



Teknisk metode for å skille lettsaltet og fullsaltet torsk

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Teknisk metode for å skille lettsaltet og fullsaltet torsk



Heavy salted



**Frozen
(No salt)**



**Light salted
(Chilled or Frozen)**



Desalted (Chilled or Frozen)



Bacalao



Fresh / Chilled



Re-fresh Cod



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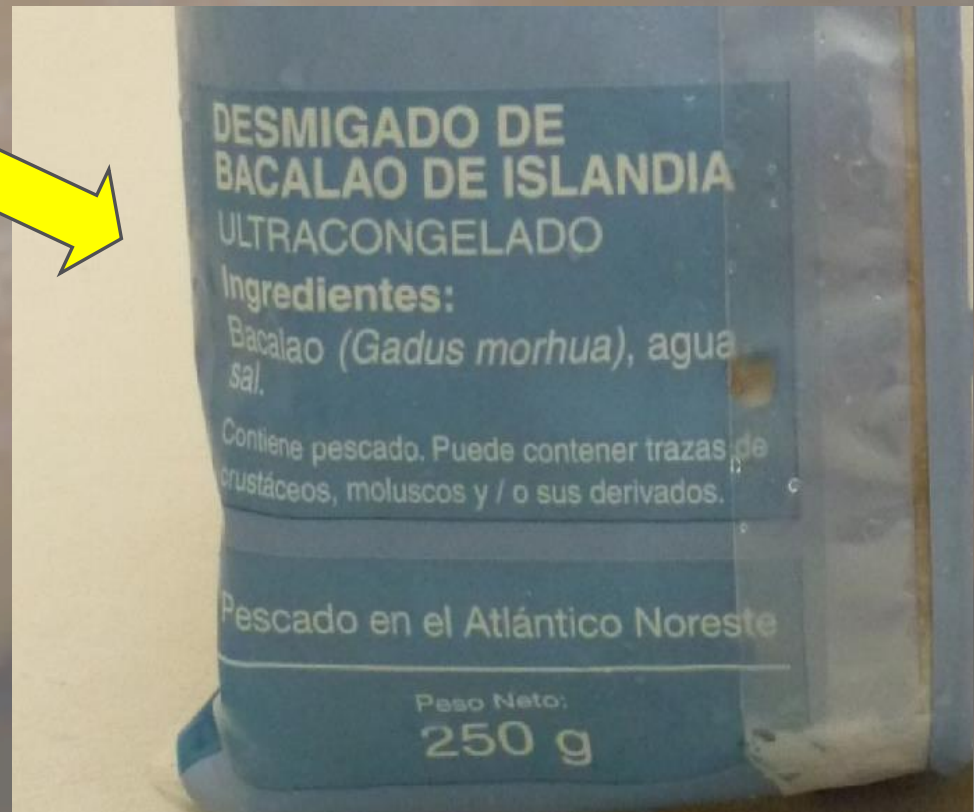
Images

MINTEL



Which kind of cod?

Seems light salted, but how does consumer know?





It seems light salted

Ingredientes: Bacalao (Gadus Morua),
agua, sal, estabilizador E-451, E-450

Modo presentación: Filete

Zona Captura/Cria: Atlántico Noreste

Método Producción: Pesca Extractiva

Lote: BA0808 Producto Descongelado

Caducidad: 17/08/2014

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ESQUEIXADA DE BACALAO

Bacalao, Pimiento, Cebolla, Aceitunas y Tomate

ESQUEIXADA DE BACALAO. ALIMENTO PREPARADO ULTRACONGELADO.

INGREDIENTES: Bacalao desmigado desalado (40%), tomate (15%), cebolla (13%), pimiento verde (12%), pimiento rojo (12%), aceitunas negras (4%) [aceitunas negras con hueso, agua, sal, estabilizador (gluconato ferroso), acidulante (ácido láctico)], aceitunas verdes (4%) [aceitunas verdes con hueso, agua, sal].

Contiene pescado y/o sus derivados.

Preparación:
Dejar descongelar en la nevera y aliñar al gusto. Se puede descongelar la ensalada utilizando el microondas; verter el contenido de la bolsa en un plato apto para microondas y descongelar (en el programa de descongelación) aproximadamente durante 5-8 minutos, removiendo de vez en cuando.

ESQUEIXADA DE BACALLÀ. ALIMENT PREPARAT ULTRACONGELAT.

INGREDIENTS: Bacallà esmicolat dessalat (40%), tomàquet (15%), ceba (13%), pebrot verd (12%), pebrot vermell (12%), olives negres (4%) [olives negres amb pinyol, aigua, sal, estabilitzador (gluconat ferroso), acidulant (àcid làctic)], olives verdes (4%) [olives verdes amb pinyol, aigua, sal].

Conté peix i derivats.

Preparació:
Deixe-ho descongelar a la nevera i amaníu-ho al vostre gust. Podeu descongelar l'amanida utilitzant el microones; aboqueu el contingut de la bossa en un plat apte per a microones i descongeleu-ho (al programa de descongelació) durant uns 5-8 minuts, remenant-ho de tant en tant.



Teknisk metode for å skille lettsaltet og fullsaltet torsk

What is going on in the Spanish and Italian retail market?

- What is “bacalao”?
- Do consumers know?.

➤ *Vi har tradisjon for å spise saltfisk. Dagens spanske forbruker har ikke peiling på dette, de er egentlig forvirret. De vet ikke hva det vil si at bacalao er «al punto de sal», saltfisk, utvannet, “fersk” saltfisk eller utvannet og fryst saltfisk.....Og grunnen er at ingen har informert publikum om dette. (Spanish importer - From FHF project 2009 : 900110) .*

Why would consumers pay more for something they do not know?



Teknisk metode for å skille lettsaltet og fullsaltet torsk

What is going on in the Spanish and Italian retail market?

**It is necessary to enhance consumer knowledge.
Need of appropriate consumer information.**

- *Jeg mener det har blitt veldig viktig å iverksette opplysningsarbeid for å vise spanske forbrukere hvilke alternative torskeprodukter som finnes i dag: Fersk torsk, lettsaltet og fryst torsk, utvannet saltfisk og tradisjonell saltfisk. Man må slutte å lure folk!” (Spanish importer - From FHF project 900110) .*



Teknisk metode for å skille lettsaltet og fullsaltet torsk

What is on-going in the Spanish and Italian retail market?

Due to no specific regulation, consumers are exposed to unfair practices or misleading omissions in labelling by cod producers /retailers.

Development of methodologies to control labelling of cod products.



Development of specific market regulation for cod products.

SALDICOD project: Development and implementation of technical criteria for the differentiation of light salted vs. desalted cod products. How to disseminate appropriate information and avoid misleading consumers.



Teknisk metode for å skille lettsaltet og fullsaltet torsk



- **Stage 1: Sampling**
- **Stage 2: Preliminary characterization and screening of techniques.**
- **Stage 3: Selection of best techniques. Methods optimization and validation.**
- **Stage 4: Development of SOP and technical documents. Dissemination of project results.**
- **Steering Committee:**
 - **Associations** : FHL, ANFABASA, ASSOITTICA.
 - **Companies**: Nils Sperre AS, Jangaard Export AS, Unicod AS, Ubago Group S.A.
 - **Norges sjømatråd**: Delegations in Italy and Spain.

Teknisk metode for å skille lettsaltet og fullsaltet torsk

Sampling:

Gather as much variance as possible in order to test the method performance in all conditions:

➤ **Industry samples:** Controlled conditions. Production traceability.



➤ **Market samples:** Not traced samples in Spain and Italy combining qualities, producers, origin, etc...





Teknisk metode for å skille lettsaltet og fullsaltet torsk

Stage 1: Sampling and comparative characterization of light salted and desalted cod.

Physical-Chemical - Microbiological:

- Lots of analysis carried out (Nutritional facts, minerals, nitrogenous compounds, freshness, oxidation, texture, microbiological studies, ... etc...).
- A lot of parameters seem discriminant in industry samples but not in market samples (pH, WHC, potassium , phosphorus levels, texture,...) due to additives, shelf-life ,...

Sensorial:

Test



Consumer panel could not differentiate between light salted and desalted as raw.

In cooked product, the panel was able to discriminate samples mainly because of a more intense flavour and harder texture.

Panel did not show a preference for light salted cod or desalted cod (either raw or cooked).



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Stage 2: Screening of techniques for the discrimination.

Methods need to be simple, accurate/precise/robust, fast, easy to incorporate by other laboratories and use available instrumental .



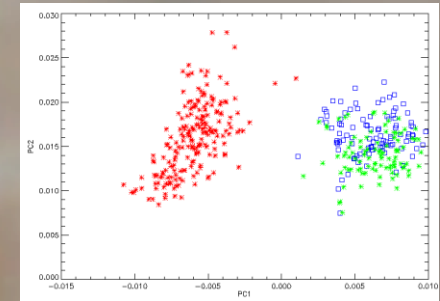
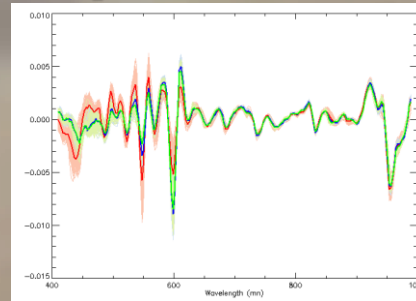
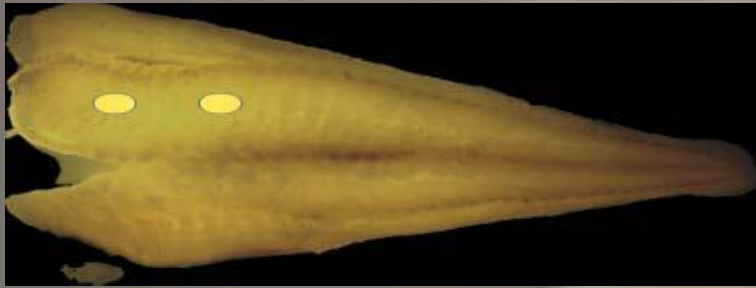
Results not fully discriminant or affected by other factors.

Results fairly discriminant but cannot be easily disseminated.

Discriminant results. Methods meeting project objectives.

- **Microbial Phenotype Microarray Characterization of the microbiota.**
- **Electronic nose.**
- **Microbial fingerprinting in cod products (T-RFLP).**
- **Determination of the protein profile of the cod samples by SDS-PAGE.**
- **Microstructure of cod muscle by optic microscopy.**
- **Colorimetric analysis.**
- **Hyperspectral imaging of cod samples.**
- **Analysis of cod samples using a machine vision system.**
- **Determination of TMAO+TMA in cod products.**
- **Determination of taurine in cod samples by HPLC-FLD.**
- **Determination of creatine, anserine and carnosine in cod by HPLC/UV.**
- **FTIR**

Hyperspectral imaging of cod samples.



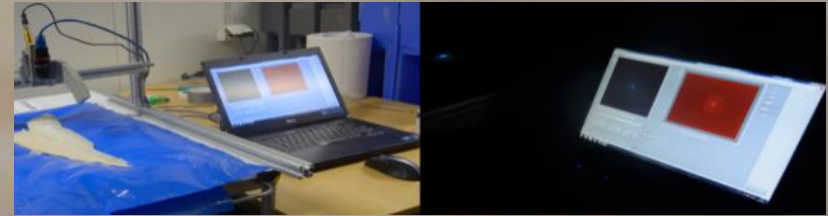
- Models developed only with industrial samples showed very good discriminant results:
 - **Light salted vs. Desalted** (99,9% correctly classified)
 - **Light salted (Frozen raw materials) vs. Light salted (Fresh raw materials).** (93,3% correctly classified)

- When introducing market samples, **Higher variance than previously tested industrial samples.**
 - *Classification performance was nearly perfect in industry samples.*
 - *93.9 % of the market samples were properly classified.*

**Promising results that could be improved including a larger market sample set .
Method not selected for optimization due to low potential for fast incorporation by other laboratories.**

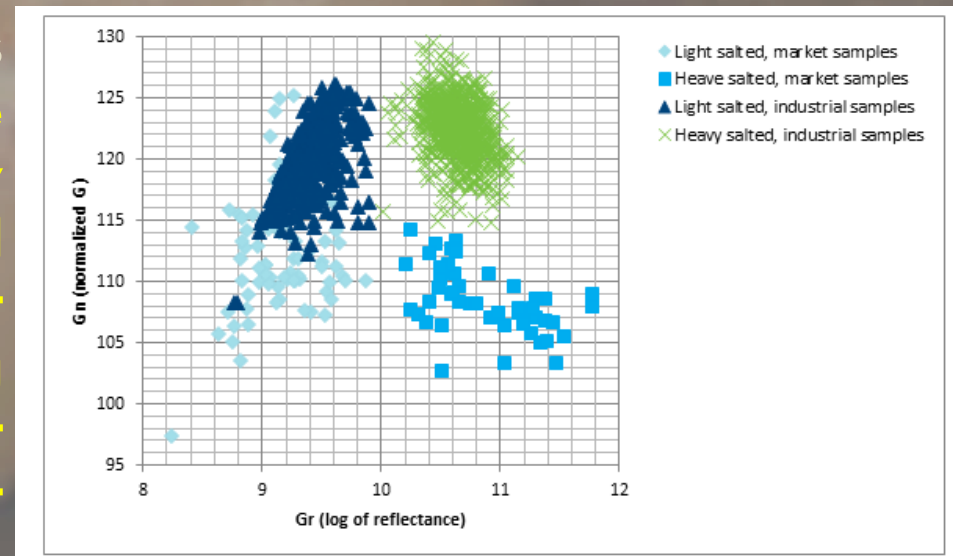
Machine vision system

Characterization of subsurface muscle structure by fluorescence scatter imaging using a near-UV polarized laser.



- Models developed in industry samples showed nearly perfect discrimination (99,9%) of light salted and desalted cod samples.
- Market samples were not tested as an external validation set. Method was validated using cross-validation.

A perfect linear discriminator is possible. Verification of these good results is only possible by first developing a consistent and reproducible measurement hardware and second acquiring measurements on a new data set of both industrial and market samples.



Stage 3: Selection of best techniques. Methods optimization and validation.

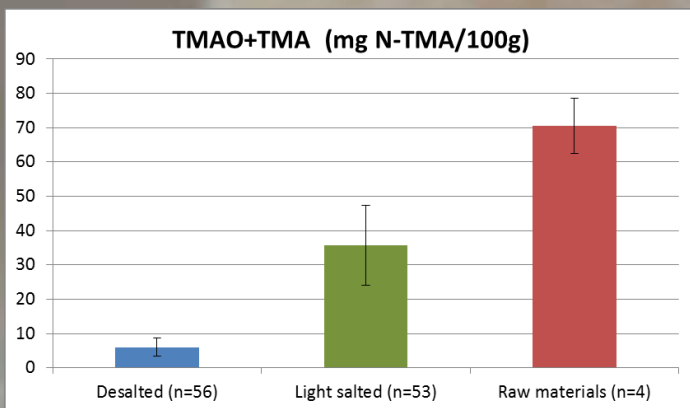
➤ Determination of TMAO+TMA in cod products.

Method based on the studies from Parkin & Hultin (1982).



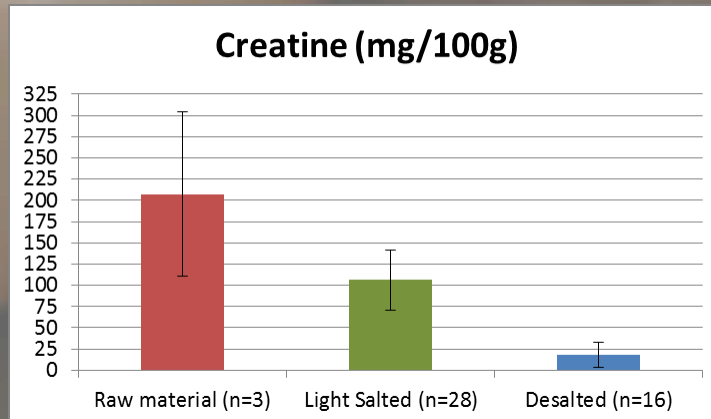
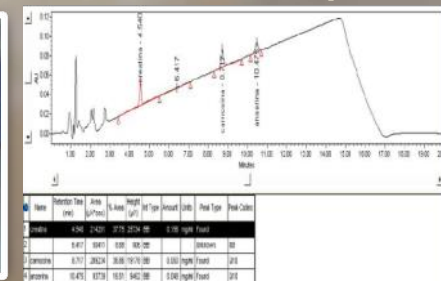
Original only in the application of results not from an analytical point of view. Successfully validated: Robust, accurate, precise, sensitive.

Differences in contents of raw materials, light salted cod and desalted cod.



➤ Determination of creatine in cod products.

HPLC/UV method adapted from Mora et al. (2007) in pork.



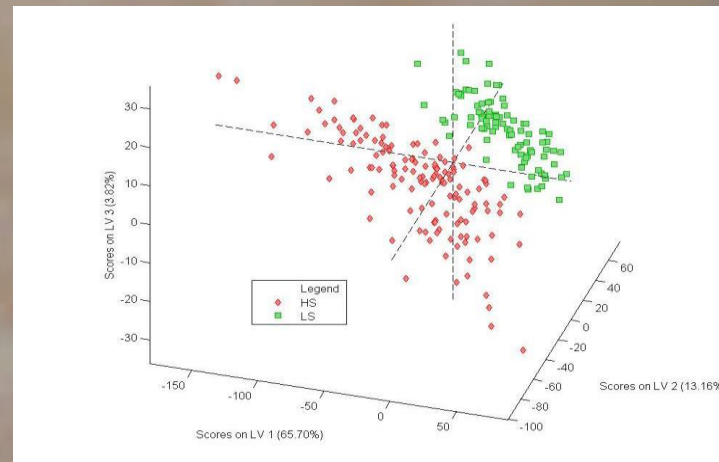
A discriminant threshold can be set at 12 mg TMAO+TMA /100g and 40 mg creatine /100g although it should be more thoroughly established with a larger set of samples.

Standard Operating Protocols have already been prepared for dissemination.

Stage 3: Selection of best techniques. Methods optimization and validation.

➤ FTIR authentication of cod products.

Low sample volume . Minimal sample preparation. High speed. Very low cost. High initial effort of developing the model. (more than 200 samples were used). Only *Gadus morhua* samples.



Discrimination of the samples was perfect in the cross validation.

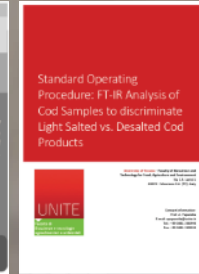
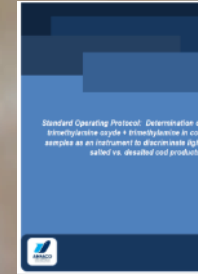
The performance of the model in real market samples was satisfactory (>90%) but the models should be further reinforced with more market samples variance.

Models could be developed in commercial FTIR instrumental available at control laboratories incorporating the SOP that has been prepared for dissemination.

Stage 4: Dissemination of project results.

Development of Standard Operating Procedures (SOP):

SOP will be free and fully available to control laboratories and industry

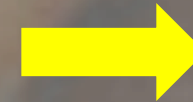


➤ **Scientific dissemination. Participation in scientific / industrial forums.**

➤ **Lobbying for a better definition of cod products in the market.**

- **Submission of papers discussing technical and legal issues. Quality Standard Proposal.**
- **Direct contact to Authorities. (AECOSAN-MAGRAMA. Meeting Madrid - 13th Oct., 2015).**

Cooperation program with Authorities for the development of specific regulation.



➤ **Design of a campaign for the appropriate information of cod products to consumers.**

- **Strengthening cooperation between national associations and Norges sjømatråd.**

Takk for oppmerksomheten

INVESTMENTS AND NEW FACILITIES

Located at the University of Vigo Campus, ANFACO-CECOPESCA has a plot of 6,000 m² with two buildings, one administrative and other scientific and technical, and the new Advanced Technology Center for Marine and Food Industry Research, which is under construction. It has the most advanced equipment and cutting-edge technologies for Marine and Food Research.



▲
Centro of Excellence
Marine-Industry Complex

8,5 M€

of investment.
2,1 M€ of
investment in 2014
in infrastructures
and scientific-
technological
equipment.

5.800 m²

Area

2014/2015

Execution period

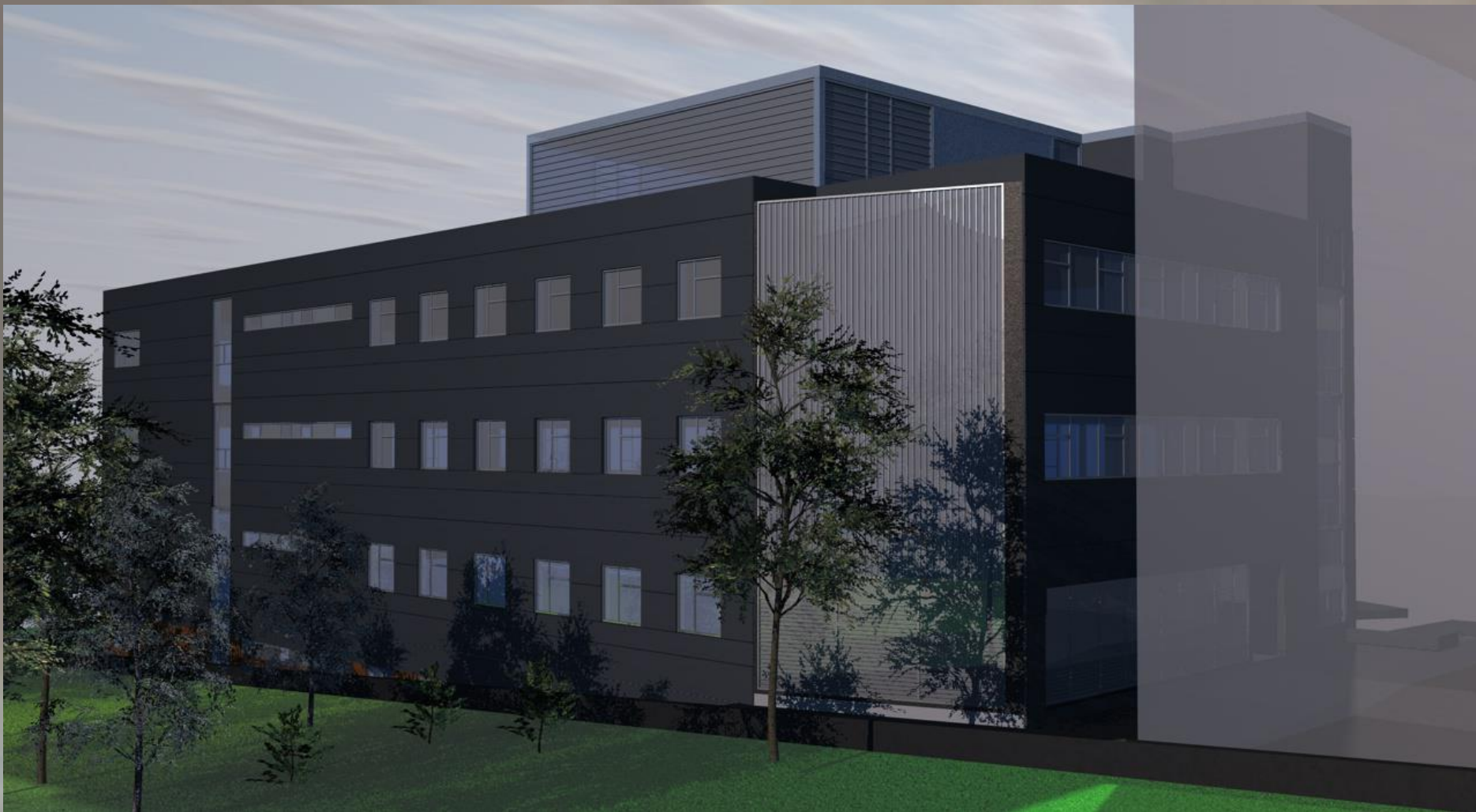
Takk for oppmerksomheten



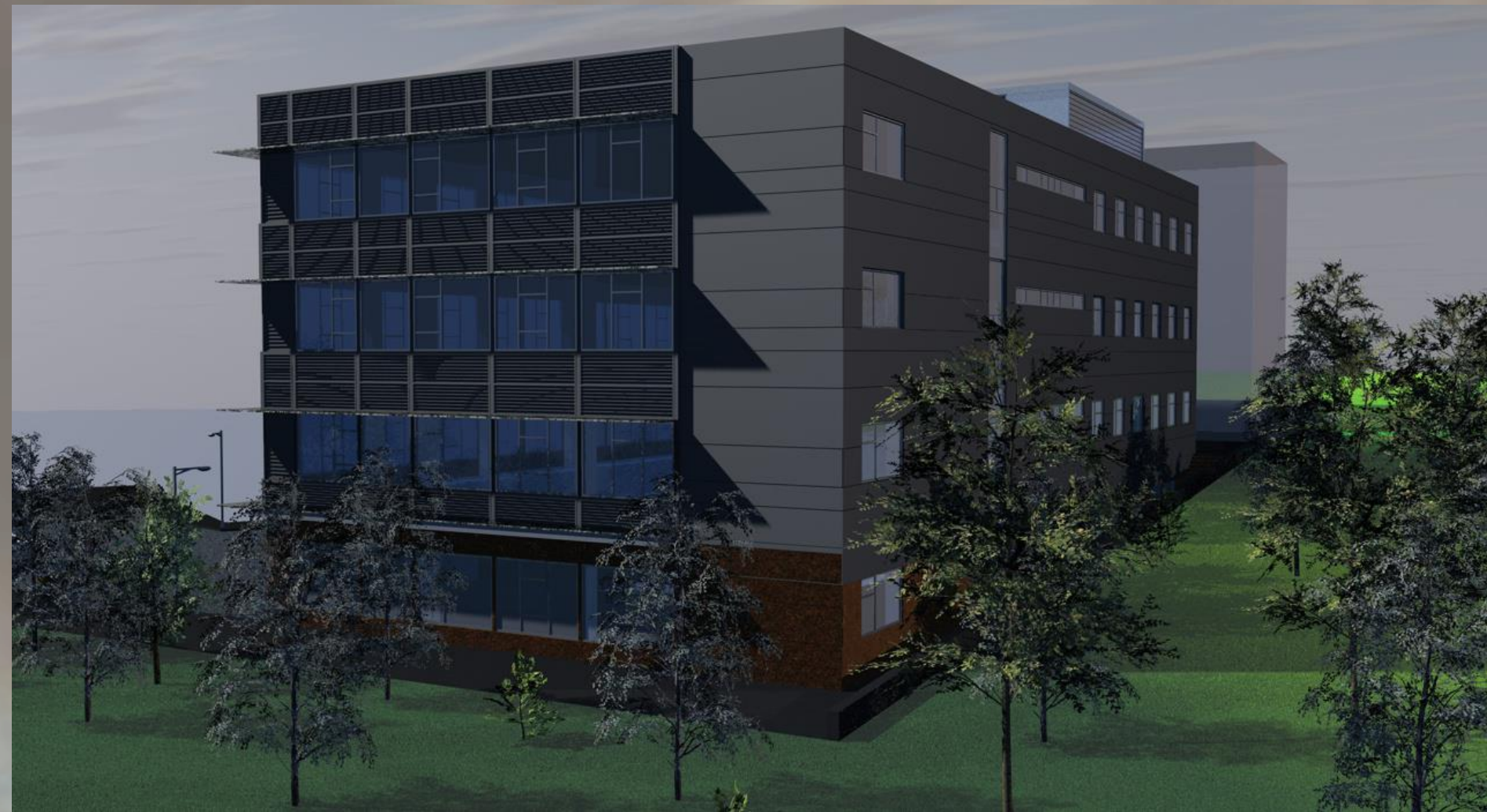
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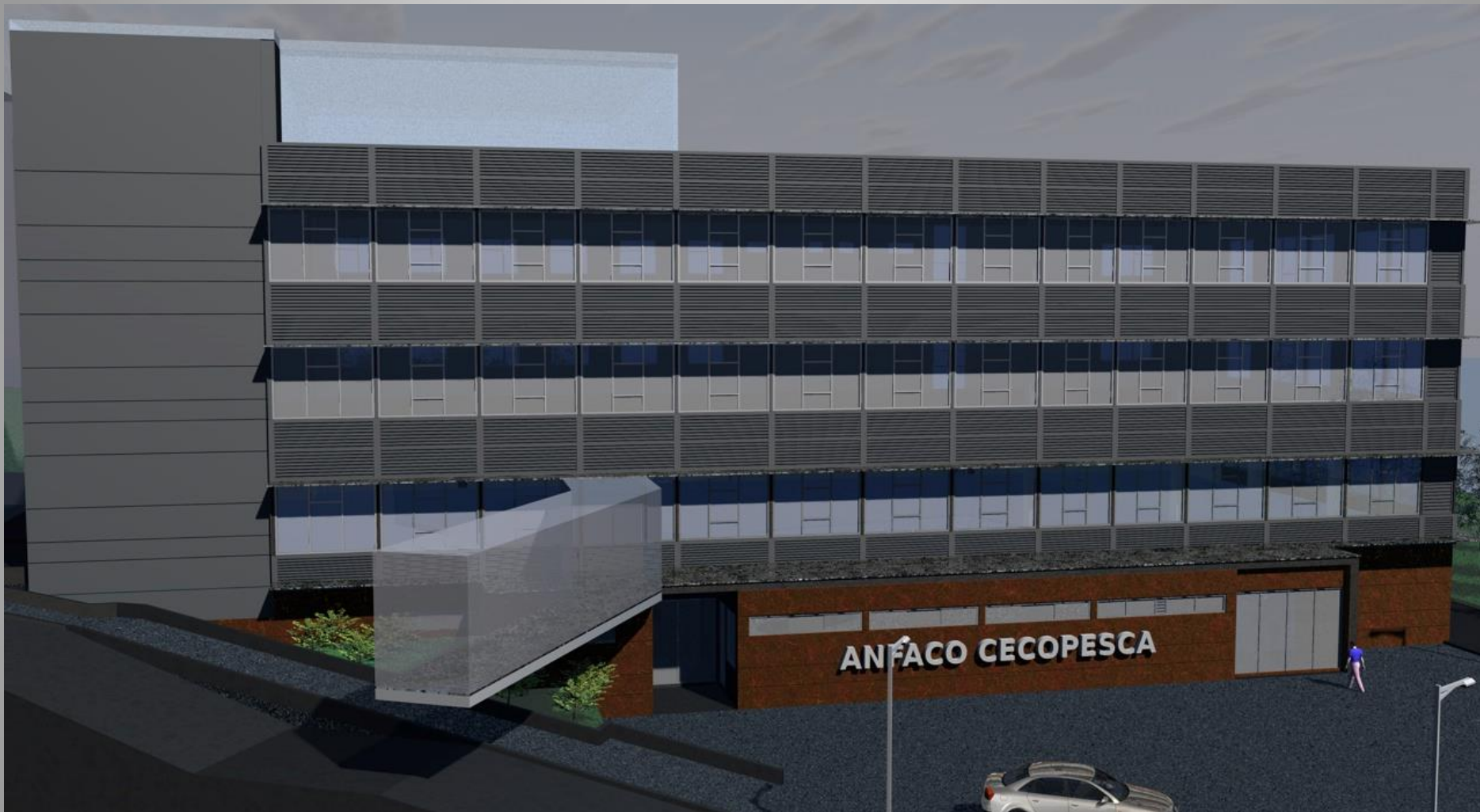
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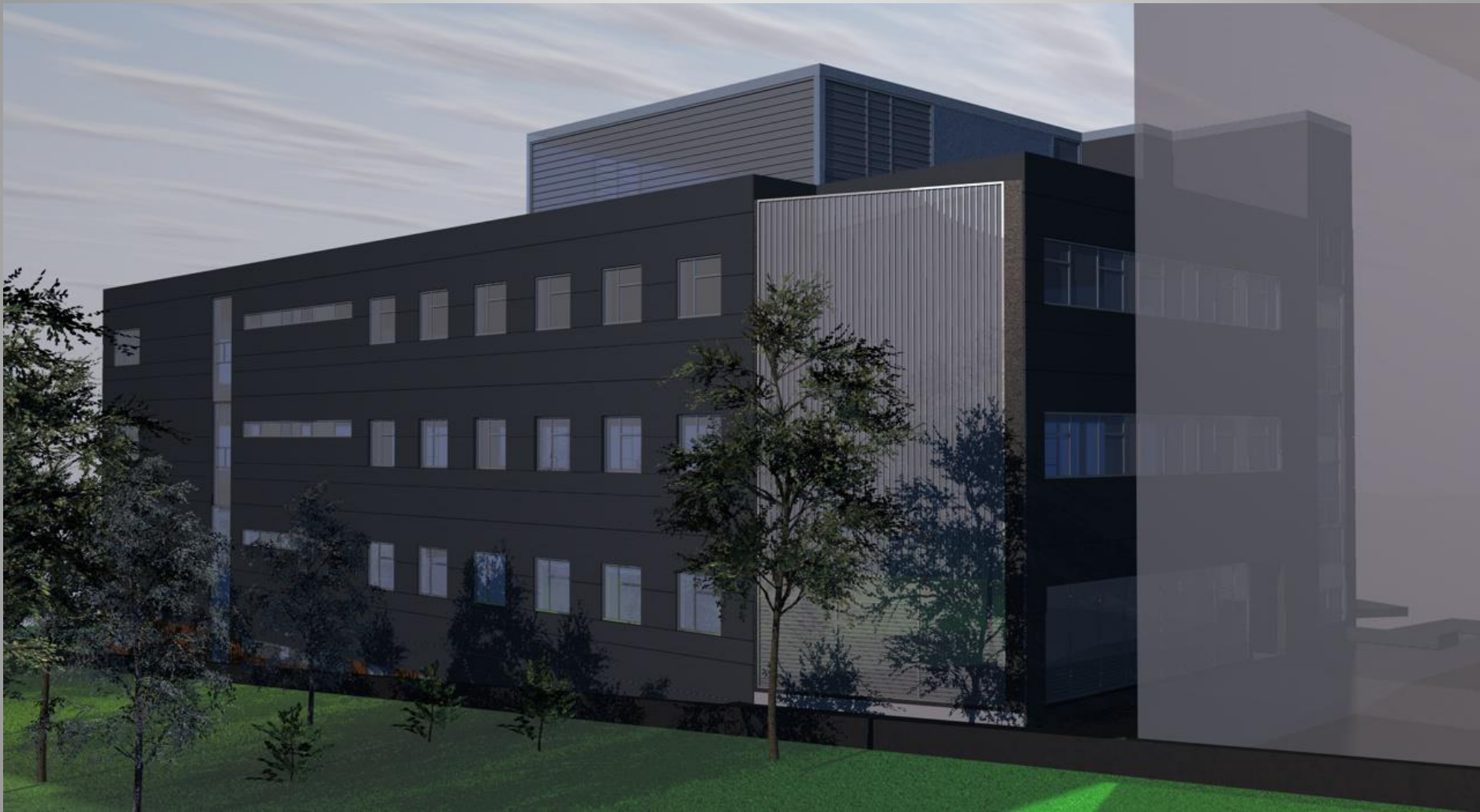
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