

Testing services to support the technological adaptation of Valencian textile companies during covid-19 crisis

AITEX – Textile Research Institute (Spain)

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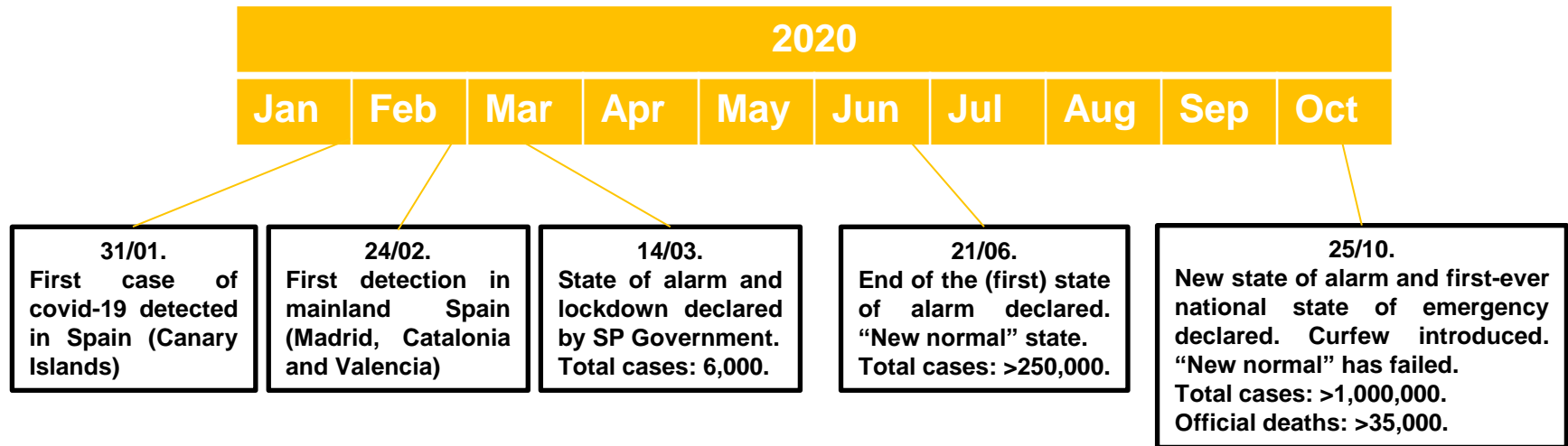
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1. CHRONOLOGY.



On March 3rd WHO warned about a "serious and growing" shortage of masks and other materials due to the coronavirus SARS-CoV-2 (*source: Europa Press, 03/03/20*).

On March 13th, the Spanish Government recognized this shortage of PPEs for medical workers (*source: El País, 13/03/20*). On March 20th, the Ministry of Industry authorized to buy and import non-marked CE PPE (FFP2/FFP3) masks (*source: BOE-A-2020-3945*).

This is the general context in Spain which AITEX faced the turbulent key months of the pandemic.

2. AITEX LAB DIVISION. TESTING SERVICES.

Since the declaration of the state of alarm on March 14th, the further months were **the most intense and stressful that AITEX's staff have ever experienced**. The **microbiology laboratory**, the **medical textiles management unit**, the **APPE laboratory** (non-textile personal protective equipment) and **PPE** (personal protective equipment: clothing and gloves) have all been working flat out.

AITEX was declared essential and worked 24/7, in microbiology and medical textiles during March to June, and since the beginning of June in the case of APPE. All of our technical units were bolstered by staff from other units within AITEX, providing permanent phone service teams, from 6 a.m. to 9:30 p.m.

AITEX was not only essential but **the only option available at national level for the homologation and manufacture of masks and surgical gowns**. Quoting to AITEX's General Manager Mr. Vicente Blanes: "We felt the full might of the system (regional administrations, the Spanish administration and all the companies in the sector) flow through us" (*source: El Español, 29/07/20*).

2. AITEX LAB DIVISION. TESTING SERVICES.

Microbiology laboratory.

- Testing and approval of **surgical masks** (in accordance with EN 14683:2019+AC:2019).
- **Hygienic single-use masks** (in accordance with UNE 0064, parts 1-2).
- **Hygienic reusable masks** (in accordance with UNE 0065).



Hygienic (community) masks are defined by bacterial filtration efficiency (BFE) and respiratory efficiency limit values.

These three mask types were the workhorse throughout the pandemic:

- **Surgical masks.** Shortage of manufacturers at national level. Emergency imports required to be certified.
- **Hygienic (single and reusable) masks.** Unexisting standards and testing methods at national level. **Not specialized machinery nor know-how** for manufacturing.

AITEX actively participated in the **creation of the:**

- **UNE 0064/0065 standards** promoted by the Ministries of Industry and Health at the height of the pandemic.
- **CEN WORKSHOP AGREEMENT - CWA 17553**, which established the characteristics agreed upon by European countries for disposable and reusable hygienic masks.

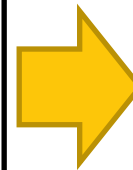
2. AITEX LAB DIVISION. TESTING SERVICES.

Microbiology laboratory.

- **Surgical gowns** were also tested and approved (EN 13795-1:2019).
- The **antibacterial capacity of fabrics** evaluated (ISO 20743).

All of these efforts enabled Spanish fabrics to be approved for use in surgical and hygiene masks when, at the height of the pandemic in Spain, there was no alternative to fabrics for the manufacture of masks. The same for surgical and medical gowns and ready-made masks and gowns.

On March 23rd, AITEX had already designed and produced a 5-layer Type IIR surgical mask using non-woven fabric manufactured in Spain with spunlace and spunbond fabrics, and just a month later, a 4-layer reusable hygienic mask using non-woven fabric. Both prototypes were immediately made public and available through the Generalitat Valenciana (GVA) and the Ministry of Industry webpages. <https://www.mincotur.gob.es/es-es/COVID-19/Paginas/guias-para-fabricacion-de-mascarillas-y-ropa-de-proteccion.aspx>



Prototype of IIR-type surgical mask (5 layers) developed by AITEX in mid-March 2020.

In the first 6 months of the pandemic the laboratory has issued more than 3,000 reports on the results of tests on masks and gowns.

2. AITEX LAB DIVISION. TESTING SERVICES.

APPE and PPE laboratories.

- Testing and certification of **usual FFP2 masks** (EN 149:2001+A1:2010).
- **Same for protection only against covid-19** (PPE-R/02.075 Versions 1 and 2 linked to VG2 of European notification bodies and EU Regulation 2016/425).
- **Face and eye protectors** (EN 166:2002 and own procedure 25DAT116 and PPE-R/03.031 linked to VG3 of European notified bodies) for the certification of these products for protection against liquid droplets and splashes.
- Testing and certifying **clothing and gloves for chemical and biological protection, and exclusively for COVID-19 protection.**

Main issues experienced by AITEX on the FFP2 masks testing:

- **Large number of requests**, vast majority of which were **imports from China.**
- **Shortage (even unavailability) of melt-blown filter** for manufacturers.
- Resistance to **NaCl filtration test** was **subcontracted** (INSST labs, Seville).
- In a short time, the **purchase of the necessary equipment** was done, and put it into operation in May'20, obtaining **ENAC approval** for the NaCl test.

The Institute has invested around 200,000 € in laboratory equipment for testing masks and gowns during the pandemic.

3. THE COOPERATION OF PUBLIC/PRIVATE VALENCIAN ENTITIES.

Medical/protective textile clustering in Valencia before 2020? NON-EXISTING.

End of March / End of May 2020

- Background and **main structure for a specialized sanitary textile cluster was created** (Municipality of Ontinyent and ATEVAL, supported by AITEX for testing).
- GVA through IVACE programme, worked impeccably and swiftly **set up mask manufacturing capacity**, first in **five companies** in the Valencia Region, and then in a further **eight** companies.
- IVACE also **promoted the manufacture of sanitary gowns** approved by AITEX in another **four companies** in the Region.
- **Textile machinery reconverted/adapted to manufacture face masks and gowns.**



Key actors of the Valencian textile industry met the Valencian president, Mr. Ximo Puig, to present the main results and response of the sector fighting against covid-19 (Nov'20).



Textile company located in Ontinyent (Southern of Valencia province) in May'20, manufacturing face masks.

3. THE COOPERATION OF PUBLIC/PRIVATE VALENCIAN ENTITIES.

Medical/protective textile clustering in Valencia before 2020? NON-EXISTING.

End of March / End of April 2020

- **>1,000 Valencian textile workers re-accepted in less than 60 days** from a Record of Temporary Employment Regulation declared at the end of Mar'20 (*source: eldiario.es 26/05/20*).
- The Spanish Ministry of Industry (through Fedekon), set up **eight Spanish companies to manufacture the type IIR surgical mask designed and approved by AITEX.**
- **ATEVAL created productosemergencias.com, a web platform** to put at the service of companies, both **from the point of view of supply and demand**, linking specialized products related to health protection and of personal safety.
- Several **funding programmes were launched** by regional/national agencies (IVACE, GVA/AVI, CDTI) **supporting industrial and scientific research.**

And finally... how the textile companies did take profit from the support of testing services and cooperation of public/private entities? How they did adapt the machinery and which kind of products and R&D actions they developed?

4. SOME EXAMPLES OF TECHNOLOGICAL ADAPTATION AND R&D ACTIONS.

Emergency adaptation of confection processes to produce surgical and hygienic face masks.

As a result of the cooperation among ATEVAL/GVA-IVACE, 5 first companies started to produce surgical face masks at the end of Mar'20, and further hygienic types at the end of Apr'20.

- Cotoblau.
- Euromoda.
- Rapife.
- Funcotex.
- Marie Claire.

Production capacity:

- **Surgical IIR type: 500,000/month**
- **Hygienic type: 200,000/day**

(source: valenciaplaza.com 08/05/20)

First-emergency production model took the AITEX prototype as a basis:

- 2 external layers (100% PP spunbond, 40 g/m²).
- 2 mid layers (80/20 PES/CV spunlace, 44 g/m²).
- 1 internal layer (100% PP spunbond, 20 g/m²).

(sources: eldiario.es 31/03/20 and <https://www.mincotur.gob.es/es-es/COVID-19/industria/>)



Special machinery for face mask production installed at Euromoda.

4. SOME EXAMPLES OF TECHNOLOGICAL ADAPTATION AND R&D ACTIONS.

Creation and specialization of a new product line, starting from home-textiles and bed linen (I).

Company EUROMODA was one of the first producing surgical masks and adapting their machinery and production processes.

Acquisition of two flat sewing machines that were have adapted according to the specifications of the mask procedure. And extra adaptations also done to apply the twistband (nose zone).

Experience on confection of cushion fillings very useful to modify the ultrasonic cutting and sealing machine, for producing the nonwoven 'sandwich').

More info:

<https://euratex.eu/covid-19/success-stories/creaciones-euromoda/>



More than 6,000 masks/day was the initial production capacity of Euromoda (Apr'20).

4. SOME EXAMPLES OF TECHNOLOGICAL ADAPTATION AND R&D ACTIONS.

Creation and specialization of a new product line, starting from home-textiles and bed linen (II).

Company MILA-ROSA has developed its MILA-CARE product brand line, based on several sanitary products like:

- Face masks (surgical, respiratory FFP grades and hygienic types).
- Sanitary wardrobe, incl. disposable gowns.

First textile company in Southern Valencia province receiving the AEMPS license.

Funded research project (Valencian Innovation Agency – AVI, 2020) to increase the production capacity of face masks and innovation on textile materials used for it:

- Capacity up to 35 units/min.
- Versality to process several materials.
- Possibilities to use PLA fibers instead of PES.
- Possibilities to improve filtration properties by nanostructured fabrics.



4. SOME EXAMPLES OF TECHNOLOGICAL ADAPTATION AND R&D ACTIONS.

TRUST project (AITEK), funded by CDTI.

Main objective: to develop a reliable, reproducible and scalable bio-indicator system for the evaluation of massive-use disinfection technologies against SARS-CoV-2 and its behavior in textile structures.

Why?

- **Behavior and durability of SARS-CoV-2 on textile substrates still unknown**
- **Unavailability of tools to evaluate the efficacy of several disinfection / cleaning methods against coronavirus**
- **What occur with garments choose and refused by customers when they are shopping?**

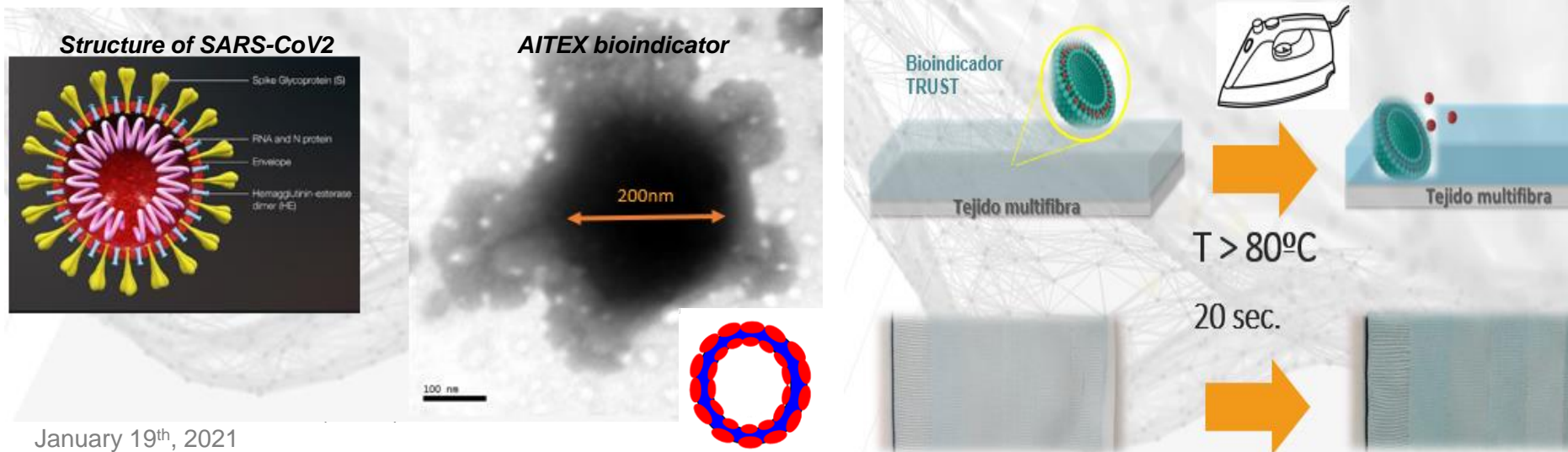
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TRUST project (AITEX), funded by CDTI.

Scientific literature proven that SARS-CoV-2 is inactivated by temperatures in the range of 56 - 92°C, preferably 70 – 75°C.

AITEX has developed a nanolipidic-based system (liposome-like double membrane) with same size and morphology than SARS-CoV-2. This system is filled with blue colour, so when the membrane is broken by heat (or other way), colour is released.

It means that the “simulating” SARS-CoV-2 on textiles has been inactivated.



5. CLOSING REMARKS.

- **Textile sector in Valencia is resilient**, being adapted quickly to the new national and international situation.
- The textile industry has been **able to re-activate the production lines** again.
- However, **current situation is not enough to face 2021 and next years** and some important issues have been stated by ATEVAL to the regional Government.
- Need for improvement in the Public Procurement Law **to strengthen the local industry** and the conditions of the bases of Public Tenders.
- **Promotion of innovation, design, quality, sustainability, new materials, product safety, European certification** and smart public procurement. And look for projects through European Next-Generation **EU funds**.

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