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NGO IN OFFICIAL RELATION WITH WHO (WORLD HEALTH ORGANIZATION)

THERMAL CLUSTERS

**Status, proposals, and strategies
for health care and local development**

Thermal research in Spain

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Ischia, 11/02/2017

Thermal research in Spain



- **Complutense University Madrid**
- **Sevilla University**
- **Zaragoza University**
- **Granada University**
- **Malaga University**
- **Extremadura University**
- **Vigo University**
- **Coruña University**

Thermal research in Spain



- **Balneotherapy**
- **Natural Mineral Water**
- **Peloids**
- **Hydrotherapy - Aquatic Therapy**

Balneotherapy research



Available online at www.sciencedirect.com

SciVerse ScienceDirect

European Journal of Integrative Medicine 4 (2012) e213–e218

European Journal of
**INTEGRATIVE
MEDICINE**

www.elsevier.com/eujim

Original article

Quality of life and assessment after local application of sulphurous water in the home environment in patients with psoriasis vulgaris: A randomised placebo-controlled pilot study

Juan José Gálvez Galve^a, Pablo Saz Peiró^{a,*}, María Ortiz Lucas^b, Antonio Hernández Torres^c, Estrella Simal Gil^d, Milagros Bernal Pérez^a

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Gálvez JJ et al. Quality of life and assessment after local application of sulphurous water in the home environment in patients with psoriasis vulgaris: A randomised placebo-controlled pilot study. Eur J Integr Med. 2012;4(2):e213–e218

Balneotherapy research

RHEUMATOLOGY

Rheumatology 2013;52:659-668
doi:10.1093/rheumatology/kes322
Advance Access publication 11 December 2012

Original article

Clinical effectiveness of mud pack therapy in knee osteoarthritis

Luis Espejo-Antúnez¹, María A. Cardero-Durán², Elisa M. Garrido-Ardila³,
Silvia Torres-Piles¹ and Berta Caro-Puértolas¹



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Madrid

Espejo-Antúnez L et al. Clinical effectiveness of mud pack therapy in knee osteoarthritis. Rheumatology (Oxford). 2013;52(4):659-68.

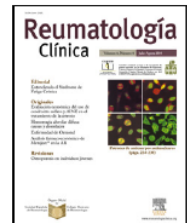
Balneotherapy research

Reumatol Clin. 2013;9(3):156–160



Reumatología Clínica

www.reumatologi clinica.org



Original Article

Effects of Mud Therapy on Perceived Pain and Quality of Life Related to Health in Patients With Knee Osteoarthritis[☆]

Luis Espejo Antúnez,^{a,*} Berta Caro Puértolas,^a Begoña Ibáñez Burgos,^b José María Porto Payán,^c Silvia T. Torres Piles^a

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Balneotherapy research

Int J Biometeorol
DOI 10.1007/s00484-017-1361-x



ORIGINAL PAPER

Anti-inflammatory effect as a mechanism of effectiveness underlying the clinical benefits of pelotherapy in osteoarthritis patients: regulation of the altered inflammatory and stress feedback response

E. Ortega¹ • I. Gálvez¹  • M. D. Hinchado¹ • J. Guerrero² • L. Martín-Cordero³ • S. Torres-Piles⁴



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Ortega E et al. Anti-inflammatory effect as a mechanism of effectiveness underlying the clinical benefits of pelotherapy in osteoarthritis patients: regulation of the altered inflammatory and stress feedback response. Int J Biometeorol. 2017 Apr 29. doi:10.1007/s00484-017-1361-x.

Balneotherapy research

Author's personal copy

Int J Biometeorol
DOI 10.1007/s00484-017-1421-2



REVIEW PAPER

The role of mineral elements and other chemical compounds used in balneology: data from double-blind randomized clinical trials

Carla Morer^{1,2} • Christian-François Roques³ • Alain Françon⁴ • Romain Forestier⁴ •
Francisco Maraver^{1,5} 



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Morer C, Roques CF, Françon A, Forestier R, Maraver F. The role of mineral elements and other chemical compounds used in balneology: data from double-blind randomized clinical trials. Int J Biometeorol. 2017 Aug 28. doi: 10.1007/s00484-017-1421-2

Natural Mineral Water research

Eur J Nutr (2012) 51:607–614
DOI 10.1007/s00394-011-0244-x

ORIGINAL CONTRIBUTION

A sodium-bicarbonated mineral water reduces gallbladder emptying and postprandial lipaemia: A randomised four-way crossover study

Laura Toxqui • Ana M. Pérez-Granados •
Ruth Blanco-Rojo • M. Pilar Vaquero

Natural Mineral Water research

400

© IWA Publishing 2012 Journal of Water and Health | 10.3 | 2012

Survival of human pathogenic bacteria in different types of natural mineral water

Concepción Serrano, Margarita Romero, Luis Alou, David Sevillano, Iluminada Corvillo, Francisco Armijo and Francisco Maraver

Natural Mineral Water research

**Nutrición
Hospitalaria**



Nutr Hosp. 2014;30(1):188-199
ISSN 0212-1611 • CODEN NUHOEQ
S.V.R. 318

Original / Otros

The calcium concentration of public drinking waters and bottled mineral waters in Spain and its contribution to satisfying nutritional needs

Isidro Vitoria¹, Francisco Maraver², Cíntia Ferreira-Pêgo^{3,4}, Francisco Armijo², Luis Moreno Aznar⁵
and Jordi Salas-Salvadó^{3,4}

Natural Mineral Water research

Osteoarthritis and Cartilage 22 (2014) 1026–1035

Osteoarthritis and Cartilage



Effect of hydrogen sulfide sources on inflammation and catabolic markers on interleukin 1 β -stimulated human articular chondrocytes



E.F. Burguera ^{† ‡}, Á. Vela-Anero ^{† §}, J. Magalhães ^{† ‡}, R. Meijide-Faílde [§], F.J. Blanco ^{† ‡ *}

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Burguera EF et al. Effect of hydrogen sulfide sources on inflammation and catabolic markers on interleukin 1 β -stimulated human articular chondrocytes. Osteoarthritis Cartilage. 2014 Jul;22(7):1026-35

Natural Mineral Water research

Aten Primaria. 2015;47(1):15–24



Atención Primaria

www.elsevier.es/ap



ORIGINAL

Fluoruro en aguas minerales naturales envasadas en España y prevención de la caries dental



Francisco Maraver^a, Isidro Vitoria^{b,*}, José Manuel Almerich-Silla^c y Francisco Armijo^a

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Natural Mineral Water research

**Nutrición
Hospitalaria**



Nutr Hosp. 2015;31(5):2297-2312
ISSN 0212-1611 • CODEN NUHOEQ
S.V.R. 318

Original/Otros

Magnesium in tap and bottled mineral water in Spain and its contribution to nutritional recommendations

Francisco Maraver¹, Isidro Vitoria², Cíntia Ferreira-Pêgo^{3,4}, Francisco Armijo¹ and Jordi Salas-Salvadó^{3,4}

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Natural Mineral Water research

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Current Drug Targets, 2016, 17, 000-000

1

REVIEW ARTICLE

Hydrogen Sulfide and Inflammatory Joint Diseases

Elena F. Burguera^{1,2,*}, Rosa Meijide-Faílde³ and Francisco J. Blanco^{1,2}

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Natural Mineral Water research



nutrients



Article

An Intervention with Mineral Water Decreases Cardiometabolic Risk Biomarkers. A Crossover, Randomised, Controlled Trial with Two Mineral Waters in Moderately Hypercholesterolaemic Adults

Laura Toxqui and M. Pilar Vaquero *

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Natural Mineral Water research

J Physiol Biochem (2016) 72:635–641
DOI 10.1007/s13105-016-0502-8



ORIGINAL PAPER

Aldosterone changes after consumption of a sodium-bicarbonated mineral water in humans. A four-way randomized controlled trial

Laura Toxqui • M. Pilar Vaquero

Natural Mineral Water research

Diatom Research, 2017

Vol. 32, No. 1, 29–42, <http://dx.doi.org/10.1080/0269249X.2017.1286266>



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Taylor & Francis Group



Diatom communities in thermo-mineral springs of Galicia (NW Spain)

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Leira M, Meijide-Failde R, Torres E. Diatom communities in thermo-mineral springs of Galicia (NW Spain). *Diatom Research*, 2017;32(1):1-14

Natural Mineral Water research

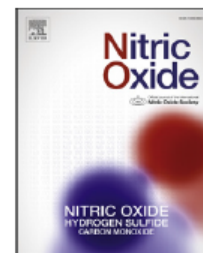
Nitric Oxide 70 (2017) 42–50



Contents lists available at ScienceDirect

Nitric Oxide

journal homepage: www.elsevier.com/locate/yniox



Long-term effects of hydrogen sulfide on the anabolic-catabolic balance of articular cartilage *in vitro*



Á. Vela-Anero ^{a, b}, T. Hermida-Gómez ^{b, c}, L. Gato-Calvo ^c, C. Vaamonde-García ^a,
S. Díaz-Prado ^{a, b}, R. Meijide-Faílde ^a, F.J. Blanco ^c, E.F. Burguera ^{b, c, *}

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Vela-Anero A, Hermida-Gomez T, Gato-Calvo L, Vaamonde-García C, Diaz-Prado S, Meijide-Faílde R, Blanco FJ, Burguera EF. Long-term effects of hydrogen sulfide on the anabolic-catabolic balance of articular cartilage in vitro. Nitric Oxide. 2017 Aug 15.

Natural Mineral Water research

Hindawi
Evidence-Based Complementary and Alternative Medicine
Volume 2017, Article ID 8034084, 11 pages
<https://doi.org/10.1155/2017/8034084>



Review Article

Sulphurous Mineral Waters: New Applications for Health

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Peloids research

Applied Clay Science 75–76 (2013) 28–38



Contents lists available at SciVerse ScienceDirect

Applied Clay Science

journal homepage: www.elsevier.com/locate/clay



Research paper

Peloids and pelotherapy: Historical evolution, classification and glossary



Celso Gomes ^{a,*}, Maria Isabel Carretero ^b, Manuel Pozo ^c, Francisco Maraver ^d, Pedro Cantista ^e, Francisco Armijo ^d, José Luis Legido ^f, Frederico Teixeira ^g, Michel Rautureau ^h, Rafael Delgado ⁱ

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^h University of Orleans, France

ⁱ Faculty of Pharmacy, University of Granada, Spain

Peloids research

Applied Clay Science 83–84 (2013) 270–279



Contents lists available at [ScienceDirect](#)

Applied Clay Science

journal homepage: www.elsevier.com/locate/clay



Research paper

Composition and physico-chemical properties of peloids used in Spanish spas: A comparative study

Manuel Pozo ^{a,*}, María Isabel Carretero ^b, Francisco Maraver ^c, Eduardo Pozo ^d, Isidoro Gómez ^b, Francisco Armijo ^c, Juan Antonio Martín Rubí ^d

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Peloids research

Applied Clay Science 80–81 (2013) 107–116



Contents lists available at ScienceDirect

Applied Clay Science

journal homepage: www.elsevier.com/locate/clay



Research paper

A study of the chemical, mineralogical and physicochemical properties of peloids prepared with two medicinal mineral waters from Lanjarón Spa (Granada, Spain)



María Virginia Fernández-González, Juan Manuel Martín-García *, Gabriel Delgado, Jesús Párraga, Rafael Delgado

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Peloids research

International Journal of Pharmaceutics 453 (2013) 473–479



Contents lists available at SciVerse ScienceDirect

International Journal of Pharmaceutics

journal homepage: www.elsevier.com/locate/ijpharm



Networking and rheology of concentrated clay suspensions “matured” in mineral medicinal water



Carola Aguzzi^{a,*}, Rita Sánchez-Espejo^b, Pilar Cerezo^a, José Machado^c, Cristina Bonferoni^d, Silvia Rossi^d, Inmaculada Salcedo^a, César Viseras^{a,b}

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Peloids research

Applied Clay Science 93–94 (2014) 23–27



Contents lists available at ScienceDirect

Applied Clay Science

journal homepage: www.elsevier.com/locate/clay



Note

Thermal conductivity and density of clay pastes at various water contents for pelotherapy use



Victoria Caridad ^a, José M. Ortiz de Zárate ^{a,*}, Mohamed Khayet ^a, José L. Legido ^b

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Peloids research

Applied Clay Science 99 (2014) 131–143



Contents lists available at ScienceDirect

Applied Clay Science

journal homepage: www.elsevier.com/locate/clay



Research paper

Assessment of three Spanish clays for their use in pelotherapy



M.I. Carretero ^{a,*}, M. Pozo ^b, J.L. Legido ^c, M.V. Fernández-González ^d, R. Delgado ^d, I. Gómez ^a,
F. Armijo ^e, F. Maraver ^e

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Peloids research

Applied Clay Science 101 (2014) 141–148



ELSEVIER

Contents lists available at ScienceDirect

Applied Clay Science

journal homepage: www.elsevier.com/locate/clay



Research paper

Study of traditional Tunisian medina clays used in therapeutic and cosmetic mud-packs



Imen Khiari ^{a,b}, Samir Mefteh ^{a,b}, Rita Sánchez-Espejo ^c, Pilar Cerezo ^d, Carola Aguzzi ^d, Alberto López-Galindo ^c, Fakhher Jamoussi ^a, César Viseras Iborra ^{c,d,*}

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Peloids research

Applied Clay Science 116–117 (2015) 1–7



Contents lists available at ScienceDirect

Applied Clay Science

journal homepage: www.elsevier.com/locate/clay



Physicochemical and *in vitro* cation release relevance of therapeutic muds “maturation”



Rita Sánchez-Espejo ^a, Pilar Cerezo ^b, Carola Aguzzi ^b, Alberto López-Galindo ^a, José Machado ^c, César Viseras ^{a,b,*}

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Peloids research

Applied Clay Science 114 (2015) 395–401



Contents lists available at ScienceDirect

Applied Clay Science

journal homepage: www.elsevier.com/locate/clay



Research paper

The water effect on instrumental hardness and adhesiveness of clay mixtures for pelotherapy



Francisco Armijo ^{a,*}, Francisco Maraver ^a, María Isabel Carretero ^b, Manuel Pozo ^c, Mario Ramos ^d, Miguel Angel Fernandez-Torán ^e, Iluminada Corvillo ^a

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Peloids research

Applied Clay Science 126 (2016) 50–56



ELSEVIER

Contents lists available at ScienceDirect

Applied Clay Science

journal homepage: www.elsevier.com/locate/clay



Research paper

Thermal behaviour of clays and clay-water mixtures for pelotherapy



Francisco Armijo^a, Francisco Maraver^a, Manuel Pozo^{b,*}, María Isabel Carretero^c, Onica Armijo^a, Miguel Ángel Fernández-Torán^d, María Virginia Fernández-González^e, Iluminada Corvillo^a

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Armijo F et al. Thermal behaviour of clays and clay-water mixtures for pelotherapy. Appl Clay Sci. 2016 Jun;126:50-56.

Peloids research

Applied Clay Science 135 (2017) 465–474



Contents lists available at ScienceDirect

Applied Clay Science

journal homepage: www.elsevier.com/locate/clay



Research paper

Physical properties of peloids prepared with medicinal mineral waters from Lanjarón Spa (Granada, Spain)



María Virginia Fernández-González^a, Juan Manuel Martín-García^{a,*}, Gabriel Delgado^a, Jesús Párraga^a,
María Isabel Carretero^b, Rafael Delgado^a

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Peloids research

Applied Clay Science 135 (2017) 119–128



Contents lists available at ScienceDirect

Applied Clay Science

journal homepage: www.elsevier.com/locate/clay



Research paper

The mineralogical, geochemical, and thermophysical characterization of healing saline mud for use in pelotherapy



Neli Glavaš^{a,*}, Maria Lourdes Mourelle^b, Carmen P. Gómez^b, José Luis Legido^b, Nastja Rogan Šmuc^c, Matej Dolenec^c, Nives Kovač^a

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Universidad
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Glavas N, Mourelle ML, Gómez CP, Legido JL, Šmuc NR, Dolenec M, Kovac N. The mineralogical, geochemical, and thermophysical characterization of healing saline mud for use in pelotherapy. Appl Clay Sci. 2017;135:119–128.

Peloids research

J Therm Anal Calorim
DOI 10.1007/s10973-017-6227-2



Specific heat of mixtures of kaolin with sea water or distilled water for their use in thermotherapy

M. M. Mato¹ · L. M. Casás² · J. L. Legido¹ · C. Gómez¹ · L. Mourelle¹ ·
D. Bessières³ · F. Plantier³

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Mato MM, Casás LM, Legido JL, Gómez C, Mourelle L, Bessieres D, Plantier F. Specific heat of mixtures of kaolin with sea water or distilled water for their use in thermotherapy. J Therm Anal Calorim 2017. doi: 10.1007/s10973-017-6227-2

Hydrotherapy Aquatic Therapy

Pain Medicine



Pain Medicine 2013; 14: 145-158
Wiley Periodicals, Inc.

REHABILITATION SECTION

Original Research Article

Effects of Different Frequencies (2-3 Days/Week) of Aquatic Therapy Program in Adults with Chronic Low Back Pain. A Non-Randomized Comparison Trial

Hydrotherapy Aquatic Therapy



Archives of Physical Medicine and Rehabilitation

journal homepage: www.archives-pmr.org

Archives of Physical Medicine and Rehabilitation 2013;94:221-30



JOURNAL-BASED CME ARTICLE

The Effectiveness of a Deep Water Aquatic Exercise Program in Cancer-Related Fatigue in Breast Cancer Survivors: A Randomized Controlled Trial

Irene Cantarero-Villanueva, PhD,^a Carolina Fernández-Lao, PhD,^a
Antonio I. Cuesta-Vargas, PhD,^b Rosario Del Moral-Avila, PhD,^c
César Fernández-de-las-Peñas, PhD,^d Manuel Arroyo-Morales, MD, PhD^a

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Hydrotherapy Aquatic Therapy

European Journal of Cancer Care

Original article

A multimodal physiotherapy programme plus deep water running for improving cancer-related fatigue and quality of life in breast cancer survivors

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Hydrotherapy Aquatic Therapy

Article

 **CLINICAL
REHABILITATION**

Aquatic therapy improves pain, disability, quality of life, body composition and fitness in sedentary adults with chronic low back pain. A controlled clinical trial

Clinical Rehabilitation
2014, Vol. 28(4) 350–360
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**Pedro Ángel Baena-Beato¹, Enrique G Artero²,
Manuel Arroyo-Morales¹, Alejandro Robles-Fuentes¹,
María Claudia Gatto-Cardia³ and Manuel
Delgado-Fernández¹**

Hydrotherapy Aquatic Therapy

International Journal of
Rheumatic Diseases

International Journal of Rheumatic Diseases 2016



ORIGINAL ARTICLE

A new approach to the improvement of quality of life in fibromyalgia: a pilot study on the effects of an aquatic Ai Chi program

Sagrario PÉREZ DE LA CRUZ¹ and Johan LAMBECK²

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Hydrotherapy Aquatic Therapy

Neurología. 2016;31(3):176–182



NEUROLOGÍA

www.elsevier.es/neurologia



ORIGINAL ARTICLE

Effects of an Ai Chi fall prevention programme for patients with Parkinson's disease☆



CrossMark

S. Pérez-de la Cruz^{a,*}, A.V. García Luengo^b, J. Lambeck^c

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Hydrotherapy Aquatic Therapy

European Journal of Physical and Rehabilitation Medicine
EDIZIONI MINERVA MEDICA

ARTICLE ONLINE FIRST

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Efficacy of aquatic therapy for multiple sclerosis: a systematic review

Illuminada CORVILLO, Enrique VARELA DONOSO, Francisco ARMIJO, Antonio
ALVAREZ-BADILLO, Onica ARMIJO, Francisco MARAVER

European Journal of Physical and Rehabilitation Medicine 2017 Feb 17

DOI: 10.23736/S1973-9087.17.04570-1

Hydrotherapy Aquatic Therapy

European Journal of Physical and Rehabilitation Medicine
EDIZIONI MINERVA MEDICA

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Effectiveness of aquatic therapy for the control of pain and increased functionality in people with Parkinson's disease: A randomized clinical trial.

Sagrario PÉREZ-CRUZ.

European Journal of Physical and Rehabilitation Medicine 2017 Jun 19

DOI: 10.23736/S1973-9087.17.04647-0

Article type: Original Article



Universidad
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Madrid

Pérez de la Cruz S. Effectiveness of aquatic therapy for the control of pain and increased functionality in people with Parkinson's disease: a randomized clinical trial. Eur J Phys Rehabil Med. 2017 Jun 19. doi: 10.23736/S1973-9087.17.04647-0.

Hydrotherapy Aquatic Therapy

Brazilian Journal of Physical Therapy 2017;21(4):287–295



Brazilian Journal of Physical Therapy

<https://www.journals.elsevier.com/brazilian-journal-of-physical-therapy>



ORIGINAL RESEARCH

Identification of intervention categories for aquatic physical therapy in pediatrics using the International Classification of Functioning, Disability and Health-Children and Youth: a global expert survey



Javier Güeita-Rodríguez^{a,*}, Francisco García-Muro^b, Beatriz Cano-Díez^b,
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Universidad
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Madrid

Güeita-Rodríguez et al. Identification of intervention categories for aquatic physical therapy in pediatrics using the International Classification of Functioning, Disability and Health-Children and Youth: a global expert survey. Braz J Phys Ther. 2017 Jul - Aug;21(4):287-295

Hydrotherapy Aquatic Therapy

DEVELOPMENTAL NEUROREHABILITATION
<https://doi.org/10.1080/17518423.2017.1368728>



ORIGINAL ARTICLE



What areas of functioning are influenced by aquatic physiotherapy? Experiences of parents of children with cerebral palsy

Javier Güeita-Rodríguez ^a, Francisco García-Muro^b, Ángel L. Rodríguez-Fernández^b, Johan Lambeck^c, Cesar Fernández-de-las-Peñas^a, and Domingo Palacios-Ceña^a

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Hydrotherapy Aquatic Therapy

ORIGINAL

Efectos de un programa intensivo de talasoterapia y terapia acuática en pacientes con ictus. Estudio piloto

Carla Morer, Cecilia Boestad, Pilar Zuluaga, Antonio Álvarez-Badillo, Francisco Maraver

Thermal research in Spain

Funding of the research



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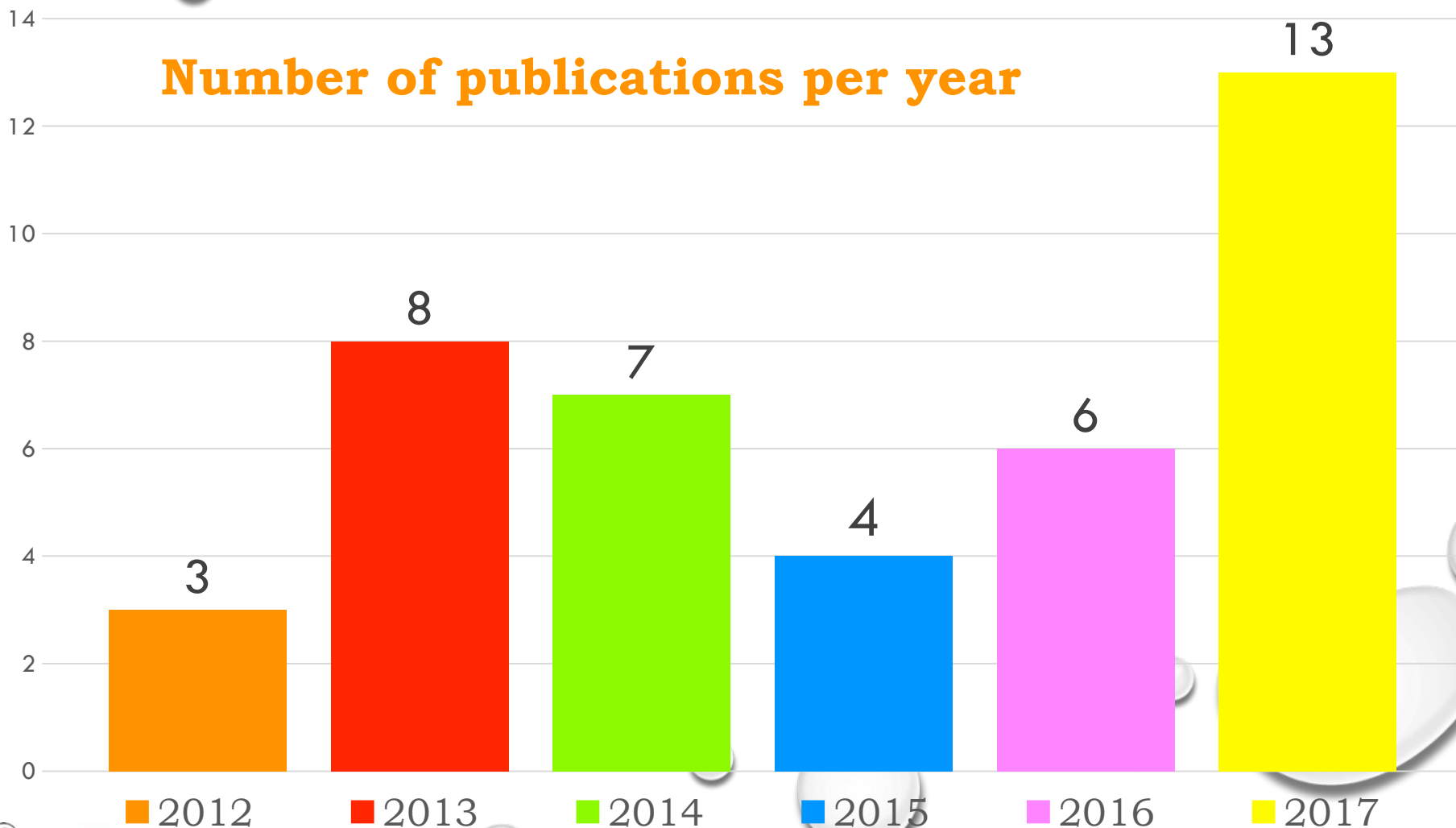
ORGANISMO : UNIVERSIDAD COMPLUTENSE DE MADRID

TITULO : DETERMINACIÓN DE PROPIEDADES TERAPÉUTICAS DE MEZCLAS Y PELOIDES PARA SU APLICACIÓN EN BALNEARIOS Y TALASOS

El órgano instructor establecido en la ORDEN PRE/621/2008, de 7 de marzo, por la que se regulan las bases, de la línea instrumental de actuación de proyectos de I + D + i, y en la Resolución de Convocatoria de 26 de diciembre de 2008, conjunta de la Secretaría de Estado de Universidades y de la Secretaría de Estado de Investigación, del Subprograma de Proyectos de Investigación Fundamental orientada a la transmisión de conocimiento a la empresa (TRACE), y antes de proceder a la propuesta definitiva de Resolución le comunica lo siguiente

Summary

Number of publications per year



Thermal research in Spain

- ◎ **Relationship with the national authorities**
- ◎ **Participants (role of doctors, medical spa operators, academics)**
- ◎ **Perspective**

A high-speed photograph of a blue liquid splash against a white background. The splash forms a large, irregular circular shape that frames the central text. Several smaller droplets and bubbles are visible within the splash, particularly near the top and bottom edges. The liquid has a vibrant blue color with white highlights where it catches the light.

Questo è tutto, grazie mille!