Acuicultura, nutrición y ecotoxicología en relación con la economía circular, la biodiversidad y el cambio climático (ACUACIRC)

Juan Carlos Navarro

Equipo de especies auxiliares en acuicultura, larvicultura y ecotoxicología (IATS-CSIC)

This study forms part of the ThinkInAzul programme and was supported by MCIN with funding from European Union NextGenerationEU (PRTR-C17.I1) and by *Generalitat Valenciana*

Descripción del Grupo de Trabajo

***Artemia*, presas vivas**

Cultivos larvarios, LÍPIDOS

BIOMARCADORES, Ecotoxicología

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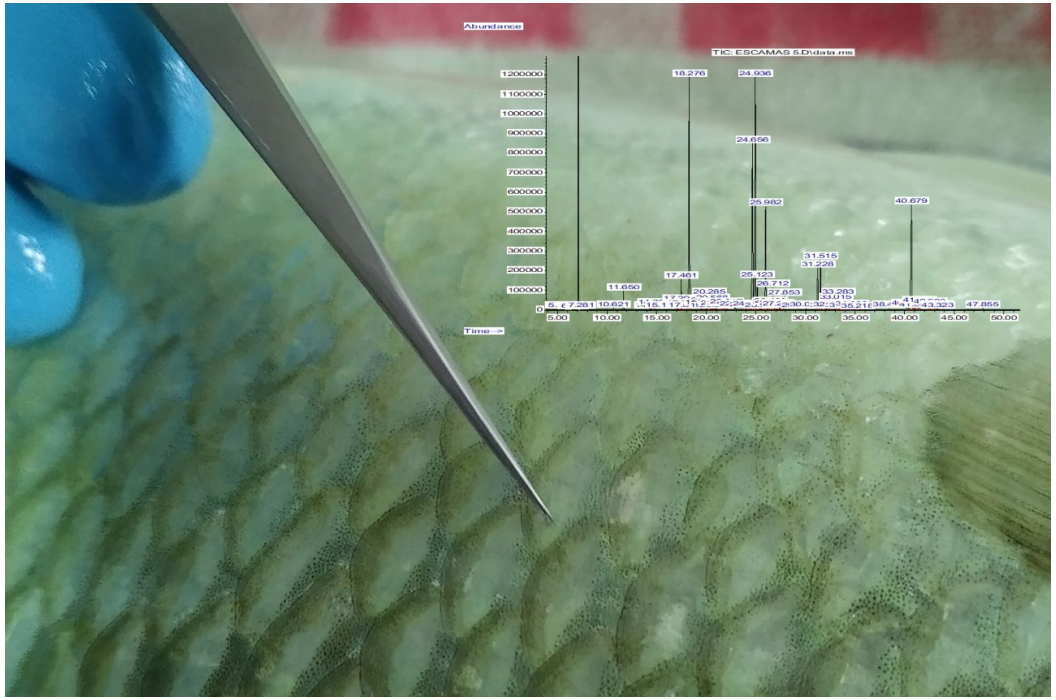
Objetivos y tareas

Tarea 3.1.3 (M3-M20) – Seguimiento del perfil de ácidos grasos – Desarrollo de un método de predicción y seguimiento del perfil de ácidos grasos de peces de acuicultura basado en el análisis de las escamas.

Responsable: CSIC8

Participantes: CSIC1

Resultados esperados: 3.1.3. Desarrollo de métodos incruentos de predicción y seguimiento del perfil de ácidos grasos de peces de acuicultura. Aplicaciones en escenarios de engorde, maduración y trazabilidad. **CSIC8. M30.**



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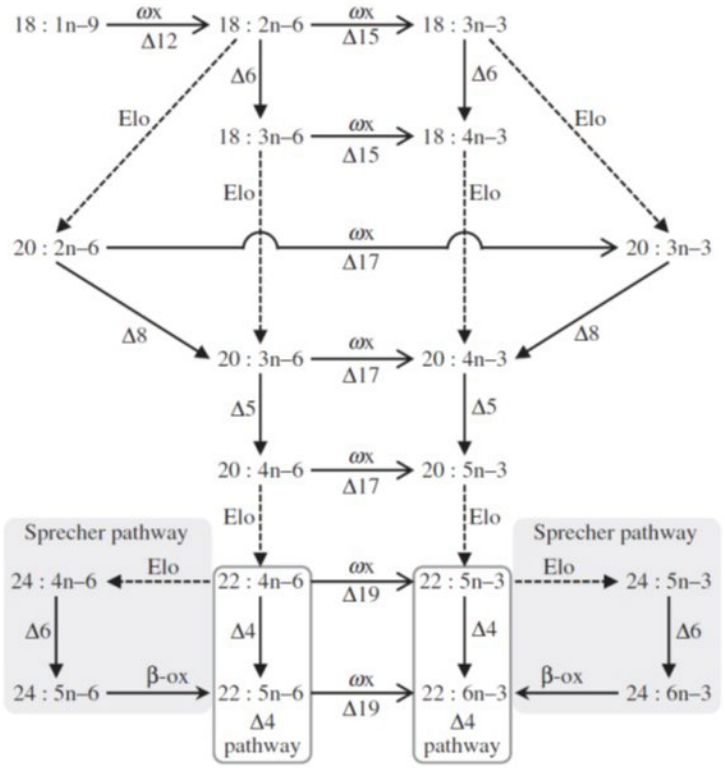
Objetivos y tareas

Tarea 3.2.3. (M3-M20) – Metabolismo lipídico – Estudios de metabolismo lipídico de organismos acuáticos de interés en acuicultura: mecanismos moleculares que explican la biosíntesis de lípidos fisiológicamente esenciales, como LC-PUFAs y VLC-PUFAs.

Responsable: CSIC8

Participantes: CSIC1

Resultados esperados: 3.2.3. Determinación de la capacidad de biosíntesis de ácidos grasos en especies de interés en acuicultura y elaboración de estrategias teóricas para la optimización de dicha síntesis a partir del diseño mejorado de piensos. **CSIC8. M24.**



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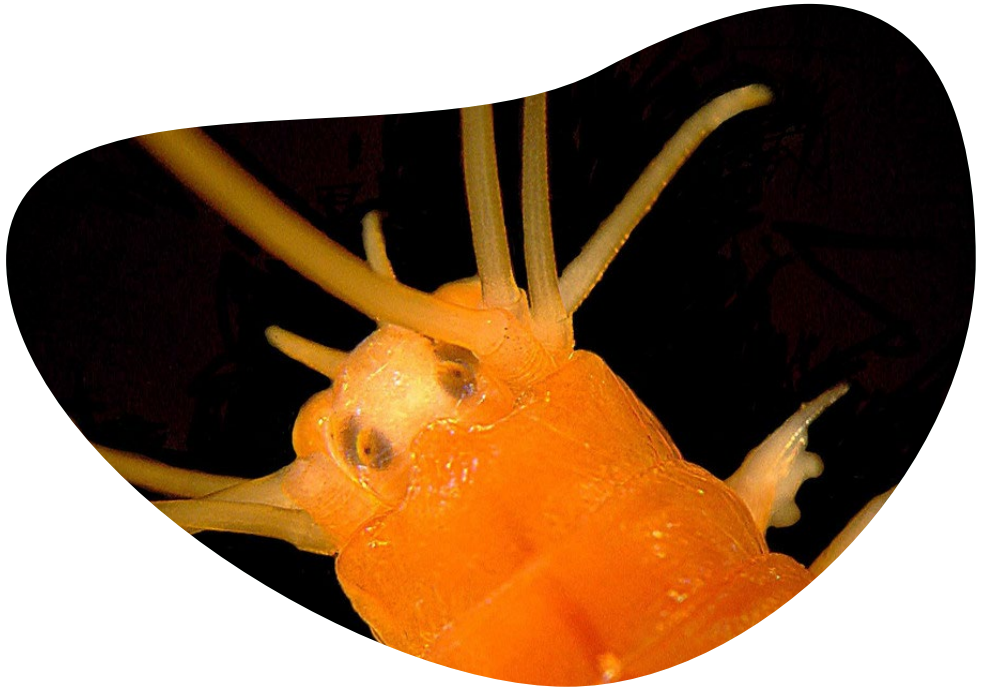
Objetivos y tareas



Tarea 3.3.2. (M3-M20) – Ácidos grasos de invertebrados – Rol de invertebrados acuáticos como generadores de ácidos grasos esenciales con vistas a su posible inclusión en piensos o como alimento directo.

Responsable: CSIC8

Participantes: UA3

Resultados esperados: 3.3.2a. Desarrollo de estrategias de cultivo de invertebrados para optimizar la producción de ácidos grasos esenciales con vistas a su uso como posibles ingredientes para la elaboración de piensos y alimento en acuicultura. **CSIC8. M30.**

Resultados esperados: 3.3.2b. Inclusión de fuentes proteicas alternativas procedentes de biomasas de invertebrados en piensos con una alta sustitución de proteína de pescado. **CSIC8. M30.**

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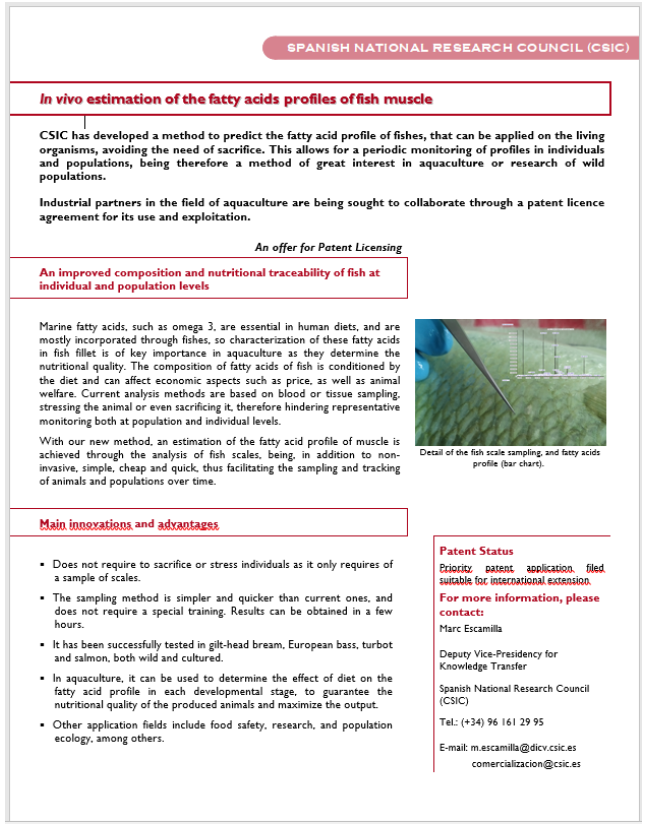
Resultados obtenidos hasta el momento

- Desarrollo y patente de un método incruento para la estima del perfil de ácidos grasos del filete a partir del análisis de las escamas



SPANISH NATIONAL RESEARCH COUNCIL (CSIC)

***In vivo* estimation of the fatty acids profiles of fish muscle**

CSIC has developed a method to predict the fatty acid profile of fishes, that can be applied on the living organisms, avoiding the need of sacrifice. This allows for a periodic monitoring of profiles in individuals and populations, being therefore a method of great interest in aquaculture or research of wild populations.

Industrial partners in the field of aquaculture are being sought to collaborate through a patent licence agreement for its use and exploitation.

An offer for Patent Licensing

An improved composition and nutritional traceability of fish at individual and population levels

Marine fatty acids, such as omega 3, are essential in human diets, and are mostly incorporated through fishes, so characterization of these fatty acids in fish fillet is of key importance in aquaculture as they determine the nutritional quality. The composition of fatty acids of fish is conditioned by the diet and can affect economic aspects such as price, as well as animal welfare. Current analysis methods are based on blood or tissue sampling, stressing the animal or even sacrificing it, therefore hindering representative monitoring both at population and individual levels.

With our new method, an estimation of the fatty acid profile of muscle is achieved through the analysis of fish scales, being, in addition to non-invasive, simple, cheap and quick, thus facilitating the sampling and tracking of animals and populations over time.

Detail of the fish scale sampling, and fatty acids profile (bar chart).

Main innovations and advantages

- Does not require to sacrifice or stress individuals as it only requires of a sample of scales.
- The sampling method is simpler and quicker than current ones, and does not require a special training. Results can be obtained in a few hours.
- It has been successfully tested in gilt-head bream, European bass, turbot and salmon, both wild and cultured.
- In aquaculture, it can be used to determine the effect of diet on the fatty acid profile in each developmental stage, to guarantee the nutritional quality of the produced animals and maximize the output.
- Other application fields include food safety, research, and population ecology, among others.

Patent Status

Priority patent application filed suitable for international extension

For more information, please contact:

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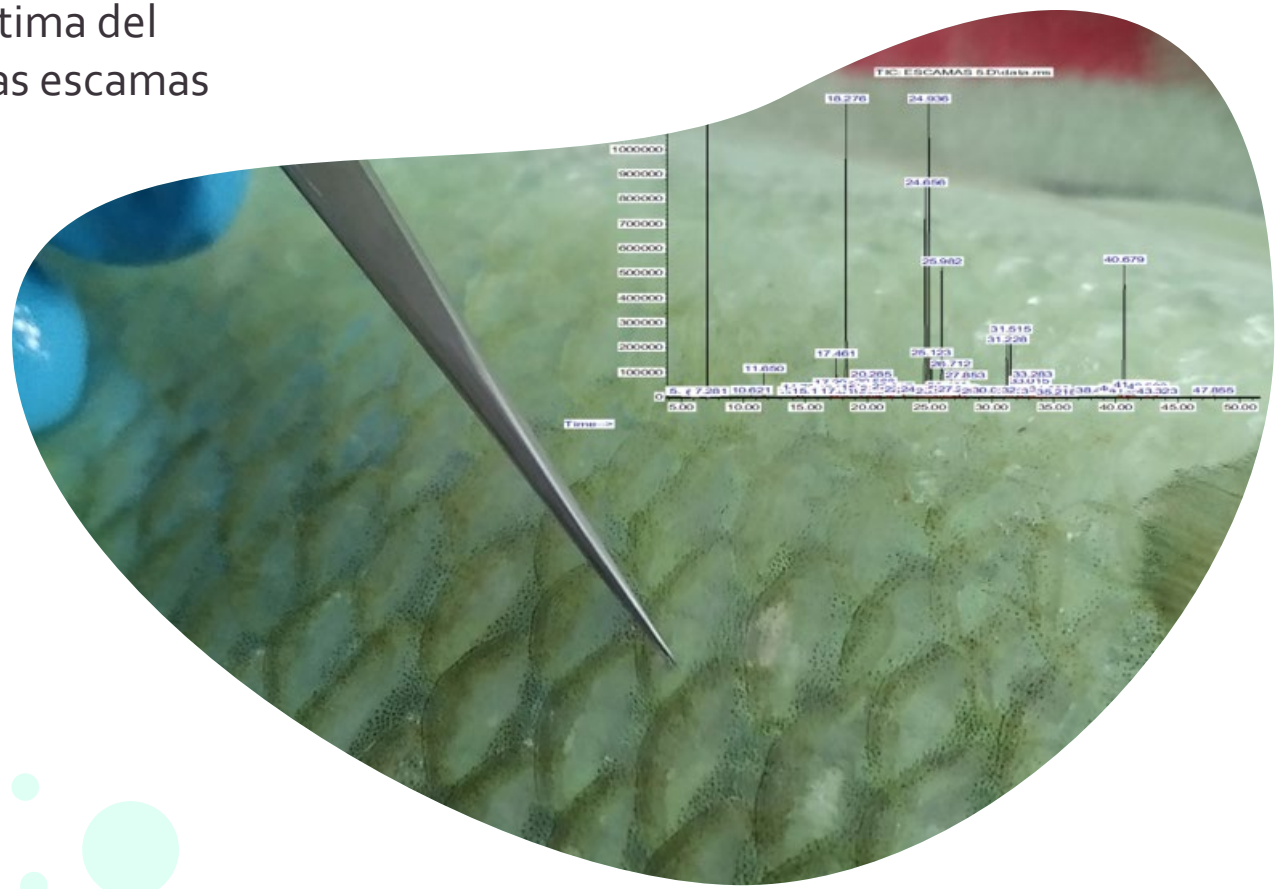

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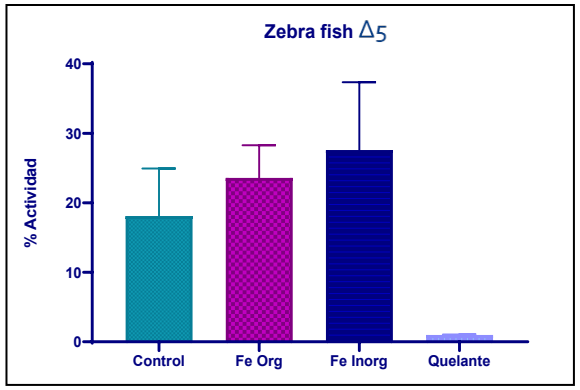
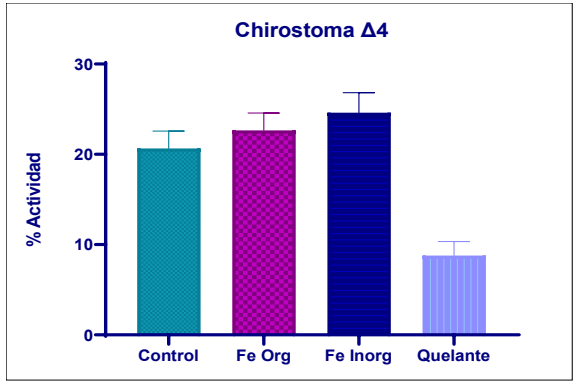
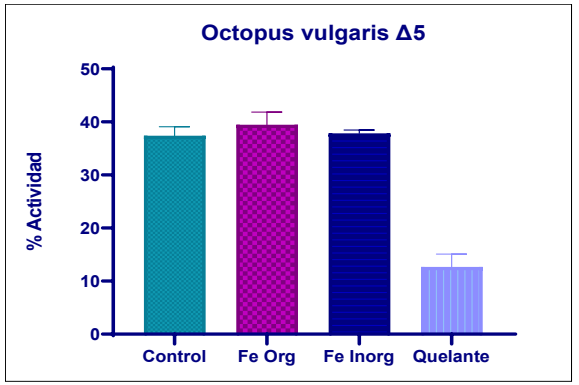
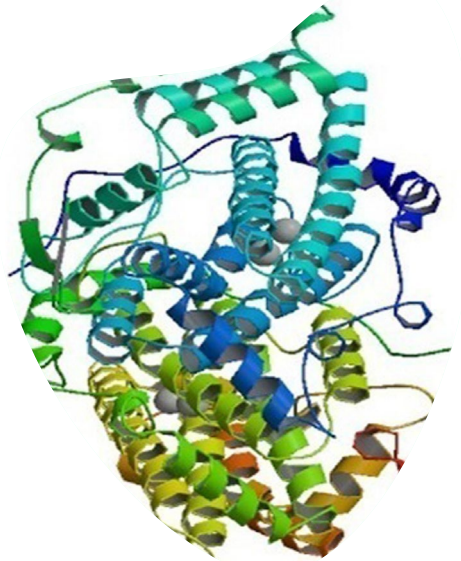
Resultados obtenidos hasta el momento

- Experimentos de Fe como cofactor: actividad de desaturasas

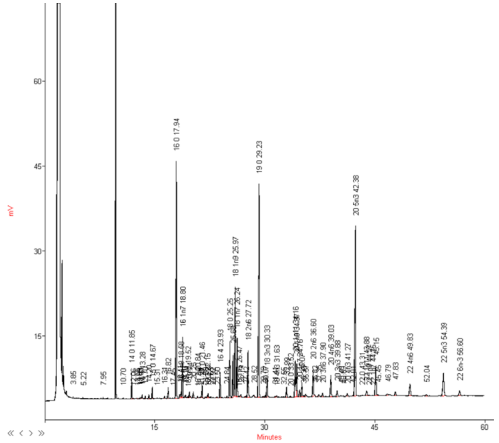


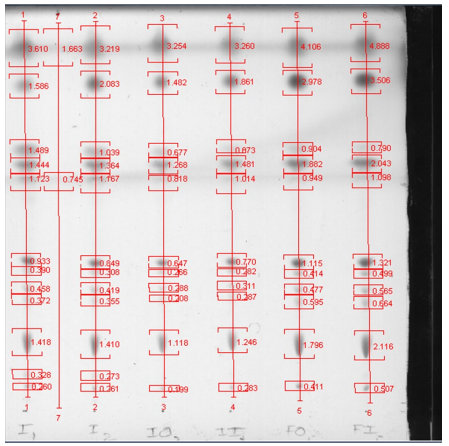






- Piensos suplementados con Fe para poliquetos: efectos





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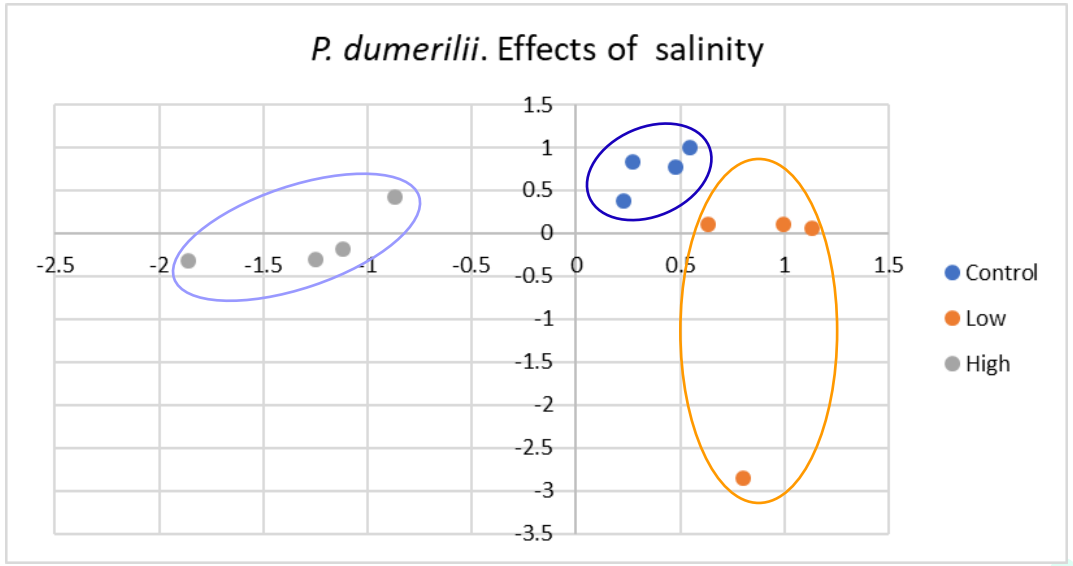
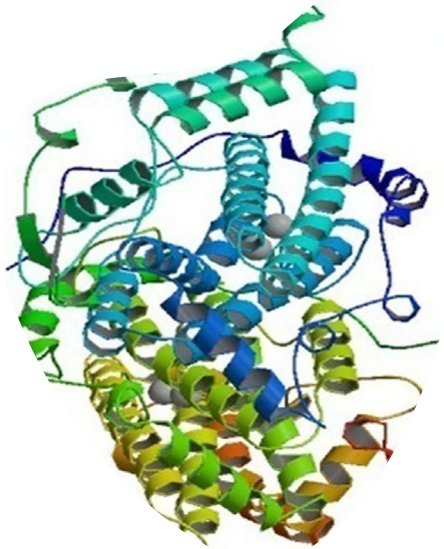
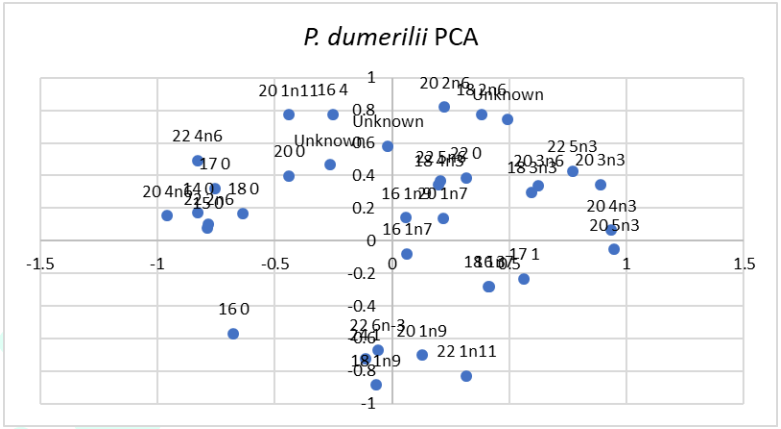
Resultados obtenidos hasta el momento

- Experimentos con *Platynereis dumerilii:* Efectos de la dieta, salinidad y temperatura sobre la composición de ácidos grasos







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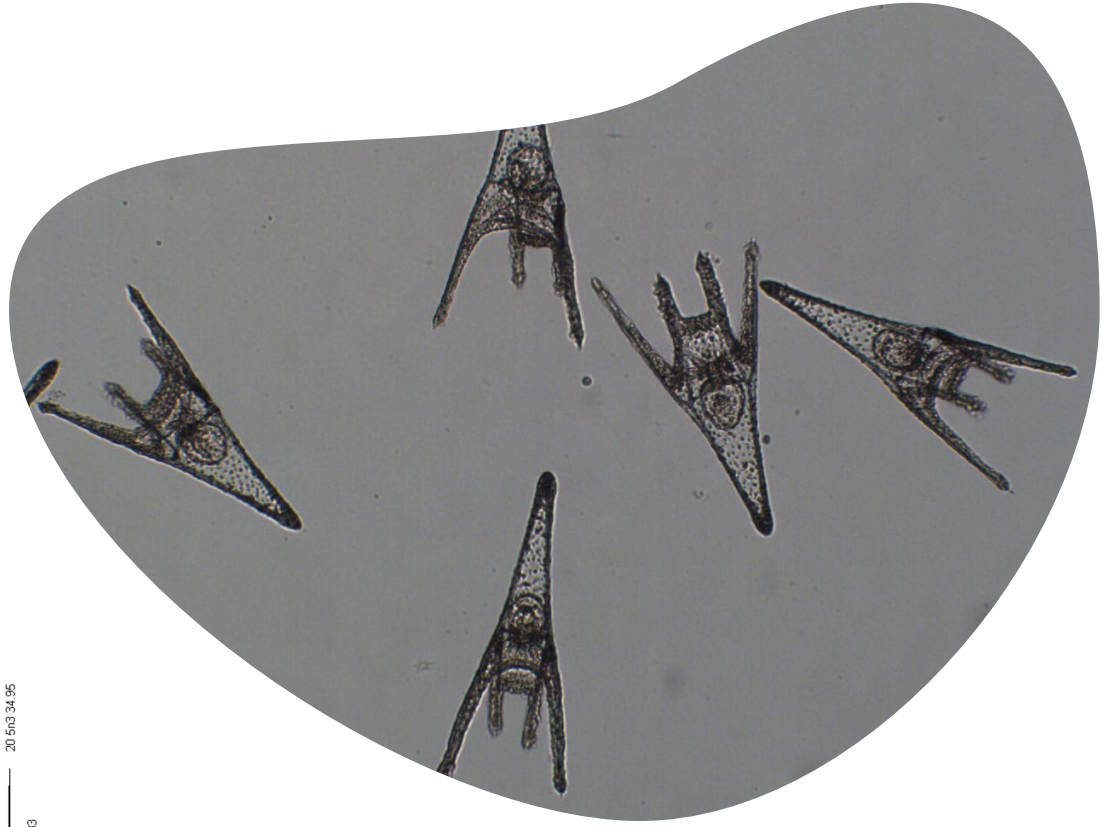
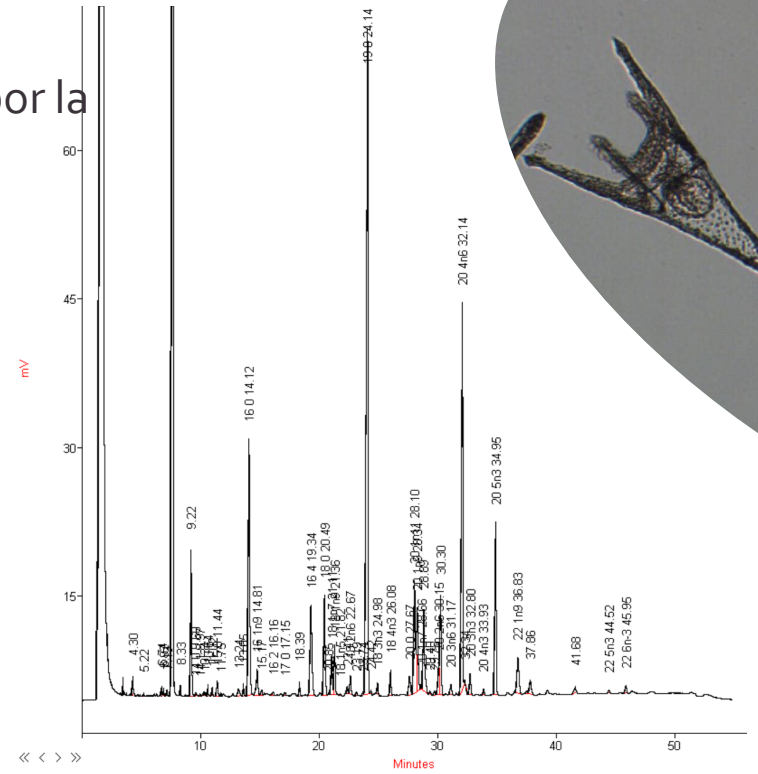
Resultados obtenidos hasta el momento

- Experimentos con larvas de erizo: *Paracentrotus lividus*
- Dos temperaturas: 20 y 24 °C emulando los cambios predichos por la FAO para los próximos 100 años
- Análisis de lípidos en curso





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Resultados obtenidos hasta el momento

- Participación en capítulo de libro sobre cultivo de cefalópodos:

Octopods aquaculture: Reproduction, rearing technology, nutritional physiology, welfare and health status. Capítulo libro CRC Press

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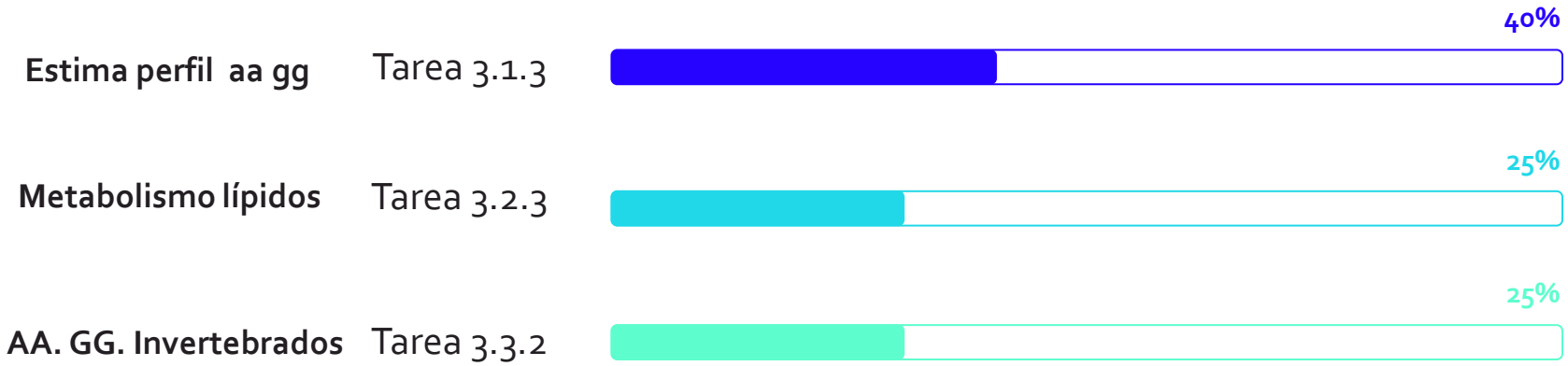
Grado de consecución de las tareas



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Hoja de ruta 6 próximos meses

- Continuar con las actividades anteriormente descritas
- Aplicación de método de predicción y seguimiento del perfil de ácidos grasos de peces de acuicultura basado en el análisis de las escamas (posible implicación empresarial)
- Transcriptoma de anfípodos caprélidos (colaboración con la Universidad de Murcia)
- Experimentos con larvas de erizo: *Paracentrotus lividus:* análisis de lípidos y ácidos grasos. Efectos de microplásticos y de la temperatura (colboración IEO, Vigo)
- Colaboraciones con Tenerife (pulpo), Vigo (pulpo, erizos), Granada (pulpo), Santander (IEO, poliquetos) y U. de Murcia (Caprélidos)

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Thanks | Gràcies

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