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del II Congreso de Jóvenes Investigadores en Ciencias Agroalimentarias

Centro de Investigación en
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Información de contacto

Centro de Investigación en Agrosistemas Intensivos Mediterráneos y Biotecnología Agroalimentaria (CIAIMBITAL)

Correo: cibainfo@ual.es

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Fibras naturales en Andalucía: Potencial desarrollo de la industria del cáñamo

ANTONIO AGUILAR GARRIDO || UNIVERSIDAD DE GRANADA

RODRÍGUEZ, CARMEN ROCÍO; CHAYAH, MERIEM; SAYADI, SAMIR

Las fibras naturales son de gran interés debido a sus ventajas: bajo coste, alta relación resistencia / peso, baja densidad y propiedades no corrosivas. Además, son renovables y degradables, y causan menos problemas de salud y medioambientales en comparación con las fibras sintéticas. Entre ellas, el género Cannabis se ha utilizado durante más de seis milenios y es una de las fuentes vegetales más antiguas para el aceite de semilla, la resina intoxicante, la medicina y la fibra textil. El cultivo del cáñamo en España se remonta a la época de Carlos III (s. VIII), cuando se extendió en las llanuras de las provincias de Granada y Segura. De hecho, España es el único país occidental en Europa, con Francia, donde el cáñamo se ha cultivado durante gran parte del siglo XX, hasta que casi desapareció en 1972. A partir de 1997, muchas regiones españolas comenzaron a plantar cáñamo, alcanzando en 1998 su máxima superficie con 16.507 ha. Sin embargo, después de que la Unión Europea redujera la ayuda de la Política Agrícola Común (PAC) en 2001, la única región que siguió cultivando cáñamo industrial fue Cataluña con 900 ha de cultivo en 2002. Sin embargo, analizando datos recientes, se puede demostrar que ha habido una notable recuperación de la producción, incluso mayor desde 2012. De hecho, la superficie dedicada para la producción de semillas de cáñamo ha aumentado de 1 ha en 2012 a 140 ha en 2017. El rendimiento total de semillas de cáñamo ha aumentado exponencialmente de 2013 a 2017 (desde 1 t en 2013 a 830 t en 2017). La falta de conocimiento de los métodos de cultivo, el procesamiento de la cosecha y el equipo específico en la cadena de valor hacen que el cultivo y la transformación del cáñamo obstaculicen su expansión. En este trabajo, se exponen los principales pasos de la cadena de valor del cáñamo industrial para contribuir a la comprensión y, por lo tanto, a la recuperación y promoción de las fibras naturales en Andalucía, particularmente el cáñamo.

Natural fibers are of high interest due to their advantages: low cost, high strength to weight ratio, low density and non-corrosive properties. Additionally, they are renewable and degradable, and cause less health and environmental problems when comparing to synthetic fibers. Among them, the genus Cannabis has been used for over six millennia and it is one of the oldest plant sources for seed oil, intoxicant resin, medicine, and textile fiber. Hemp cultivation in Spain dates back to the time of Carlos III (s. VIII), when it was extended in the plains of the provinces of Granada and Segura. In fact, Spain is the only Western country in Europe – with France – where hemp has been grown for much of the twentieth century, until it almost disappeared in 1972. From 1997 many Spanish regions began to plant hemp, reaching in 1998 its maximum devoted surface with 16,507 ha. However, after the European Union reduced aid from the Common Agricultural Policy (CAP) in 2001, the only region that has continued to grow industrial hemp was Catalonia with 900 hectares under cultivation in 2002. Nevertheless, analyzing recent data, it can be shown that there has been a noticeable production recovery, even higher from 2012. In fact, the devoted surface for hemp seed production has increased from 1 ha in 2012 to 140 ha in 2017. Total yield of hemp seed has increase exponentially from 2013 to 2017 (from 1 t in 2013 to 830 t in 2017). The lack of knowledge of methods of cultivation, harvest proccessing and specific equipment in the value chain make hemp cultivation and transformation hinder its expansion. In this work, the main steps of the value chain of industrial hemp are exposed for contributing to the comprehension and thus the recovery and promotion of natural fibers in Andalucia, particularly hemp.

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NATURAL FIBERS IN ANDALUSIA: POTENTIAL DEVELOPMENT OF INDUSTRIAL HEMP

Aguilar, Antonio [1]; Rodriguez, Carmen Rocío [2]; Chayah, Meriem [3]; Sayadi, Samir [2]*

[1] Soil Science and Agricultural Chemistry Department, Faculty of Sciences, University of Granada, Campus Fuentenueva, 18071, Granada, Spain.

[2] Department of Economy of the Agri-food Chain, Institute of Agricultural Research and Training (IFAPA), 18080 Granada, Spain.

[3] University of Granada, 18011 Granada, Spain.

**Corresponding author: samir.sayadi@juntadeandalucia.es*

1. INTRODUCTION: EVOLUTION AND CURRENT SITUATION

Natural fibers are of high interest due to their advantages: low cost, high strength to weight ratio, low density and non-corrosive properties. Additionally, they are renewable and degradable, and cause less health and environmental problems when comparing to synthetic fibers. Among them, the genus *Cannabis* has been used for over six millennia and it is one of the oldest plant sources for seed oil, intoxicant resin, medicine, and textile fiber. Hemp cultivation in Spain dates back to the time of Carlos III (s. VIII), when it was extended in the plains of the provinces of Granada and Segura. In fact, Spain is the only Western country in Europe – with France – where hemp has been grown for much of the twentieth century, until it almost disappeared in 1972. From 1997 many Spanish regions began to plant hemp, reaching in 1998 its maximum devoted surface with 16,507 ha (Figure 1). However, after the European Union reduced aid from the Common Agricultural Policy (CAP) in 2001, the only region that has continued to grow industrial hemp was Catalonia with 900 hectares under cultivation in 2002.

Nevertheless, analyzing recent data, it can be shown that there has been a noticeable production recovery, even higher from 2012. In fact, the devoted surface for hemp seed production has increased from 1 ha in 2012 to 140 ha in 2017. Total yield of hemp seed has increase exponentially from 2013 to 2017 (from 1 t in 2013 to 830 t in 2017).

The lack of knowledge of methods of cultivation, harvest proccessing and specific equipment in the value chain make hemp cultivation and transformation hinder its expansion.

In this work, the main steps of the value chain of industrial hemp are exposed for contributing to the comprehension and thus the recovery and promotion of natural fibers in Andalucia, particularly hemp.

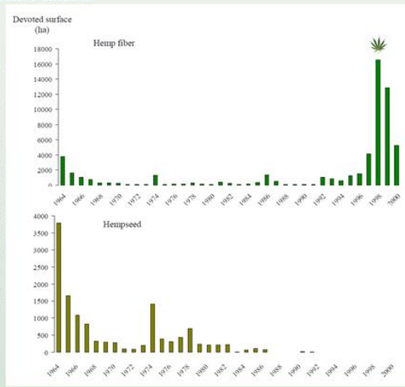

Figure 1. Devoted surface evolution in Spain for fiber and hemp seed (Source: FAOSTAT)

2. METHODOLOGY

To overcome this work an extensive bibliographic revision has been carried out from national and international scientific and sectorial journals, technical reports, dissemination papers, oficial statistics, related websites, etc. The search has been focused on the value chain of hemp, especially in proccessing. For that, "Web of Science", "Google Scholar" and "Google" have been used with search combinatios such as "hemp value chain", "hemp industry", "hemp retting", etc. Additionally, three informal interviews were carried out during 2019 with eight experts each [agents from the administration, hemp farmers, producers (hemp transformation industry), technicians and researchers] to get further local and regional information.

3. RESULTS: THE HEMP VALUE CHAIN. MAIN CONSTRAINTS

The main steps and final generic purposes in the value chain are presented in Figure 2:

- Harvesting: this step is still problematic since specific machines are not commercially available and normally adapted harvesters are utilized. The main problem consists in the high resistance of hemp fibers, which difficult the use of traditional mowers in an optimum way.
- Retting: pectineus substances that bind together elemental bast fibers become degraded. This progression is completed either by microorganisms present on the stems or in soil, acid/bases, or by special enzymes. Three major types of retting can be distinguished including field (or dew), water and chemical retting, some special facilities are required: tanks, dryers, specialty chemicals
- Decorticating: fibers are separated. This process is usually mechanized, in which retted plants pass through rollers which break the stems. Later, fibers are separated from the woody core by hitting (scutching) or by blades that rotate parallel to fibers.
- Hackling: long fibers are softened and refined by hackling process to obtain primary and secondary fibers.

It is necessary the development of decorticating and hackling facilities coupled with the final purpose type of fiber: bast and hurd fibers (for biocomposites applications for example) or refined fibers for textile purposes.

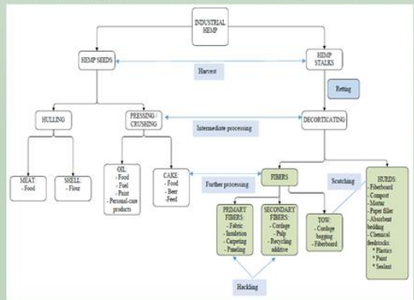

Figure 2. Hemp value chain with main generic purposes (Own elaboration)

4. CONCLUSIONS

Estimates for 2018 indicate a continued increase in the agricultural area devoted to the cultivation of industrial hemp, but the absence of transformation centers to process the fiber in construction products or textiles, together with the low prices of the seed in bulk, and also legal aspects surrounding these products are among the limiting factors of the value chain and therefore make them curretly a risky economic activity. However, the market for hemp products is constantly increasing, especially food products derived from seeds and supplements based on extracts rich in cannabinnoid molecules (especially CBD, cannabidiol).

In this context, it is neccessary to develop an integral regulation based on scientific and social evidence, to compete in the world market for hemp. In addition, Spain and particularly Andalusia has the greatest of all the advantages for this crop: a privileged climate, which allows it to obtain several harvests a year, among other potential factors that could favor the development of hemp value chain (production, industrialisation, distribution and consumption).

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