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## 🌐 Знание языков

Հայերեն Русский English

## 🔬 Научные интересы

- Биоэнергетика, Биохимия, Микробиология, Биотехнология

## 🏆 Государственные награды и почетные звания

2016 Премия Моррисона Рогозы Американского общества микробиологии (ASM)

2019 Серебряная медаль по случаю 100-летия ЕГУ

## 📖 Публикации

Статья

### **Gold nanoparticles activate hydrogenase synthesis and improve heterotrophic growth of *Ralstonia eutropha* H16**

Tatevik Manutsyan, Syuzanna Blbulyan, Anait Vassilian, Tatiana Semashko, Gayane Kirakosyan, Lilit Gabrielyan, Karen Trchounian, Anna Poladyan

FEMS Microbiology Letters 2024 1-8

Статья

### **Growth and hydrogen production by *Escherichia coli* during utilization of sole and mixture of sugar beet, alcohol, and beer production waste**

Kairat Bekbayev, Satenik Mirzoyan, Akerke Toleugazykyzy, Dinara Tlevlessova, Anait Vassilian, Anna Poladyan, Karen Trchounian

Biomass Conversion and Biorefinery 2024 909-919

Статья

### **Role of the *Escherichia coli* FocA and FocB formate channels in controlling proton/potassium fluxes and hydrogen production during osmotic stress in energy-limited, stationary phase fermenting cells**

Anush Babayan, Anait Vassilian, Anna Poladyan, Karen Trchounian

Biochimie 2024 91-98

Статья

### **Proton conductance and regulation of proton/potassium fluxes in *Escherichia coli* FhIA-lacking cells during fermentation of mixed carbon sources**

Heghine Gevorgyan, Anna Poladyan, Karen Trchounian, Anait Vassilian  
Archives of Biochemistry and Biophysics 2024 109999

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**Development of an H<sub>2</sub> fuel cell electrochemical system powered by Escherichia coli cells**

Torgom Seferyan, Lusine Baghdasaryan, Meri Iskandaryan, Karen Trchounian, Anna Poladyan

Electrochemistry Communications 2024 107746

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Статья

**The antimicrobial effects of silver nanoparticles obtained through the royal jelly on the yeasts Candida guilliermondii NP-4**

Seda Marutyan, Hasmik Karapetyan, Lusine Khachatryan, Anna Muradyan, Syuzan Marutyan,

Anna Poladyan, KarenTrchounian

Scientific Reports 2024 19163

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Статья

**L-amino acids affect the hydrogenase activity and growth of Ralstonia eutropha H16**

Meri Iskandaryan, Syuzanna Blbulyan, Mayramik Sahakyan, Anait Vassilian, Karen Trchounian,

Anna Poladyan

AMB Express 2023 33

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Статья

**Valorization of whey-based side streams for microbial biomass, molecular hydrogen, and hydrogenase production**

Anna Poladyan, Karen Trchounian, Ela Minasyan, Meri Iskandaryan, Hayarpi Aghekyan, Sargis Aghayan,

Avetis Tsaturyan, Ani Paloyan, Garabed Antranikian, Lev Khoyetsyan

Applied Microbiology and Biotechnology 2023 4683-4696

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Статья

**The influence of hydrogen production on the formation of metabolic pathways and regulation of ΔpH in Escherichia coli**

Heghine Gevorgyan, Anait Vassilian, Anna Poladyan, Karen Trchounian

International Journal of Hydrogen Energy 2022 40264-40274

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Статья

**THE EFFECT OF ANTIOXIDANT ACTIVITY OF PLANTS TRIFOLIUM PRATENSE L. AND CRATAEGUS LAEVIGATA ON LIPID PEROXIDATION IN RAT'S TISSUES EXPOSED TO HYPOBARIC HYPOXIA**

I. A. BADALYAN, A. A. POLADYAN

Proceedings of the YSU B: Chemical and Biological Sciences 2022 239-244

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**BIOMASS AND BIOHYDROGEN PRODUCTION BY ESCHERICHIA COLI UPON CONSUMPTION OF MEAT INDUSTRY AND LIGNOCELLULOSIC CORN WASTES MIXTURE**

Syuzanna Blbulyan, Satenik Mirzoyan, Karen Trchounian, Anna Poladyan

Proceedings of the YSU B: Chemical and Biological Sciences 2021 224-231

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**Biomass and biohydrogen production during dark fermentation of Escherichia coli using office paper waste and cardboard**

Anna Poladyan, Lena Margaryan, Karen Trchounian, Armen Trchounian  
International Journal of Hydrogen Energy 2020 286-293

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*Статья*

**Application of organic waste glycerol to produce crude extracts of bacterial cells and microbial hydrogenase—the anode enzymes of bio-electrochemical systems**

Anna Poladyan, Syuzanna Blbulyan, Tatiana Semashko, Volha Dziameshka, Liudmila Zhukouskaya,

Armen Trchounian

FEMS Microbiology Letters 2020 1-7

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*Статья*

**ETHANOL SUPPLEMENTATION AS A NEW APPROACH TO REGULATE GROWTH AND HYDROGEN PRODUCTION OF ESCHERICHIA COLI UPON GLYCEROL FERMENTATION**

A. A. Poladyan

Proceedings of the YSU B: Chemical and Biological Sciences 2020 138-146

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**Growth of the facultative chemolithoautotroph *Ralstonia eutropha* on organic waste materials: Growth characteristics, redox regulation and hydrogenase activity**

Anna Poladyan, Syuzanna Blbulyan, Mayramik Sahakyan, Oliver Lenz, Armen Trchounian

Microbial Cell Factories 2019 1-13

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*Статья*

**Characterization of hydrogen production by *Escherichia coli* wild-type and mutants of hydrogenases utilizing xylose as fermentation substrate**

Anna Poladyan, Armen Trchounian

Bioenergy Research 2019 1033-1041

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*Статья*

**Hydrogen production by *Escherichia coli* using brewery waste: optimal pretreatment of waste and role of different hydrogenases**

Anna Poladyan, Karen Trchounian, Anait Vassilian, Armen Trchounian

Renewable Energy 2018 931-936

<http://www.journals.elsevier.com/renewable-energy>

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*Статья*

***Escherichia coli* wild type and hydrogenase mutant cells growth and hydrogen production upon xylose and glycerol co-fermentation in media with different buffer capacities**

Anna Poladyan, Lusine Baghdasaryan, Armen Trchounian

International Journal of Hydrogen Energy 2018 15870-15879

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*Статья*

**Enhancement of *Escherichia coli* bacterial biomass and hydrogen production by some heavy metal ions and their mixtures during glycerol vs glucose fermentation at a relatively wide range of pH**

Karen Trchounian, Anna Poladyan, Armen Trchounian

International Journal of Hydrogen Energy 2017 6590-6597

<http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/>

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*Статья*

**Hydrogen production by Escherichia coli growing in different nutrient media with glycerol: Effects of formate, pH, production kinetics and hydrogenases involved**

Karen Trchounian, Satenik Mirzoyan, Anna Poladyan, Armen Trchounian

International Journal of Hydrogen Energy 2017 24026-24034

<http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/>

---

Статья

**NEW APPROACHES TO ENHANCE HYDROGEN PRODUCTION FROM GLYCEROL BY ESCHERICHIA COLI**

A. Poladyan

Հայաստանի Կենսաբանական հանդես 2017 153-159

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Статья

**Optimizing strategy for Escherichia coli growth and hydrogen production during glycerol fermentation in batch culture: Effects of some heavy metal ions and their mixtures**

Karen Trchounian, Anna Poladyan, Armen Trchounian

Applied Energy 2016 335-340

<http://www.elsevier.com/locate/apenergy>

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Статья

**Alkanna orientalis (L.) Boiss. plant isolated cultures and antimicrobial activity of their extracts: phenomenon, dependence on different factors and effects on some membrane-associated properties of bacteria.**

Margarit Petrosyan, Yekaterina Shcherbakova, Naira Sahakyan, Zaruhi Vardanyan, Anna Poladyan, Yuri Popov, Armen Trchounian

PLANT CELL TISSUE AND ORGAN CULTURE 2015 727-738

<http://link.springer.com/journal/11240>

---

Статья

**Escherichia coli growth and hydrogen production in batch culture upon formate alone and with glycerol co-fermentation at different pHs**

Karen Trchounian, Varduhi Abrahamyan, Anna Poladyan, Armen Trchounian

International Journal of Hydrogen Energy 2015 9935-9941

<http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/>

---

Статья

**Hydrogen production by Escherichia coli during glucose fermentation: Effects of oxidative and reductive routes used by the strain lacking hydrogen oxidizing hydrogenases 1 (hya) and 2 (hyb)**

Varduhi Abrahamyan, Anna Poladyan, Anait Vassilian, Armen Trchounian

International Journal of Hydrogen Energy 2015 7459-7464

<http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/>

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Статья

**Redox stress in geobacilli from geothermal springs: Phenomenon and membrane-associated response mechanisms**

Astghik Ghazaryan, Syuzanna Blbulyan, Anna Poladyan, Armen Trchounian

Bioelectrochemistry 2015 1-6

<http://www.journals.elsevier.com/bioelectrochemistry>

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Статья

**Համակարգչային տեխնոլոգիաների կիրառման առավելությունները և փորձը բուհական կենսաբանության դասավանդման ընթացքում**  
L.U. Գաբրիելյան, Ա.Ա. Փոլադյան, Ա.Հ. Թռչունյան  
Բնագետ 2014 139-141

---

Статья

**Hydrogen-oxidizing hydrogenases 1 and 2 of Escherichia coli regulate the onset of hydrogen evolution and ATPase activity, respectively, during glucose fermentation at alkaline**  
Anna Poladyan, Karen Trchounian, Armen Trchounian, R. Gary Sawers  
FEMS Microbiology Letters 2013 143-148  
[http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1574-6968](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1574-6968)

---

Статья

**Oxidative and Reductive Routes of Glycerol and Glucose Fermentation by Escherichia coli Batch Cultures and Their Regulation by Oxidizing and Reducing Reagents at Different pHs**  
Anna Poladyan, Anait Vassilian, Armen Trchounian, Arev Avagyan  
Current Microbiology 2013 49-55  
<http://www.springer.com/life+sciences/microbiology/journal/284>

---

Статья

**Glycerol fermentation and molecular hydrogen production by Escherichia coli batch cultures affected by some reducing reagents and heavy metal ions**  
Anna Poladyan, Karen Trchounian, Armen Trchounian, Mikayel Minasyants  
NATO Science for Peace and Security Series C: Environmental Security, Black Sea Energy Resource Development and Hydrogen Energy Problems  
2013 153-163  
<http://www.springer.com/us/book/9789400761513>

---

Статья

**Multiple and reversible hydrogenases for hydrogen production by Escherichia coli: dependence on fermentation substrate, pH and the F0F1-ATPase**  
Karen Trchounian, Anna Poladyan, Anait Vassilian, Armen Trchounian  
Critical Reviews in Biochemistry and Molecular Biology 2012 236-249  
<http://www.tandfonline.com/toc/ibmg20/current>

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**Effect of Different Substrates on Growth and Redox Potential Kinetics of Escherichia coli Wild Type and Hydrogenases Lacking Mutant**  
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**Glycerol Fermentation and Hydrogen Metabolism by Escherichia coli: New Approaches to Enhance Hydrogen Production**  
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**Hydrogen production by Escherichia coli wild type and hydrogenase mutants upon formate and glycerol fermentation under different growth conditions**  
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**Developing hydrogen production biotechnology: cheap substrates, effective strains and optimized fermentative conditions**

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**Escherichia coli growth and hydrogen production upon glycerol fermentation at slightly acidic pH: effects of formate and some heavy metal ions**

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Թռչունյան Կ.Ա., Գաբրիելյան Լ.Ս., Փոլադյան Ա.Ա., Թռչունյան Ա.Հ.

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A. Poladyan, R. Hayrapetyan, A. Trchounian

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A. Poladyan, O. Lenz, A. Trchounian

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**Ralstonia eutropha Hydrogenase Application in Bioelectrocatalysis as Anode Enzyme**

A. Poladyan, T. Semashko, L. Zhukouskaya, V. Dziameshka, A. Trchounian

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**Analysis of the Escherichia coli hydrogenases as anodic enzymes in bioelectrochemical system**

Anna Poladyan, Tatyana Semashko, Lyudmila Zhukouskaya, Volha Diameshka, Armen Trchounian

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**Upcycling of office waste paper and cardboard to biohydrogen**

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**Redox regulation of the growth, hydrogenase activity and bioenergetic properties of Ralstonia eutropha upon different carbon source utilization**

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**Lignocellulosic waste as feedstock for bacterial biomass production: enhanced hydrogen evolution and hydrogenase activity**

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**Ethanol Affected Bacterial Growth and molecular Hydrogen Production by Escherichia coli Upon Fermentation of Glycerol**

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**Prospective Trends in Biotechnology for Biohydrogen**

Karen Trchounian, Anna Poladyan, Lilit Gabrielyan, Armen Trchounian

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**The role of formate neutralization and molecular hydrogen generation in the metabolic flux in Escherichia coli during fermentation of mixed carbon sources**

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S. Mirzoyan, A. Vassilian, A. Poladyan, K. Trchounian

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**Biomass and biohydrogen production by Escherichia coli upon consumption of meat and lignocellulosic waste mixture**

Syuzanna Blbulyan, Anna Poladyan, Satenik Mirzoyan, Liana Mnatsakanyan, Karen Trchounian

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**WINE GRAPE WASTE APPLICATION FOR ESCHERICHIA COLI BIOMASS AND H<sub>2</sub> PRODUCTION**

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**The valorization of whey-based side-streams for microbial biomass, hydrogen and hydrogenase enzyme production**

Anna Poladyan, Hayarpi Aghekyan, Ella Minasyan, Karen Trchounian, Ani Paloyan, Sargis Aghayan,

Garabed Antranikian, Meri Iskandaryan, Diana Ghevondyan

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**ՕՐԳԱՆԱԿԱՆ ԹԱՓՈՆՆԵՐԻՑ ԿԵՆՍԱԶԱՆԳՎԱԾԻ ԵՎ ԿԵՆՍԱԵՆԵՐԳԻԱՅԻ ՓՈԽԱԿԵՐՊՄԱՆ ԿԵՆՍԱԹԻՄԻԱԿԱՆ ՈՐԴԻՆԵՐԻ ԲՆՈՒԹԱԳՐՈՒՄԸ ԵՎ ՕՔՍԻԴԱԿԵՐԱԿԱՆԳՈՂԱԿԱՆ ԿԱՐԳԱՎՈՐՈՒՄԸ**

Փոլադյան Ա.Ա., Գևորգյան Հ.Խ., Վանյան Լ.Մ., Բաբայան Ա.Բ., Բաղդասարյան Լ.Հ., Վասիլյան Ա.Վ.,

Պետրոսյան Հ.Հ.

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**THE OXIDATIVE STRESS AND POSSIBLE PREVENTIVE ACTION OF PLANT BORN POLYPHENOLS**

Anahit Shirvanyan, Anush Babayan, Alvard Minasyan, Margarit Petrosyan, Anna Poladyan,

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**THE OXIDATIVE STRESS AND T2DM-INDUCED DIABETIC NEPHROPATHY: POSSIBLE PREVENTIVE ACTION OF PANT-BORN OLIGOMERIC POLYPHENOLS**

Gohar Sahakyan, Anne Vejux, Margarit Petrosyan, Anna Poladyan, Naira Sahakyan

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**Characteristic effects of gold nanoparticles on growth and H<sub>2</sub> metabolism of *Ralstonia eutropha* H16 and *Escherichia coli***

Anna Poladyan, Tatev Manutsyan, Meri Iskandaryan, Syuzanna Blbulyan, Anait Vassilian,

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**The role of glycine-betaine in the hydrogen metabolism of *Ralstonia eutropha* H16**

Meri Iskandaryan, Liana Mnatsakanyan, Anna Poladyan

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**Fe ions effect on hydrogenase activity of *Ralstonia eutropha* H16 in various growth media**

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**A NOVEL COST-EFFECTIVE APPROACH FOR PRODUCTION OF HYDROGENASE ENZYMES AND MOLECULAR HYDROGEN FROM WHEY-BASED BY-PRODUCTS**

Anna Poladyan, Meri Iskandaryan, Ofelya Karapetyan, Ela Minasyan, Anait Vassilian, Karen Trchounian,

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**REDOX REGULATION OF HYDROGEN PRODUCTION IN *ESCHERICHIA COLI* DURING GROWTH ON BYPRODUCTS OF THE WINE INDUSTRY**

Lusine Baghdasaryan, Karen Trchounian, Garabed Antranikian, Anna Poladyan, Ofelya Karapetyan

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**BIOTECHNOLOGICAL POTENTIAL OF SPENT COFFEE GROUNDS FOR LARGE-SCALE HYDROGEN PRODUCTION**

Liana Vanyan, Anait Vassilian, Anna Poladyan, Karen Trchounian

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**Influence of acidic pH on the interaction between proton ATPase and enzymes responsible for molecular hydrogen generation**

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**Formate-hydrogen lyase has a significant role in proton motive force generation in *Escherichia coli* at acidic pH during mixed carbon fermentation**

Heghine Gevorgyan, Anait Vassilian, Anna Poladyan, Karen Trchounian

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Meri Iskandaryan, Anna Poladyan

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**Bioenergetic Properties of Microbes as Potential Target for Antibacterial Activity of Plant-Based Compounds**

Anna Poladyan, Karen Trchounian, Naira Sahakyan

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**Cupriavidus necator H16 growth and H<sub>2</sub>-oxidizing Activity Using Mixture of Glycerol and Roasted Coffee Waste**

R. Avetisyan, L. Mnatsakanyan, K. Trchounian, A. Poladyan

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**Evaluation of an H<sub>2</sub> fuel cell electrochemical system powered by microbial cells**

M. Iskandaryan, A. Poladyan, L. Baghdasaryan, T. Seferyan

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**Effect of glycine on the heterotrophic growth and [NiFe]-hydrogenase activity of Cupriavidus necator H16**

M. Iskandaryan, J. Schoknecht, O. Lenz, A. Poladyan

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**The role of the Escherichia coli FocA and FocB formate channels in proton flux during fermentation of mixed carbon sources**

Anush Babayan, Anait Vassilian, Anna Poladyan, Karen Trchounian

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