# Literature list about the MELiSSA Project and connected research (1988-2023) followed by seminal proceedings of 1987-1988

**Legend of paper (or book chapters) topics/MELiSSA compartments:**
**LSS : Life Support Systems**
**SP* : Space flight experiments and related studies (biocontamination, confined or extreme environments, space simulations (radiation, microgravity, low shear)**
**Mo: modelling**
**C1: MELiSSA first compartment (thermophilic, anaerobic, waste degradation)**
**C2: MELiSSA second compartment (anaerobic, photosynthetic)**
**C3: MELiSSA third compartment (nitrifying)**
**C4a : MELiSSA fourth compartment (microbial food production (spirulines (*Limnospira indica* ex:*Arthrospira)*))**
**C4b: MELiSSA fourth compartment (plant food production)**
**C5: Consumers compartment**
**MPP: MELiSSA Pilot Plant.**

| Year | Authors | Topic/MELiSSA Compartment | Title | Journal | Volume | Pages/DOI/ PMID.. |
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| **2023** | Nguyen Tinh Van, Viver T, Smets I, Bernaerts K, Faust K, Lavigne R, Poughon L, Dussap C-G, Springael D | C1 | *Thermocaproicibacter melissae* gen.nov., sp.nov., a thermophilic chain-elongating bacterium, producing *n*-caproate from polymeric carbohydrates | Int.J.Syst.Evol. Microbiology 2023 | 73: 005893 | DOI: 10.1099/ Ijsem. 0.005893 |

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| **2023** | Marra D, Karapantsios T, Caserta S, Secchi E, Holynska M, Labarthe S, Polizzi B, Ortega S, Kostoglou M, Lasseur C, Karapanagiotis I, Lecuyer S, Bridier A, Noirot-Gros M-F, Briandet R | SP | Migration of surface-associated microbial communities in spaceflight habitats | Biofilm 2023 Feb 24; 5:100109 | 2023; 5: 100109. | 10.1016/j.biofilm.2023.100109 PMCID: PMC9999172 PMID: 36909662 |
| **2023** | Caporale AG, Palladino M, De Pascale S, Duri LG, Rouphael Y, Adamo P. | C4b | How to make the Lunar and Martian soils suitable for food production - Assessing the changes after manure addition and implications for plant growth. | J Environ Manage. | 2023 Jan1 325(Pt A): 116455. | DOI: 10.1016/j.jenvman.2022.116455. Epub 2022 Oct 13. PMID: 36242975 |
| **2023** | Alloul A, Blansaer N, Cabecas Segura P, Wattiez R, Vlaeminck SE, Leroy B. | C2 | Dehazing redox homeostasis to foster purple bacteria biotechnology. | Trends Biotechnol. | 2023 Jan 41(1): 06-119. | DOI: 10.1016/j.tibtech.2022.06.010. Epub 2022 Jul 14. |
| **2023** | Nguyen Tinh Van, Viver T, Mortier J, Bin Liu, Smets I, Bernaerts K, Faust K, Lavigne R, Poughon L, Dussap C-G, Springael D | C1 | Isolation and characterization of a thermophilic chain elongating bacterium that produces the high commodity chemical n-caproate from polymeric carbohydrates. | Bioresource Technology | 2023 | DOI: 10.1016/j.biortech.2022.128170. Epub October 2022 |

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| **2022** | Segura PC, Wattiez R, Vande Wouwer A, Leroy B, Dewasme L | C2 | Dynamic modeling of *Rhodospirillum rubrum* PHA production triggered by redox stress during VFA photoheterotrophic assimilations. | .J Biotechnol.2022 Dec 10; | 360: 45-54. | DOI: 10.1016/j.jbiotec.2022.10.014. Epub 2022 Oct 20. PMID: 36273668 |
| **2022** | Caporale AG, Amato M, Duri LG, Bochicchio R, De Pascale S, Simeone GDR, Palladino M, Pannico A, Rao MA, Rouphael Y, Adamo P | C4b | Can Lunar and Martian Soils Support Food Plant Production? Effects of Horse/Swine Monogastric Manure Fertilisation on Regolith Simulants Enzymatic Activity, Nutrient Bioavailability, and Lettuce Growth. | Plants (Basel). Dec 2 | 11(23): 3345 | DOI: 10.3390/plants11233345. PMID: 36501382 |
| **2022** | Duri LG, Pannico A, Petropoulos SA, Caporale AG, Adamo P, Graziani G, Ritieni A, De Pascale S, Rouphael Y. | C4b | Bioactive Compounds and Antioxidant Activity of Lettuce Grown in Different Mixtures of Monogastric-Based Manure With Lunar and Martian Soils. | Front Nutr. | 2022 Apr 29;9 :890 786 | DOI: 10.3389/fnut.2022.890786. eCollection 2022. PMID: 35571954 |
| **2022** | Abdeljelil N, Ben Miloud Yahia N, Landoulsi A, Chatti A, Wattiez R, Van Houdt R, Gillan D. | SP* | Growth and biofilm formation of *Cupriavidus metallidurans* CH34 on different metallic and polymeric materials used in spaceflight applications | Biofouling | 38 (6):643 -655 | DOI: 10.1080/08927014.2022.2106858. Epub 2022 Aug 4. PMID: 35924687 |

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| **2022** | Faust V, van Alen T.A, Op den Camp H.J.M., Vlaeminck S.E., Guanigué R., Boon N., Udert K.M. | C3 | Ammonia oxidation by novel "Candidatus *Nitrosacidococcus urinae*" is sensitive to process disturbances at low pH and to iron limitation at neutral pH | Water Research X October 2022, 100157 | 17,1 | DOI.org/10.1016/j.wroa.2022.100157 |
| **2022** | Ciurans C, Guerrero J M, Martínez-Mongue I., Dussap C-G, Marin de Mas I , Godia, F | C4b, Mo | Enhancing control systems of higher plant culture chambers via multilevel structural mechanistic modelling | Front. Plant Sci. 13:970410. | | DOI.org/10.3389/fpls.2022.970410 |
| **2022** | Kumar D, Tiwari A., Fontaine J-P | SP* | Evaluation of water vapor condensation using the thermoelectric cooling technique by experimental and theoretical observations | Phys. Fluids | 34, 102108 | DOI.org/10.1063/5.0106434 |
| **2022** | Segers C, Mysara M, Coolkens A, Baatout S, Leys N, Lebeer S, Verslegers M, Mastroleo F | C4a, C5 | *Limnospira indica* PCC8005 or *Lacticaseibacillus rhamnosus* GG dietary supplementation modulate the gut microbiome in mice | Appl.Microbiol. | Vol2 | 3, 636-650 |
| **2022** | Verbeelen T., Van Houdt R., Leys N.,Guanigué R., Mastroleo F. | SP* | Optimization of RNA extraction for bacterial whole transcriptome studies of low-biomass samples. | i Science | | DOI.org/10.1016/j.isci.2022.105311 |
| **2022** | Vitale E, Izzo LG, Amitrano C, Velikova V, Tsonev T, Simoniello P, De Micco V, Arena C. | C4b | Light Quality Modulates Photosynthesis and Antioxidant Properties of B. vulgaris L. Plants from Seeds Irradiated with High-Energy Heavy Ions: Implications for Cultivation in Space. | Plants (Basel). 2022 Jul 10;11(14):1816. | | DOI :10.3390/plants11141816. PMID: 35890451; PMCID: PMC9316636 |

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| **2022** | Faust V., Gruber W., Ganigué R., Vlaeminck S.E., Udert K.M | C3 | Nitrous Oxide Emissions and Carbon Footprint of Decentralized Urine Fertilizer Production by Nitrification and Distillation | ACS ES&T Engineering | 2(9) 1745-55 | DOI: 10.1021/acsestengg.2c00082 |
| **2022** | Audas C., Ortega Ugalde S, Paille C, Lamaze B, Lasseur C. | LSS | Life Support Systems beyond Low Earth Orbit advocates for an improved resources management approach | EEEP Journal | 1, 5-13 | DOI.org/10.32006/eeep.2022.1.0513 |
| **2022** | Cabecas Segura P, Onderwater R, Deutschbauer A, Dewasme L, Wattiez R, Leroy B. | C2 | Study of the Production of Poly(Hydroxybutyrate-*co*-Hydroxyhexanoate) and Poly(Hydroxybutyrate-*co*-Hydroxyvalerate-*co*-Hydroxyhexanoate) in *Rhodospirillum rubrum* | Appl Environ Microbiol. Mar 22 | 88(6): e01586 21 | DOI:10.1128/AEM.01586-21.PMID: 35080906; PMCID: PMC8939316. |
| **2022** | Garcia-Gragera, D., Peiro, E., Arnau, C., Cornet, J. F., Dussap, C. G., & Godia, F. | MPP,C4a | Dynamics of long-term continuous culture of *Limnospira indica* in an air-lift photobioreactor | Microbial biotechnology | 15(3) : 931–948 | DOI.org/10.1111/1751-7915.13882 |
| **2022** | Mastroleo F., Arnau C., Jimenez C., Verbeelen T., Mysara M., Gòdia F., Leys N., & Van Houdt R.. | C3 | Metaproteomics, heterotrophic growth and distribution of *Nitrosomonas europaea* and *Nitrobacter winogradskyi* after long-term operation of an autotrophic nitrifying biofilm reactor | Appl. Microbiol. | 2(1) 272-287 | DOI.org/10.3390/applmicrobiol2010020 |
| **2022** | Aronne G, Muthert LWF, Izzo LG, Romano LE, Iovane M, Capozzi F, Manzano A, Ciska M, Herranz R, Medina FJ, | LSS ,C4b,SP* | A novel device to study altered gravity and light interactions in seedling tropisms | Life Sciences in Space Research | 32 : 8-16 | DOI.org/10.1016/j.lssr.2021.09.005 |

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| **2022** | Izzo L.G., Romano L.E., Muthert L.W.F., Iovane M., Capozzi F., Manzano A., Ciska M., Herranz R., Medina F.J., Kiss J.Z., van Loon J.J.W.A., Aronne G. | C4b | Interaction of gravitropism and phototropism in roots of *Brassica oleracea* | Environmental and Experimental Botany | | DOI.org/10.1016/j.envexpbot.2021.104700 |
| **2021** | El-Nakhel, C.; Geelen, D.; De Paepe J.; Clauwaert, P.; De Pascale, S.; Rouphael, Y. | C4b | An Appraisal of Urine Derivatives Integrated in the Nitrogen and Phosphorus Inputs of a Lettuce Soilless Cultivation System. | Sustainability | 13, 4218. | DOI.org/10.3390/su13084218 |
| **2021** | Guarato P. | LSS, Mo | Carbon Capture, Utilization and Storage in Switzerland Volume 1. The Technological and Scientific framework | Cahier de l'IDHEAP (Institut des hautes études en administration Publique/Unil. Lausanne) | 315 2021 104pp | ISBN 978 2 940667 05 5 |
| **2021** | Guarato P. | LSS, Mo | Carbon Capture, Utilization and Storage in Switzerland Volume 2. The Institutional and Legal framework | Cahier de l'IDHEAP | 316 2021 205pp | ISBN 978 2 940667 06 2 |
| **2021** | Ciurans C, Bazmohammadi N, Poughon L, Vazquez J.C, Dussap C-G, Godia F, Guerrero J.M | MPP, Mo, LSS | Hierarchically Controlled Ecological Life Support Systems | Comp. Chem. Engineering | 157, 107625 2021 Dec 5 | DOI.org/10.1016/j.compchemeng.2021.107625 |

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| **2021** | Verbeelen T, Leys N, Guanigue R, Mastroleo F | C3,C2, LSS, SP* | Development of Nitrogen Recycling Strategies for Bioregenerative Life Support Systems in Space | Front. Microbiol. | 2021 Oct 13 | DOI.org/10.3389/fmicb.2021.700810 |
| **2021** | Garcia-Gragera D, Arnau C, Peiro E, Godia F, Dussap C-G, Poughon L, Gerbi O, Lamaze B , Lasseur C. | MPP, LSS | MELiSSA Pilot Plant Integration: building blocks for a regenerative life support platform | Front. Astronomy and Space Sciences, section Astrobiology | 2021 Oct 19 | DOI.org/10.3389/fspas.2021.750616 |
| **2021** | Cabecas Segura P, De Meur Q, Tanghe A, Onderwater R, Dewasme L, Wattiez R, Leroy B. | C2 | Effects of Mixing Volatile Fatty Acids as Carbon Sources on *Rhodospirillum rubrum* Carbon Metabolism and Redox Balance Mechanisms | Microorganisms | 2021 Sept 21 | DOI: 10.3390/microorganisms9091996. PMID: 34576891; PMCID: PMC8471276 |
| **2021** | Bayon-Vicente G, Marchand E, Ducrotois J, Dufrasne FE, Hallez R, Wattiez R, Leroy B. | C2 | Analysis of the Involvement of the Isoleucine Biosynthesis Pathway in Photoheterotrophic Metabolism of *Rhodospirillum rubrum* | Front Microbiol. | 2021 Sept 21 | DOI: 10.3389/fmicb.2021.731976. PMID: 34621257; PMCID: PMC8490811 |
| **2021** | Paradiso R, De Pascale S | C4b | Bioregenerative systems to sustain human life in Space: the research on higher plants | Ital Hortus | 2021 Sept | DOI: 10.26353/j.italhort/2021.2.0121 |
| **2021** | Garcia-Gragera D, Peiro E, Arnau C, | C4a | Dynamics of long-term continuous culture of *Limnospira indica* in an air-lift photobioreactor | Microb Biotechnol | 2021 Aug 2. | PMID: 34342154 |

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| **2021** | Yadav A, Maertens L, Meese T, Van Nieuwerburgh F, Mysara M, Leys N , Cuypers A, Janssen P-J | C4a, SP* | Genetic Responses of Metabolically Active *Limnospira indica* Strain PCC 8005 Exposed to γ-Radiation during Its Lifecycle | Microorganisms | 2021 Jul 30<br>9(8):16-26. | PMID: 34442705 PMCID: PMC8400943 DOI:10.3390/microorganisms9081626 |
| **2021** | Fahrion J, Mastroleo F, Dussap CG, Leys N. | C4a, LSS | Use of photobioreactors in Regenerative Life Support Systems for Human Space Exploration | Front. Microbiol. June 29 | 12: 699525 | DOI: 10.3389 PMID: 34276632 |
| **2021** | Sachdeva N, Poughon L, Gerbi O, Dussap C-G, Lasseur C, Leroy B, Wattiez R. | C4a, LSS | Ground Demonstration of the Use of *Limnospira indica* for Air Revitalization in a Bioregenerative Life-Support System Setup: Effect of Non-Nitrified Urine–Derived Nitrogen Sources | Frontiers in Astronomy and Space Sciences | 2021 June 8 | DOI:10.3389/fspas.2021.700270 |
| **2021** | Lasseur C, Mergeay M. | LSS | Closed ecological systems in extreme environments , current and future ways to closed life support systems : Virtual MELISSA conference , Ghent (B) (3-5 /11/2020). A review | Ecological Engineering and Environment Protection, | No 1, p. 25-35 | DOI:org/10.32006/eeep.2021.1.2535 |
| **2021** | Van Gerrewey T, El-Nakhel C, De Pascale S, De Paepe J, | C4b | Root-Associated Bacterial Community Shifts in Hydroponic Lettuce Cultured with Urine-Derived Fertilizer | Microorganismsmdpi ,1255426 | 9 | DOI:10.3390/microorganisms9061326 |

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| **2021** | De Pascale S, Arena C, Aronne G, De Micco V, Pannico A, Paradiso R, Rouphael Y. | C4b, LSS, SP* | Biology and crop production in Space environments: Challenges and opportunities. | Life Sci Space Res (Amst). | 29: 30-37 | DOI: 10.1016/j.lssr.2021.02.005. Epub 2021 Mar 2. PMID: 33888285 Review. |
| **2021** | Cockell CS, Santomartino R, Finster K, Waajen AC, Nicholson N, Loudon CM, Eades LJ, Moeller R, Rettberg P, Fuchs FM, Van Houdt R, Leys N, Coninx I, Hatton J, Parmitano L, Krause J, Koehler A, Caplin N, Zuijderduijn L, Mariani A, Pellari S, Carubia F, Luciani G, Balsamo M, Zolesi V, Ochoa J, Sen P, Watt JAJ, Doswald-Winkler J, Herová M, Rattenbacher B, Wadsworth J, Everroad RC, Demets R. | SP* | Microbially-Enhanced Vanadium Mining and Bioremediation Under Micro- and Mars Gravity on the International Space Station. | Front Microbiol. | 12 Apr 1 | DOI: 10.3389/fmicb.2021.641387. eCollection 2021. PMID: 33868198 |
| **2021** | Izzo LG, Mickens MA, Aronne G, Gómez C. | C4b | Spectral effects of blue and red light on growth, anatomy, and physiology of lettuce. | Physiol Plant. 2021 | Mar 13. | DOI: 10.1111/ppl.13395. PMID: 33715155 |
| **2021** | Izzo LG, Aronne G. | C4b | Root Tropisms: New Insights Leading the Growth Direction of the Hidden Half. | Plants (Basel). 2021 | 10(2):220 Jan 23 | DOI: 10.3390/plants10020220. |

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| **2021** | Ciurans C, Bazmohammadi N, Vazquez J.C, Dussap C-G , Guerrero J.M, Godia F | MPP, Mo, LSS | Hierarchical Control of Space Closed Ecosystems<br><br>Expanding Microgrid Concepts to Bioastronautics | IEEE Industrial Electronic magazine 2021 | January | 1932-4529/21©2021IEEE |
| **2020** | Brunet J. | LSS , Mo | Ingénierie de la systémique<br>Tome3 : Un système régénératif pour le spatial :<br>Application au projet MELiSSA | Book<br>112pp | Tome 3 | ISBN 9791034350391<br>(English version in prep.) |
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| **2020** | Aronne G, Romano L E, Izzo LG | C4b | Subsequent inclusion/exclusion criteria to select the best species for an experiment performed on the ISS in a refurbished hardware | Life Sciences in Space Research | 27: 19-26 | DOI: 10.1016/j.lssr.2020.07.002. Jul 11. PMID: 34756226 |

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| **2020** | Lindeboom, R.E.F., De Paepe J., Vanoppen, M., Alonso Fariñas, B., Coessens, W., Alloul, A., Christiaens, M.E.R., Dotremont, C., Beckers, H., Lamaze, B., Demey, D., Clauwaert, P., Verliefde, A.R.D. Vlaeminck, S.E. | SP*, C3 | A five-stage treatment train for water recovery from urine and shower water for long-term human Space missions | Desalination | 495 | 114634 |
| **2020** | De Paepe J, De Paepe K, Gòdia F, Rabaey K, Vlaeminck S, Clauwaert P | C3 | Bio-electrochemical COD removal for energy-efficient, maximum and robust nitrogen recovery from urine through membrane aerated nitrification | Water Research | 185 | 116223 |
| **2020** | Duri LG, El-Nakhel C , Caporale A G, Ciriello M, Graziani G, Pannico A, Palladino M, Ritieni A, De Pascale S, Vingiani S, Adamo P , Rouphael Y | C4b | Mars Regolith Simulant Ameliorated by Compost as in situ Cultivation Substrate Improves Lettuce Growth and Nutritional Aspects | Plants (Basel) May 14;9(5):628 | | DOI: 10.3390/plants9050628 PMID: 32423057 PMCID: PMC7285329 |

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| **2020** | Paradiso R, Ceriello A, Pannico A, Sorrentino S, Palladino M, Giordano M, Fortezza R, De Pascale S. | C4b | Design of a module for cultivation of tuberous plants in microgravity: The ESA Project "Precursor of Food Production Unit" (PFPU). | Frontiers Plant Science | 11 | DOI: 10.3389/fpls.2020.00417 |
| **2020** | Carillo P, Morrone B, Fusco GM, De Pascale S, Rouphael Y. | C4b | Challenges for a sustainable food production system on board of the International Space Station: A technical review. | Agronomy | 10(5) | https://www.mdpi.com/2073-4395/10/5/687 |
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| **2020** | Clauwaert P, De Paepe J, Jiang F, Alonso-Fariñas B, Vaiopoulou E, Verliefde A, Rabaey K | C3, LSS | Electrochemical tap water softening: A zero chemical input approach. . | Water Res. 2020 | 169:115263 Feb 1 | DOI: 10.1016/j.watres.2019.115263. Epub 2019 Nov 4. PMID: 31734395 |
| **2020** | Senatore G, Mastroleo F, Leys N, Mauriello G. | LSS, SP* , C4a | Growth of *Lactobacillus reuteri* DSM17938 Under Two Simulated Microgravity Systems: Changes in Reuterin Production, Gastrointestinal Passage | Astrobiology | 20 1-14 | DOI: 10.1089/ast.2019.2082 |

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| **2020** | Van Houdt R, Leys N | SP* | Monitoring the Microbial Burden in Manned Space Stations. | In: Choukèr A. (ed) Stress Challenges and Immunity in Space, Springer-Verlag (Berlin-Heidelberg) | Chap 25 p463-475 | DOI.org/ 10.1007/978.3 .030-16996-1_25 |
| **2020** | Quintens R, Baatout S, Moreels M | SP* | Assessment and Biomonitoring of Exposure to Space radiation | In: Choukèr A. (ed) Stress Challenges and Immunity in Space, Springer-Verlag (Berlin-Heidelberg) | Chap28 p519-533 | DOI.org/ 10.1007/978.3 .030-16996-1_28 |
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**Legend of paper (or book-chapters) topics & MELiSSA compartments:**

**LSS : Life Support Systems**
**SP* : Space flight experiments and related studies (biocontamination, confined and extreme environments, space simulations (radiation, microgravity, low shear))**

**Mo: Modelling**

**C1: MELiSSA first compartment (thermophilic, anaerobic, waste degradation)**
**C2: MELiSSA second compartment (anaerobic photosynthetic)**
**C3: MELiSSA third compartment (nitrifying)**

**C4a : MELiSSA fourth compartment (microbial food production (as among others: cyanobacteria: *Limnospira indica* PCC8005 /*Arthrospira* sp.PCC8005) (The taxonomic discussion is still ongoing (August 2019): making use of pangenomic taxonomy signatures for a large**

**set of publicly available cyanobacterial genomes, strain PCC 8005 was allocated as the type strain to a new species named *Arthrospira nitrilium* (Walter et al, 2017), opening up a fresh discourse on *Arthrospira* taxonomy. Recently, mass produced Arthrospira have been placed into a new genus, *Limnospira*, mainly based on 16S rRNA phylogenetic analysis but also taking into account morphological and ecological data (Nowicka-Krawczyk et al., 2019), further fueling the complex debate among cyanobacterial taxonomists on the true and final position of the *Arthrospira* genus and its current member species).**

## C4b: MELiSSA fourth compartment (plant food production)

## C5: Consumers compartment

## MPP: MELiSSA Pilot Plant