nHI (Fig. 9G)	Orange SGM: NC	Orange CM: NC

(Supplementary Table Continuation)

(Fig. X) refers to the corresponding figure. Abbreviations: GOR/PAJ=Microbial mat incubation from Salar de Gorbea and Salar de Pajonales, respectively. CGOR/CPAJ=Just water control from Salar de Gorbea and Salar de Pajonales, respectively. Coord. = Coordinates. Subst.= Substrate. FG = Fine Gypsum. CG = Coarse Gypsum. NS = No Substrate. UCM = Unconsolidated Microbial Mat. CM = Consolidated Microbial Mat. SGM = Slimy Gelatinous Microbial Mat (appearance of CM mat but filled with bubbles:Fig. 6I). NMD = No Microbial Mat Developed. NP = No Precipitates. NC = No Changes Observed. PSB = Purple Sulfur Bacteria. FSB = Filamentous Sulfur Bacteria. Dia = Diatom. Cyan = Cyanobacteria. Dccpss = Dactylococcopsis. Chccpss = Chroococcidiopsis. Fil = Filaments. EPS = Extracellular Polymeric Substances. pGp = Prismatic Gypsum. IGp = Lenticular Gypsum. hbGp = Hemibipyramidal Gypsum. eHI = Euhedral Halite. nHI = Nodular Halite. sCc = Subhedral Calcite. pCc = Prismatic Calcite. bCc = Botryoidal calcite. bSi = Botryoidal Silicate. pClays = Protoclays.

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							Day 0	Day 7	Day 30	Day 60	Day 90	Day 300
GOR-10	2020	GOR	-68.658558	-25.398318	NS	Gor 10	NP	White UCM: NP	White UCM: NP	Yellow UCM: PSB, Dia, Cyan, pGp	Yellow UCM: NC	White UCM: NC
GOR-11	2020	GOR	-68.640682	-25.358234	NS	Gor 11	NP	Grey UCM: NP	Grey UCM: Cyan, Dia, pGp	Green Grey UCM: NC	Grey UCM: NC	Green Grey UCM: NC
GOR-12	2020	GOR	-68.642527	-25.362691	NS	Gor 12	NP	Green, Brown UCM: NP	Green, Brown UCM: NP	Green, Brown UCM: NC	Green, Brown UCM: NC	Green, Black UCM: NC
GOR-13	2020	GOR	-68.641464	-25.355969	NS	Gor 13	NP	Brown UCM: NP	Brown UCM: NP	Brown UCM: NC	Brown UCM: NC	Green, Brown UCM: NC
GOR-14	2020	GOR	-68.641611	-25.356701	NS	Gor 14	NP	Grey UCM: NP	Grey UCM: NP	Grey UCM: NC	Yellow Brown UCM: NC	Yellow Green: NC
GOR-15	2020	GOR	-68.690186	-25.42855	NS	Gor 15	NP	White UCM: NP	White UCM: NP	White UCM: NP	White UCM: NC	White UCM: NC
GOR-16	2020	GOR	-68.658308	-25.398949	NS	Gor 16	NP	Grey UCM: NP	Grey UCM: NP	Grey UCM: Dia (Fig 6N, O), PSB, pGp (Fig, 9F), pCc, bSi, eHI (Fig. 9I), EPS-rich	Green, Brown UCM: NC	Green, Brown UCM: NC
GOR-17	2020	GOR	-68.65892	-25.399567	CG	Gor 17	NP	Grey UCM: NP	Grey UCM: Dia, Cyan, pGp	Grey UCM: NC	Brown UCM: NC	Light Green CM: NC
GOR-18.1	2020	GOR	-68.661015	-25.394413	CG	Gor 18	NP	Grey UCM: NP	Grey UCM: NP	Grey UCM: NC	Dark Green UCM: NC	Dark Green UCM: NC

(Supplementary Table Continuation)

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Sample	Year	Salar	Coord. (Longitude)	Coord. (Latitude)	Subst.	Water	Check-ups					
							Day 0	Day 7	Day 30	Day 60	Day 90	Day 300
GOR-18.2	2020	GOR	-68.661015	-25.394413	NS	Gor 18	NP	Brown Grey UCM: NP	Brown Grey UCM: Dia, PSB, FSB	Brown Grey UCM: NC	Green, Red UCM: NC	Dark Green UCM: NC
GOR-19	2020	GOR	-68.658923	-25.399574	NS	Gor 19	NP	Grey UCM: NP	Grey UCM: NC	Grey UCM: NC	Green UCM: NC	Green UCM: NC
CGOR-10	2020	GOR	-68.658558	-25.398318	NS	Gor 10	NP	NP	NP	NP	NP	NP
CGOR-11	2020	GOR	-68.640682	-25.358234	NS	Gor 11	NP	NP	NP	NP	NP	NP
CGOR-12	2020	GOR	-68.642527	-25.362691	NS	Gor 12	NP	NP	NP	NP	NP	NP
CGOR-13	2020	GOR	-68.641464	-25.355969	NS	Gor 13	NP	NP	NP	NP	NP	NP
CGOR-14	2020	GOR	-68.641611	-25.356701	NS	Gor 14	NP	NP	NP	NP	NP	NP
CGOR-15	2020	GOR	-68.690186	-25.42855	NS	Gor 15	NP	NP	NP	NP	NP	NP
CGOR-16	2020	GOR	-68.658308	-25.398949	NS	Gor 16	NP	NP	NP	NP	NP	NP
CGOR-17	2020	GOR	-68.65892	-25.399567	NS	Gor 17	NP	NP	NP	NP	NP	NP
CGOR-18	2020	GOR	-68.661015	-25.394413	NS	Gor 19	NP	NP	NP	NP	NP	NP
CGOR-19	2020	GOR	-68.658923	-25.399574	NS	Gor 19	NP	NP	NP	NP	NP	NP
CG	2018	PAJ	-68.786408	-25.145443	CG	No	Gp (Fig. 8A)					
FG	2018	PAJ	-68.786408	-25.145443	FG	No	Gp (Fig. 8B)					

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