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List of publications

Dr. Sergey N. Kosourov

ORCID: 0000-0003-4025-8041

A. Peer-reviewed scientific articles

A1. Refereed original research articles in scientific journals

1. Levä T., Mahlamäki E., **Kosourov S.,** Allahverdiyeva Y., Mäkelä M., Tammelin T. (2025) Non-invasive monitoring of cyanobacteria growth in a nanocellulose matrix. *Algal Research* 89: 104090.
2. **Kosourov S.,** ✉ Tammelin T., Allahverdiyeva Y. ✉ (2025) Engineered biocatalytic architecture for enhanced light utilisation in algal H_2 production. *Energy & Environmental Science* 18: 937–947.
3. He M., Santana-Sánchez A., Tóth G.S., Ermakova M., Collard D., **Kosourov S.**, Allahverdiyeva Y. (2025) Deletion of Flv3A facilitates long-term H_2 photoproduction in diazotrophic *Anabaena* sp. PCC 7120. *Physiologia Plantarum* 177(1): e70087.
4. Grimm H.C., Erlsbacher P., Medipally H., Malihan-Yap L., Sovic L., Zöhrer J., **Kosourov S.N.**, Allahverdiyeva Y., Paul C.E., Kourist R. (2025) Towards high atom economy in whole-cell redox biocatalysis: up-scaling light-driven cyanobacterial ene-reductions in a flat panel photobioreactor. *Green Chemistry* 27: 2907-2920.
5. Tóth G.S,. Backman O., Siivola T., Xu W., **Kosourov S.**, Siitonen V., Xu C., Allahverdiyeva Y. (2024) Employing photocurable biopolymers to engineer photosynthetic 3D-printed living materials for production of chemicals. *Green Chemistry* 26: 4032–4042.
6. Virkkala T., **Kosourov S.**, Rissanen V., Siitonen V., Arola S., Allahverdiyeva Y., Tammelin T. (2023) Bioinspired mechanically stable all-polysaccharide based scaffold for photosynthetic production. *Journal of Materials Chemistry B* 11: 8788–8803.
7. Vajravel S., Allahverdiyeva Y., **Kosourov S.**✉ (2023) Balancing algal photosynthesis, O_2 consumption, and H_2 recycling for sustained H_2 photoproduction in pulse-illuminated algal cultures. *Sustainable Energy Fuels* 7: 1818–1828.
8. Siitonen V., Probst A., Tóth G., Kourist R., Schroda M., **Kosourov S**., Allahverdiyeva Y. (2023) Engineered green alga *Chlamydomonas reinhardtii* as a whole-cell photosynthetic biocatalyst for stepwise photoproduction of H_2 and ε-caprolactone. *Green Chemistry* 25: 5945–5955.
9. Santana-Sánchez A., Nikkanen L., Werner E., Tóth G., Ermakova M., **Kosourov S.**, Walter J., He M., Aro E.-M., Allahverdiyeva Y. (2023) Flv3A facilitates O_2 photoreduction and affects H_2 photoproduction independently of Flv1A in diazotrophic *Anabaena* filaments. *New Phytologist* 237: 126–139.
10. Levä T., Rissanen V., Nikkanen L., Siitonen V., Heilala M., Phiri J., Maloney T.C., **Kosourov S.**, Allahverdiyeva Y., Mäkelä M., Tammelin T. (2023) Mapping nanocellulose- and alginate-based photosynthetic cell factory scaffolds: Interlinking porosity, wet strength, and gas exchange. *Biomacromolecules* 24: 3484–3497.
11. Tóth G.S., Siitonen V., Nikkanen L., Sovic L., Kallio P., Kourist R., **Kosourov S.**, Allahverdiyeva Y. (2022) Photosynthetically produced sucrose by immobilized *Synechocystis* sp. PCC 6803 drives biotransformation in *E. coli*. *Biotechnology for Biofuels and Bioproducts* 15: 146.
12. Latonen R.-M., Cabrera J.A.W., Lund S., **Kosourov S**., Vajravel S., Boeva Z., Wang X., Xu C., Allahverdiyeva Y. (2021) Electrospinning of electroconductive water-resistant nanofibers of PEDOT–PSS, cellulose nanofibrils and PEO: Fabrication, characterization, and cytocompatibility. *ACS Applied Bio Materials* 4: 483–493.

13. Rissanen V., Vajravel S., **Kosourov S.**, Arola S., Kontturi E., Allahverdiyeva Y., Tammelin T. (2021) Nanocellulose-based mechanically stable immobilization matrix for enhanced ethylene production: a framework for photosynthetic solid-state cell factories. *Green Chemistry* 23: 3715–3724.

14. Vajravel S., Sirin S., **Kosourov S.**, Allahverdiyeva Y. (2020) Towards sustainable ethylene production with cyanobacterial artificial biofilms. *Green Chemistry* 22: 6404–6414.

15. **Kosourov S.**,✉ Nagy V., Shevela D., Jokel M., Messinger J.,✉ Allahverdiyeva Y.✉ (2020) Water oxidation by photosystem II is the primary source of electrons for sustained H_2 photoproduction in nutrient-replete green algae. *Proceedings of the National Academy of Sciences of the United States of America* 117: 29629–29636.

16. Jokel M., Nagy V., Tóth S.Z., **Kosourov S.**, Allahverdiyeva Y. (2019) Elimination of the flavodiiron electron sink facilitates long-term H_2 photoproduction in green algae. *Biotechnology for Biofuels* 12: 280.

17. Murukesan G., Lynch F., Allahverdiyeva Y., **Kosourov S.**✉ (2019) Acclimation responses of immobilized N_2-fixing heterocystous cyanobacteria to long-term H_2 photoproduction conditions: carbon allocation, oxidative stress and carotenoid production. *Journal of Applied Phycology* 31: 131–143.

18. Volgusheva A., **Kosourov S.**, Lynch F., Allahverdiyeva Y. (2019) Immobilized heterocysts as microbial factories for sustainable nitrogen fixation. *Journal of Biotechnology* 306, Supplement: 100016.

19. **Kosourov S.**,✉ Jokel M., Aro E.-M., Allahverdiyeva Y.✉ (2018) A new approach for sustained and efficient H_2 photoproduction by *Chlamydomonas reinhardtii*. *Energy & Environmental Science* 11: 1431–1436.

20. Jämsä M., **Kosourov S.**, Rissanen V., Hakalahti M., Pere J., Ketoja J.A., Tammelin T., Allahverdiyeva Y. (2018) Versatile templates from cellulose nanofibrils for photosynthetic microbial biofuel production. *Journal of Materials Chemistry A* 6: 5825–5835.

21. **Kosourov S.**, Murukesan G., Seibert M., Allahverdiyeva Y. (2017) Evaluation of light energy to H_2 energy conversion efficiency in thin films of cyanobacteria and green alga under photoautotrophic conditions. *Algal Research* 28: 253–263.

22. **Kosourov S.**, Murukesan G., Jokela J., Allahverdiyeva Y. (2016) Carotenoid biosynthesis in *Calothrix* sp. 336/3: composition of carotenoids on full medium, during diazotrophic growth and after long-term H_2 photoproduction. *Plant Cell Physiology* 57: 2269–2282.

23. Jokel M., **Kosourov S.**, Battchikova N., Tsygankov A.A., Aro E.M., Allahverdiyeva Y. (2015) *Chlamydomonas* flavodiiron proteins facilitate acclimation to anoxia during sulfur deprivation. *Plant Cell Physiology* 56: 1598–1607.

24. **Kosourov S.,** Leino H., Murukesan G., Lynch F., Sivonen K., Tsygankov A.A., Aro E-M., Allahverdiyeva Y. (2014) Hydrogen photoproduction by immobilized N_2-fixing cyanobacteria: understanding the role of the uptake hydrogenase in the long-term process. *Applied and environmental microbiology* 80: 5807–5817.

25. Ermakova M., Battchikova N., Richaud P., Leino H., **Kosourov S**., Isojärvi J., Peltier G., Flores E., Cournac L., Allahverdiyeva Y., Aro E-M. (2014) Heterocyst-specific flavodiiron protein Flv3B enables oxic diazotrophic growth of the filamentous cyanobacterium *Anabaena* sp. PCC 7120. *Proceedings of the National Academy of Sciences of the United States of America* 111: 11205–11210.

26. Gosse J.L., Chinn M.S., Grunden A.M., Bernal O.I., Jenkins J.S., Yeager C., **Kosourov S.**, Seibert M., Flickinger M.C. (2012) A versatile method for preparation of hydrated microbial-latex biocatalytic coatings for gas absorption and gas evolution. *Journal of industrial microbiology & biotechnology* 39: 1269–1278.

27. **Kosourov S.N.**,✉ Batyrova K.A., Petushkova E.P., Tsygankov A.A., Ghirardi M.L., Seibert M. ✉ (2012) Maximizing the hydrogen photoproduction yields in *Chlamydomonas reinhardtii* cultures: The effect of the H_2 partial pressure. *International Journal of Hydrogen Energy* 37: 8850–8858.

28. Leino H., **Kosourov S.N.**, Saari L., Sivonen K., Tsygankov A.A., Aro E-M., Allahverdiyeva Y. (2012) Extended H_2 photoproduction by N_2-fixing cyanobacteria immobilized in thin alginate films. *International Journal of Hydrogen Energy* 37: 151–161.

29. Batyrova K.A., Tsygankov A.A., **Kosourov S.N.**✉ (2012) Sustained hydrogen photoproduction by phosphorus-deprived *Chlamydomonas reinhardtii* cultures. *International Journal of Hydrogen Energy* 37: 8834–8839.

30. **Kosourov S.N.,** Ghirardi M.L., Seibert M. (2011) A truncated antenna mutant of *Chlamydomonas reinhardtii* can produce more hydrogen than the parental strain, *International Journal of Hydrogen Energy.* 36(3): 2044-2048.

31. **Kosourov S.N.,** Seibert M. (2009) Hydrogen photoproduction by nutrient-deprived *Chlamydomonas reinhardtii* cells immobilized within thin alginate films under aerobic and anaerobic conditions. *Biotechnol Bioeng.* 102 (1): 50-58.

32. Meuser J.E., Ananyev G., Wittig L.E., **Kosourov S.,** Ghirardi M.L., Seibert M., Dismukes G.C., Posewitz M.C. (2009) Phenotypic diversity of hydrogen production in chlorophycean algae reflects distinct anaerobic metabolisms. *J Biotechnol*. 142(1): 21-30.

33. Tolstygina I.V., Antal T.K., **Kosourov S.N.,** Krendeleva T.E., Rubin A.B., Tsygankov A.A. (2009) Hydrogen production by photoautotrophic sulfur-deprived *Chlamydomonas reinhardtii* pre-grown and incubated under high light *Biotechnol Bioeng.* 102(4): 1055-1061.

34. Laurinavichene T.V., **Kosourov S.N.**, Ghirardi M.L., Seibert M., Tsygankov A.A. (2008) Prolongation of H_2 photoproduction by immobilized, sulfur-limited *Chlamydomonas reinhardtii* cultures. *J Biotechnol*. 134(3-4): 275-277.

35. **Kosourov S.**, Patrusheva E., Ghirardi M.L., Seibert M., Tsygankov A.A. (2007) A comparison of hydrogen photoproduction by sulfur-deprived *Chlamydomonas reinhardtii* under different growth conditions. *J Biotechnol*. 128(4): 776-787.

36. Makarova V.V., **Kosourov S.**, Krendeleva T.E., Semin B.K., Kukarskikh G.P., Rubin A.B., Sayre R.T., Ghirardi M.L., Seibert M. (2007) Photoproduction of hydrogen by sulfur-deprived *Chlamydomonas reinhardtii* mutants with impaired photosystem II photochemical activity. *Photosynth. Research.* 94(1): 79-89.

37. Tsygankov A.A., **Kosourov S.N.**, Tolstygina I.V., Ghirardi M.L., Seibert M. (2006) Hydrogen production by sulfur-deprived *Chlamydomonas reinhardtii* under photoautotrophic conditions. *International Journal of Hydrogen Energy*. 31(11): 1574-1584.

38. **Kosourov S.**, Makarova V., Fedorov A.S., Tsygankov A., Seibert M., Ghirardi M.L. (2005) The effect of sulfur re-addition on H_2 photoproduction by sulfur-deprived green algae. *Photosynth. Research.* 85: 295-305.

39. Makarova V.V., **Kosourov S.N.**, Krendeleva T.E., Kukarskikh G.P., Ghirardi M.L., Seibert M., Rubin A.B. (2005) Photochemical activity of photosystem II and hydrogen photoproduction in sulfur-deprived *Chlamydomonas reinhardtii* mutants D1-R323D and D1-R323L. *Biofizika* 50(6): 1070-1078.

40. Fedorov A.S., **Kosourov S.**, Ghirardi M.L., Seibert M. (2005) Continuous hydrogen photoproduction by *Chlamydomonas reinhardtii*: Using a novel two-stage, sulfate-limited chemostat system. *Applied Biochem. Biotech.* 121-124: 403-412.

41. **Kosourov S.**, Seibert M., Ghirardi M.L. (2003) Effects of extracelular pH on the metabolic pathways of sulfur-deprived, H_2-producing *Chlamydomonas reinhardtii* cultures. *Plant Cell Physiol.* 44(2): 146-155.

42. Tsygankov A., **Kosourov S.**, Seibert M., Ghirardi M.L. (2002) Hydrogen photoproduction under continuous illumination by sulfur-deprived, synchronous *Chlamydomonas reinhardtii* cultures. *International Journal of Hydrogen Energy* 27(11-12): 1239-1244.

43. **Kosourov S.**, Tsygankov A., Seibert M., Ghirardi M.L. (2002) Sustained hydrogen photoproduction by *Chlamydomonas reinhardtii*: Effects of culture parameters. *Biotechnol Bioeng.* 78(7): 731-740.

44. Tsygankov A.A., Fedorov A.S., **Kosourov S.N.**, Rao K.K. (2002) Hydrogen production by cyanobacteria in an automated outdoor photobioreactor under aerobic conditions. *Biotechnol Bioeng.* 80(7): 777-783.

45. **Kosourov S.N.**,✉ Kuznetsova L.G. Gogotov I.N. (2000) Induction of potassium transport in wheat sprout roots by low potassium content in the medium. *Dokl Biol Sci*. 373(1-6): 430-432.

46. **Kosourov S.N.**,✉ Kuznetsova L.G. (1999) Potassium uptake by wheat roots at low potassium concentrations in ambient solution. *Russian J Plant Physiol*. 46(2): 168-173.

A2. Refereed review articles in scientific journals

47. **Kosourov S**.,✉ Böhm M., Senger M., Berggren G., Stensjö K., Mamedov F., Lindblad P.,✉ Allahverdiyeva Y.✉ (2021) Photosynthetic hydrogen production: Novel protocols, promising engineering approaches and application of semi-synthetic hydrogenases. *Physiologia Plantarum* 173: 555–567.

A3. Refereed book chapters

48. Jokel M., **Kosourov S**., Allahverdiyeva Y. (2020) Hydrogen Photoproduction in Green Algae: Novel Insights and Future Perspectives. *In: Climate Change, Photosynthesis and Advanced Biofuels*. Springer Singapore, Singapore, pp. 237–253. ISBN: 978-981-15-5227-4.

49. **Kosourov S.N.,**✉ He M., Allahverdiyeva Y., Seibert M. (2018) Chapter 15. Immobilization of Microalgae as a Tool for Efficient Light Utilization in H2 Production and other Biotechnology Applications. *In: Seibert M., Torzillo G. ed., Microalgal Hydrogen Production: Achievements and Prospectives,* The Royal Society of Chemistry, pp. 355–384. ISBN: 978-1-84973-672-5.

50. Allahverdiyeva Y., Aro E.M., **Kosourov S.N.** (2014) Chapter 21. Recent Developments on Cyanobacteria and Green Algae for Biohydrogen Photoproduction and Its Importance in CO_2 Reduction. *In: Gupta V., Tuohy M., Kubicek C., Saddler J., Xu F. ed., Bioenergy Research: Advances and Applications.* Elsevier. ISBN: 978-0-444-59561-4.

51. Tsygankov A., **Kosourov S**. (2014) Chapter 14. Immobilization of photosynthetic microorganisms for efficient hydrogen production. *In: Zannoni D. and De Philippis R. ed., Microbial Bioenergy: Hydrogen Production.* Springer, Dordrecht. ISBN: 978-94-017-8553-2.

52. Ghirardi M.L., **Kosourov S.**, Maness P.C., Smolinski S., Seibert M. (2010) Algal hydrogen production. *In: Flickinger M.C. ed., Encyclopedia of Industrial Biotechnology: Bioprocess, Bioseparation, and Cell Technology.* Wiley – VCH Verlag; ISBN: 0-471-79930-0.

53. Ghirardi M.L., King P., **Kosourov S.**, Forestier M., Zhang L., Seibert M. (2005) Development of algal systems for hydrogen photoproduction: Addressing the hydrogenase oxygen-sensitivity problem. *In: Collings A.F. and Critchley C. ed., Artificial Photosynthesis: From Basic Biology to Industrial Application.* Weinheim: Wiley – VCH Verlag; p. 213-228. ISBN: 3-527-31090-8.

B. Non-refereed scientific articles

54. Ghirardi M.L., Maness P.C., **Kosourov S.** (2015) Algal Hydrogen Production – stand-alone or integrated system? *In Proceedings of the 16th International Biotechnology Symposium and Exhibition, September 14-19, 2014, Fortaleza, Ceara, Brazil.* Biotechnology for the Development of a Green Economy. ISBN 978-85-420-0788-6 pp. 195-199.

55. **Kosourov S.**, Tsygankov A., Ghirardi M.L., Seibert M. (2001) Sustained hydrogen photoproduction by *Chlamydomonas reinhardtii* – Effects of sulfur re-addition. *In PS2001 Proceedings: 12th International Congress on Photosynthesis, August 18-23, 2001, Brisbane Convention and Exhibition Centre, Queensland, Australia.* CSIRO Publishing, Melbourne. S37-009. 4 p.

56. Ghirardi M.L., **Kosourov S.**, Seibert M. (2001) Optimization of a Cyclic Algal Hydrogen Photoproduction System for Possible Future Commercial Applications. *In McLean G.F. ed., Building the Hydrogen Economy: Proceedings of the 11th Canadian Hydrogen Conference, 17-20 June 2001, Victoria, British Colombia, Canada.* Toronto: Canadian Hydrogen Association; Vol 2: 504-510.

C. Monographs and reports

C1. Refereed scientific reports

57. Ghirardi M.L., **Kosourov S.**, Tsygankov A., Rubin A., Seibert M. (2002) Cyclic Photobiological Aglal H_2-Production. *In Proceedings of the 2002 U.S. DOE Hydrogen and Fuel Cells Annual Program/Lab R&D Review.* Golden, CO: National Renewable Energy Laboratory; pp. 52-63.
58. Ghirardi M.L., **Kosourov S.**, Seibert M. (2001) Cyclic Photobiological Aglal H_2-Production. *In Proceedings of the 2001 U.S. DOE Hydrogen Program Review.* Golden, CO: National Renewable Energy Laboratory; pp. 67-76.
59. Ghirardi M.L., **Kosourov S.**, Tsygankov A., Seibert M. (2000) Two-Phase Photobiological Algal H_2-Production System. *In Proceedings of the 2000 U.S. DOE Hydrogen Program Review.* Golden, CO: National Renewable Energy Laboratory; pp. 282-294.

G. Theses

60. **Kosourov S.N.** (2000) Potassium uptake by wheat roots at low external potassium concentrations. PhD Dissertation Summary in Biological Sciences. M. V. Lomonosov Moscow State University, Moscow. 16 p. (in Russian)
61. **Kosourov S.N.** (2000) Potassium uptake by wheat roots at low external potassium concentrations. PhD Dissertation. Pushchino. 108 p. (in Russian)

H. Patents and invention disclosures

62. Allahverdiyeva Y., Aro E.M., Hakalahti M., Jämsä M., Ketoja J., **Kosourov S.,** Pere J., Rissanen V., Tammelin T. (2017) Engineered nanocellulose microalgal films as catalysts for bio-based chemical production platform. Invention disclosure.
63. **Kosourov S**., Ghirardi M.L., Seibert M. (2010) Multi-stage microbial system for continuous hydrogen production. U.S. Patent #7732174. 13 p.