Knowledge management and innovation: a bibliometric case study as technology transfer about pectin

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Resumen

Los medios de información online hoy en día son muy amplios, y la metodología de búsqueda si no se tiene el conocimiento previo en cualquier área del conocimiento hace que leamos información inútil. Este artículo demuestra la manera de cómo realizar búsquedas basándose en un estudio de caso en pectinas, utilizando Methodiordinatio como transferencia de tecnología. Realizando un análisis bibliométrico basado en palabras claves *"Anthropotechnology, Knowledge management and innovation, technology transfer, pectin*" en tres bases de datos, *Scopus*, *ScienceDirect* y *Web on Science*. La transferencia de conocimiento y fácil comunicación al lector, debe tener la capacidad de desarrollar búsquedas de información no ambigua ni compleja. Por lo que se puede esperar que proporcionen a los investigadores herramientas con ventajas que no se pueda imitar ni competir fácilmente, estimular la investigación, despertando principal interés, con especial referencia en innovación en pectinas. La revisión se refiere a la bibliometría con respecto al estudio de caso de pectinas en el área de ingeniería III y algunas otras áreas importantes de investigación. Se seleccionaron primero 32 % en área de interés; el 40 % de las otras áreas sólo se tomó un 3%. Los países que más investigaciones realizaron fueron la India y Spain, seguido por Brazil, China, Italia, Belgica, Malaysa, France, Turkey e Iran. Las mayores publicaciones fueron en la revista *International Journal of Food Science & Technology*. De las otras áreas el mayor número de artículos publicados en ciencias agrarias, seguido de biotecnología y ciencia de los alimentos. Se utilizaron referenciadores bibliográficos como Zotero, EndNote, y JabRef, ayudando a organizar los artículos de manera simple. Y por último están cubiertas en esta revisión, la situación actual sobre fuentes de extracción de pectinas, tal que en los resultados se encontraron la mayor cantidad de materias primas, los residuos agroalimentarios; mencionando la recuperación, sugerencias de valorización de los cultivos, utilizando nuevas tecnologías, nuevas tendencias, desafíos, incluida la reducción de pérdidas posteriores para mejorar la seguridad alimentaria, así como mantener la sostenibilidad, prácticas agrícolas y un impacto ambiental mínimo.

Descriptores: *Antropotecnología, Gestión del conocimiento e innovación, transferencia de tecnología, pectina*

Abstract

The online information media nowadays are very broad and if the research methodology does not have prior knowledge in any area, the information may be useless. This article demonstrates a way of searching based on a case study in pectins, using Methodiordinatio as technology transfer, by mean of the bibliometric analysis based on keywords "Anthropotechnology, Knowledge management and innovation, technology to transfer, pectin" in data bases, Scopus, ScienceDirect and Web on Science. The transfer of knowledge and easy communication to the reader must have the capacity to develop searches of non neither ambiguous nor complex information, providing to the researches tools with advantages that cannot be imitated or easily competed, stimulate research, arousing major interest, with special reference to pectins in innovation. The revision about the bibliometric with respect to the case study of pectins, in the area of engineering III and some other important areas of investigation. First 32% were selected in area of interest, of the 40% of the other areas only a volume of 3%. The countries with more investigations were India and Spain, followed by Brazil, China, Italy, Belgium, Malaysia, France, Turkey and Iran. The greater amount of publications was in the magazine International Journal of Food Science & Technology. In the other areas the greater number of articles was published in Agrarian Sciences, followed of Biotechnology and Food Science. Bibliographical tools such as Zotero, EndNote, and JabRef were used, helping to organize articles of simple way. Finally, the present situation on sources of pectins extraction, the agro alimentary wastes as raw material, mentioning the recovery, suggestions the valuation, using new technologies, new tendencies, challenges, including the reduction of later losses to improve the food security, as well as to maintain the sustainability practical agricultural and a minimum environmental impact were exposed.

Keywords: *Anthropotechnology, Knowledge management and innovation, technology transfer, pectin*

1. Introduction

The process of knowledge transfer is dynamic and continuous and includes a learning process for assimilation, and a series of activities that lead from the adoption to the acceptance. The communication of knowledge once acquired, can be written or verbal. The scientific community should be aware of the possible barriers to the dissemination of information if it has the intends to promote the transfer of knowledge [1].

In practice, is improves the competence and the quality of the information. It is why the acquired knowledge must be applied so that they are conserved; in such a way that it allows the scientific community to learn, more than the own knowledge.

The center in knowledge has led to a greater attention towards information technology [2 3]. Identify knowledge is based on great advantage, since it can develop, retain and transfer knowledge [4]. In many studies there are positive connections between R & D efforts (research plus development) to generate new ideas and innovation.

The exchange of information throughout the research process provides basic for the accumulation of knowledge production and scientific progress [5]. In this context, the amount of information found on Web pages is numerous, so the number of scientific publications in various Journals has increased considerably in recent years.

Two factors that contribute to this have been observed, firstly, new technologies that provide research with new scientific research, which supports the emergence of new studies; second, the need for specialization and construction of new knowledge, imposed by markets and knowledge society, which lead to the search and dissemination of new knowledge. This he is only one of several different metric possible to be used to offer investigation activity, justifying why the university is considered the best place to precede investigation initiatives and to make knowledge transfer.

The main result of the scientific activities can be found in a series of periodic Journals and the scientific publications play an important role as primary raw material, constructing scientific knowledge to accelerate the processes of the technological innovation. Often the scientists create new scientific tools search of information [6].

In order to detect new dominions of investigation it is to analyze the amount of scientific publication citations [6, 7].
According to de Solla Price (1965) the scientists have tendency to mention more recent articles; and they may be excluding common articles that they deserve inclusion.

In this sense, this article is organized of the following way: revision of literature, research methodology, finally, discussion and conclusion that summarize the results, analyzes its implications of the theory and practice of the case study, and provides possible suggestions for future research. For the case study, the compilation data were carried out using Scopus, ScienceDirect and Web of science databases [8]. The study of selected case was the pectins, for with methodiordinatio [5].

2. Theoretical Background

2.1. Anthropotechnology

The anthropotechnology is developed from diverse studies of technology transfer, from the technical and organizational point of view.

Anthropotechnology is based on a discipline to solve problems, placed by the technology transfer, which establish the diverse theoretical bases of a new knowledge [9].

For a long time, the logic of industrial development used by international development agencies, induced developing countries in an intensive way such as: equipment, machines, factories, scientific knowledge, originating the term transfer of technology.

Through the ages, the human being has sought methods and work processes that reduce effort, to have good results.

The technology can be considered as a powerful force in the sense of being able to extend the mental capacities, with the computer revolution [9, 10].

The transfer of knowledge has been considered a relatively important work as part of knowledge management [11], different types from knowledge require diverse ways of transfer [12], such as: who is the objective receiver, type, nature of the operation of knowledge to transfer in agreement proposed by Dixon cited for [12, 13].

The transfer of technologies [14] is carried out in various types and areas of knowledge and assumes different types of modalities executed by diverse reasons and it extends several academic disciplines and professions [13].

Nowadays, postgraduate programs provide a diverse knowledge transfer; as well as different methodologies for the collection of research data, the use of the keywords in any search tool Webbased search tool, quickly gives credibility, the key to writing an article.

Although there is a professional society dedicated to the TT (Journal of Technology Transfer), where there are scientific articles on TT related to companies, but the studies of research methodologies in databases related to technology transfer are few and none hydrocolloids (pectins); so this article promises to serve as a basis as an organizational framework and / or summarize the data related to pectins and the relationship with anthropotechnology

3. Research methodology

3.1. Sample and data collection

This study uses Methodiordinatio, a methodology that proposes to select and to classify the scientific documents, including the impact factor, the number of citations and the year of publication.

3.2. Study of case

The case study represents a qualitative investigation.

A case analysis is a good departure point in the inductive process of the theory Yin, 1988 quoted by Tseng, 2008, since it allows the researcher to observe and collect information about new and unknown natural phenomena that had never been studied before [15].

The intent of this case study is to gather information from the article using keywords: *Anthropotechnology, Knowledge management and innovation, technology transfer, pectin;* the information can be visualized in the tables and images with the main descriptions in pectin such as:

raw material, extraction method, parameters and yield.

3.3. Selection of the case

The Pectin

This substance is commercially obtained from apple pomace, grapefruit and citrus peel [16]. Most commercial pectin is obtained from lemon peel, lime, passion fruit and apple pomace [2, 14, 17].

In the conventional way, the pectin is extracted in acid solution to temperatures around 80 °C by approx. 1 hour with continuous agitation [18]. In the industry, the pectin is extracted in acid conditions with high temperature [19].

The acid residual waters are a great environmental limitation, for today there are studies about other extraction methods that are respectful with the environment, such as of ultrasound [18, 20, 21], microwaves [18, 22] and subcritical water [20].

The properties and functionality of the pectin depend to a great extent on the structural characteristics of these polysaccharides, determined by the source, as well as treatment and conditions of extraction [23, 24].

This study of case allows to finding articles with different methodologies used for pectin extraction, its yield, raw material of extraction; using the method Methodiordinatio, so that tacit and explicit knowledge takes place guided by the practice in pectins.

In general, the researchers find direct interferences in the time of information searches to write a thesis project or an article, resulting in poorly performed work.

Using this research method, the knowledge produced can serve as a reality to concur to an action, and that the researchers in hydrocolloid subjects (pectins) can compare data; on the other hand, it is based on the methodology developed by [5] “Methodiordinatio”, it is promising since it allows the systematic selection and classification of scientific articles using mathematical formulas. The steps information search steps in the High Impact Journal are shown in the table 1.

Table 1: Phases search and selection of information

Phases	Description
(1)	Determination of key words
(2)	Search in the main data bases: Scopus, CienceDirect, Web of Science
(3)	Filter or bibliometrics in data bases
(4)	Article extraction using three referrers: EndNote (version: X8), Zotero (version:4.0.26) and JabRef (version:2.10)
(5)	Article analysis according to Methodiordinatio
(6)	Decision of article selection

Source: the authors

3.4. Study of case – Articles of extraction of pectin. Table 2, table 3 and table 4, shows collected data, as pectin extraction parameters.

4. Result

Using the Methodiordinatio, in the search of information we found 155 articles and we used 74 papers in all the revision. For the study of case, 34 papers were selected.

According the results, 32 % of all the researched in Journals belong to the area of Engineering III, but only 19 Journals were selected. 40 % of articles belong to the area of Food Science and 3 % were selected single, 4 % belong to Agrarian Sciences and it was selected 2 % equal to Biotechnology; 1 % belongs to Environmental Sciences as showed in Figure 1.

About the Figure 2, in relation to countries, we find 10 countries, distributing 21 % India, 21 % Spain, Brazil with 16 %, the smaller percentage by China and Italy. Belgium, Malaysia, France, Turkey and Iran, with 5 % reach one.

All these researches were published in Journals of high impact is to say A1, A2, B1 and B2 respectively (Figure 3).

Table 2: Summary of results of bibliographical review. Number of Ranking according to Methodiordinatio. Raw material of pectin obtain, method of extraction in specialized Journals from Engineering III (1-20) and group of other areas of research

Ranking number	Fruit	Method of extraction	Conditions	pH	Temperature	Extraction time	Yield (Galacturonic Acid (GalA))
1	Durian rind (*Durio zibethinus*)	Solid-liquid [25] ratio (1: 5-1: 15 g/ml)	SL ratio 1:10 g/ml	2.8	86 °C	43 min	(9.1%± 0.5%)
2	Thorny orange (*Poncirus trifoliata*) sweet orange (*Citrus sinensis*)	Electromagnetic induction	-	1.2	80 ºC	90 min	24% (w/w)
3	Grapefruit peel (*Citrus×paradisi*)	Ultrasound-assisted heating extraction (UAHE) Power intensity 12.56 W/cm^2	Furthermore, UAHE pectin possessed lower viscosity, molecular weight and degree of etherification, but higher degree of branching and purity than CHE pectin		66.71 ºC	27.95 min	27.34%
		Conventional heating extraction (CHE)	-	-	80.1 ºC	73.9 min	11.12%
4	Passion fruit peel (*Passiflora edulis f. flavicarpa*)	Microwave-power (628 W). Tartaric acid emerged as the best extracting agent in terms of yield (18.2%), however, the obtained pectin exhibited low purity and low degree of etherification. The time and microwave-power significantly affects the yield of pectin extraction with both nitric and tartaric acids.		Degree of etherification (64.56% for acetic acid and 64.15% for nitric acid)		9 min	13 and 12.9%
5	Pasion fruit peel (*Passiflora edulis*)	Conventional heating using HPP (High pressure assisted) as pretreatment. Solid/liquid ratio 1:30	300 MPa	-	50 ° C	20 min	At 100 ° C 17 min is obtained 14.34%
6	Orange peel (*Citrus sinensis*)	Microwave assisted extraction. solid–liquid ratio of 1: 16.9 g/ml	Microwave power of 422 W	1.4	-	Irradiation time 169 s	19.24%

7	*Carcia papaya* L. peel (*Papaya carica* L.)	Solid-liquid ratio of 1:15 g/ml. Microwave assisted extraction	Microwave power of 512 w	1.8	-	140 s	25.41%

Ranking number	Fruit	Method of extraction	Conditions	pH	Temperature	Extraction time	Yield (Galacturonic Acid (GalA))
8	Apple Pomace (*Malus domestica*)	Ethanol used in pectin precipitation at pH 1.5 increases the yield of the precipitate		1.5 to 2	80 to 90 ◦C	1 to 3 h	3.4% to 8.9%.
9	'Pera' sweet orange (*Citrus sinensis L. Osbeck.*)	Solution of citric acid (solute/solvent 1:70) ≈ Ration m/v: 1:70 (mass: volume).	650 rpm	2.5	80 ºC	120 min	11.26% (albedo) 8.51% (flavedo) g pectin/g dry)
10	Orange pomace (*Citrus sinensis L.*)	The yield of extraction with citric acid was 17.75% and amid condition of extraction with nitric acid was 10.9 %		2.5 ± 0.5	80 ºC	20 min	17.75% Rdo. Flour
11	Faba bean hulls (*Vicia faba* L.)	Extraction with ethanol, solid to liquid (1:25)	-	1.5	85 ºC	80 min	Rdto. 12.55% 13.79%
12	Durian Rind (*Durio zibethinus*)	-	-	2.0	90 ◦C	4 h	-
13	Lemon peels (*Citrus limón*)	HCl, HNO_3. the best results in terms of yield HCL	-	2.5 – 3.5	70 °C	4h	>20% ($HN0_3$) 26.3 %±1.3(HCL)
14	Flour apple (*Malus domestica*)	Solute/solvent 1:50	68.84% Degree of etherification	2.5	97 ºC	30 min	9.73%
	Apple pomace (*Malus domestica*)	-	-	-	-	-	6.13%
15	Mango (*Mangifera indica*) and ambarella (*Spondias cytherea*) peel	Hydrochloric acid	-	1.5	85 ºC	1 h	15-20%
16	Orange peel	The best result was obtained with ammonium oxalate extraction 0.25 %	-	3.5	75 ºC	90 min	30.12%

17	Apple pomace and citrus peel	Subcritical water	-	-	-	-	21.95% (citrus peel)
		Apple pomace	-	-	-	-	16.68%
18	Material enriched with beet pulp (*Beta vulgaris*)	Ultrasonic-assisted treatment combined with subcritical water	10.70 MPa liquid/solid 44.03	-	120.72 °C	30.49 min	24.63%.
19	Orange juice remainders	Orange juice waste assisted by ohmic heating	Voltaje 15 V/cm	-	90 °C	30 min	14.32g/100gdm

Ranking number	**Fruit**	**Method of extraction**	**Conditions**	**pH**	**Temperature**	**Extraction time**	**Yield (Galacturonic Acid (GalA))**
		Conventional method					13.53g/100 gdm
Others research fields							
1	Pomelo peels (*Citrus grandis*)	Hot-solvent microwave extraction (HSME) smaller time greater yield	520 W	2.0	-	5.6 min	0.05 e 2.93% 3.29 ± 0.15%
2	Soy hulls (*Glycine max*)	Chemical extraction methods (acid extraction)	-	-	-	-	0.84 g Lgalacturonic acid/g dried sample
3	Grapefruit peels (*Citrus × paradisi*)	Extraction with acid	-	1.5	120 ° C	-	(22.55 %
4	Palmyra palm (*Borassus aethiopum Mart*) fruit	HNO_3 1H	-	2.5	30 min	80ºC	825 g/kg[1] 8.25 % (+_ 3.8)
5	Sweet potato residues (*Ipomoea batatas*)	Extraction with acid (HCl) liquid/solid ratio (v/w) 30:1.	-	1.7	93 ° C	2.2 h	5.09% and 70.03% (w/w)
6	Sweet potato *(Ipomoea batatas, Convolvulaceae*) residues	Disodium phosphate Solution, Liquid⁄solid ratio 20:1	-	7.9	66 ° C	3.3 h	10.24%
7	Orange shells valencia (*Citrus sinensis*)			1.5	90 ºC	75 min	-

8	Passion Fruit Peels (*Passiflora edulis f. flavicarpa*)	Conventional method, solid/liquid 1:25	-	2.0	70 ºC	75 min	14.6%
9	Grapefruit peel (Duncan cultivar)	Extraction with acid	-	1.5	120 °C	90 min	22.55%
10	Jackfruit rinds (p/v) (solvent ratio was adjusted to be 1:25 (w/v)	Microwave-assisted extraction (MAE)	450 W	-	-	-	16.72-17.63%
		Extraction with acid	-	-	90 °C	1 h and 10 min	14.59%
11	Saba banana [*Musa 'saba'* (*Musa acuminata* x *Musa balbisiana*)] peel wastes	Hydrochloric acid (0.5 N) HCl	-	1.5	90 ºC	4 h	17.05%
12	Apple juice	Extraction with acid hot (HCl)	-	-	70 ºC	1 h y 30 min	52.6%
13	Quince *(Cydonia oblonga)* Pomace	Extraction with acid (HCl)	-	2.20	80 ºC	3 h	25.2 mg/g
14	Passion Fruit Peels (*Passiflora*	Citric acid	-	2.0	-	75 min	14.60%
Ranking number	**Fruit**	**Method of extraction**	**Conditions**	**pH**	**Temperature**	**Extraction time**	**Yield (Galacturonic Acid (GalA))**
	edulis f. Flavicarpa)						
15	Jackfruit (*Artocarpus heterophyllus*) Waste	Sodium hexametaphosphate/HCl	0.6 g/3N	2.2 ± 0.02	80 ± 5 ° C	15 min	15.14%
16	Sugar beet pulp (*Beta vulgaris*)	Ultrasound-/microwave-assisted acid. Recovery of pectin 636.20 kDa		-	-	-	26.16%
	Uronic acid content	Microwaves. Solid-liquid 1:30	295.95 kDa	-	92 °C	37 min	75.38%
17	Sugar beet pulp (SBP) (*Beta vulgaris*)	Compared with gum Arabic, the highest yield SBPP fraction had better emulsifying activity, but poorer emulsion-stabilizing ability. Using subcritical water combined with ultrasonic treatment 42.5 kDa average molecular weight (AMW) were obtained from SBP when using distilled water with solid/liquid ratio of 1:81				110 °C	29.1%

Source: the authors

Table 3: Number of Ranking (Methodiordinatio), article authors published in the high impact Journals, according to country, number of citations, year of publication and its affiliation to the area of Engineering III (20 articles) and other areas (17)

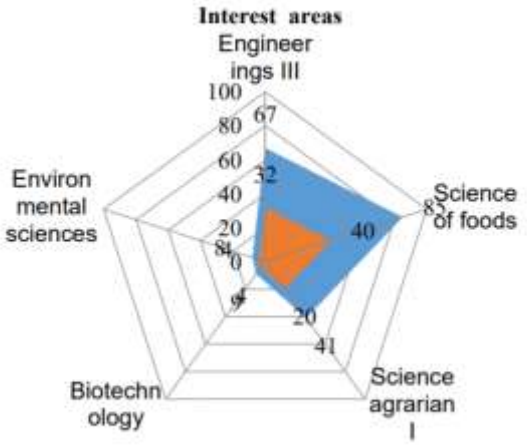
Ranking Number	Methodiordinatio	References	Country	Journal name	Impact factor 2017	Citations	Publication Year	Qualis
1	100.00	[26]	India	International journal biological of macromolecules	3.138	20	2015	A2
2	Book	[27]	-	-	-	-	-	-
3	118.00	[18]	China	Food chemistry	4.052	38	2015	A1
4	115.00	[28]	Brazil	Food hydrocolloids	3.858	49	2014	A1
5	88.00	[29]	Spain	Journal of and Food Agricultural Chemistry	2.857	21	2014	A1
6	133.00	[30]	India	Carbohydrate Polymers	4.219	73	2013	A1
7	101.00	[31]	India	International journal biological of macromolecules	3.138	21	2015	A2
8	90.00	[32]	Belgium	Journal of Food Science	1.649	90	2007	A2
9	83.00	[33]	Brazil	Journal of Food Engineering	0.712	3	2015	A1
10	89.00	[34]	Brazil	Journal of Food Science and Technology	2.203	9	2015	B1
11	85.00	[35]	India	Journal of Food Science and Technology	2.203	5	2014	B1
12	38.00	[36]	Malaysia	Journal of Food Science	1.649	18	2009	A2
Ranking Number	**Methodiordinatio**	**References**	**Country**	**Journal name**	**Impact factor 2017**	**Citations**	**Publication Year**	**Qualis**
13	37.00	[37]	Italy	International Journal of Food Science & Technology	1.384	17	2009	B1
14	146.00	[38]	Brazil	Brazilian Archives of Biology and Technology	0.468	166	2005	B2
15	34.00	[39]	France	International Journal of Food Science & Technology	1.384	14	2009	B1
16	26.00	[25]	Turkey	Carbohydrate polymers	4.219	114	1999	A1

17	153.00	[20]	China	Food hydrocolloids	4.090	83	2014	A1
18	105.00	[40]	China	Food chemistry	4.052	29	2015	A1
19	100.00	[41]	Iran	Chemical engineering and processing	2.154	-	2017	A2
				Other area of research				
1	93.00	[42]	China	LWT.Food Science and Technology	2.416	3	2016	A1
2	88.00	[43]	USA	LWT.Food Science and Technology	2.416	8	2015	A1
3	93.00	[44]	EE.UU	LWT.Food Science and Technology	2.416	3	2016	A1
4	80.00	[45]	EE.UU	LWT.Food Science and Technology	2.416	10	2015	A1
5	65.00	[21]	China	International Journal of Food Science and Technology	1.504	5	2013	C
6	58.00	[46]	China	International Journal of Food Science & Technology	1.504	18	2011	C
7	92.00	[47]	Brazil	Food and Bioprocess Technology	2.571	2	2016	A1
8	95.00	[48]	Malaysia	Agriculture and Agricultural Science Procedia	-	25	2014	C
9	72.00	[14]	Pakistan	Current Nutrition and Food Science	-	2	2014	B1
10	81.00	[49]	Malaysia		-	11	2014	B1
11	85.00	[50]	Malaysia	International Food Research Journal	-	5	2015	B1
12	100.00	[51]	Malaysia	International Food Research Journal	-	-	2017	B1
13	72.00	[52]	Argentina	Food Science and Technology International	1.222	2	2014	B1
14	95.00 76.00	[48]	Malaysia		-	25	2014	C
15		[53]	Bangladesh	Agriculture and Agricultural Science Procedia	-	6	2014	C
16	84.00	[54]	China	International Journal of Food Science and Technology	1.504	4	2015	C
17	81.00	[55]	China	International Journal of Food Science and Technology	1.504	1	2015	C

Source: the authors

Table 4: Number of articles according to impact factor Journals selected

Journal identification (Engineering III)	**Journal Amount**	**Qualis**
International journal of biological macromolecules	2	A2
Food chemistry	2	A1
Food hydrocolloids	2	A1
Journal of Agricultural and Food Chemistry	1	A1
Carbohydrate Polymers	2	A1
Journal of Food Science	2	A2
Journal of Food Engineering	1	A1
Journal of Food Science and Technology	2	B1
International Journal of Food Science & Technology	3	B1
Brazilian Archives of Biology and Technology	1	B2
Chemical engineering and processing	1	A2
Total	19	
Outside Engineering III		
LWT - Food Science and Technology	4	A1
International Journal of Food Science and Technology	4	C
Food and Bioprocess Technology	1	A1
Current Nutrition and Food Science	1	B1
International Food Research Journal	3	B1
Food Science and Technology International	1	B1
Agriculture and Agricultural Science Procedia	3	C
Total	17	



Source: the authors

Figure 1: Amount of revision.

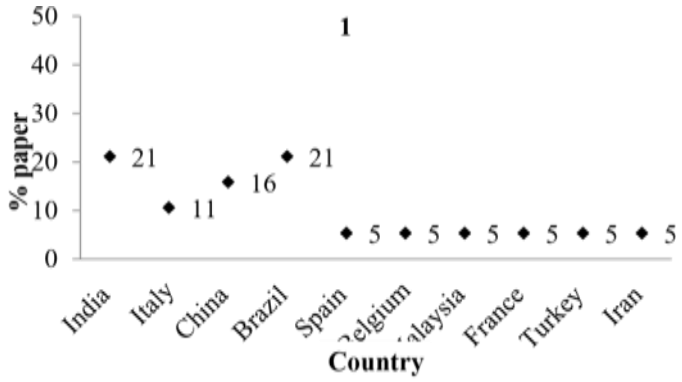


Figure 2: Percentage of Journals found by research country. Source: the authors

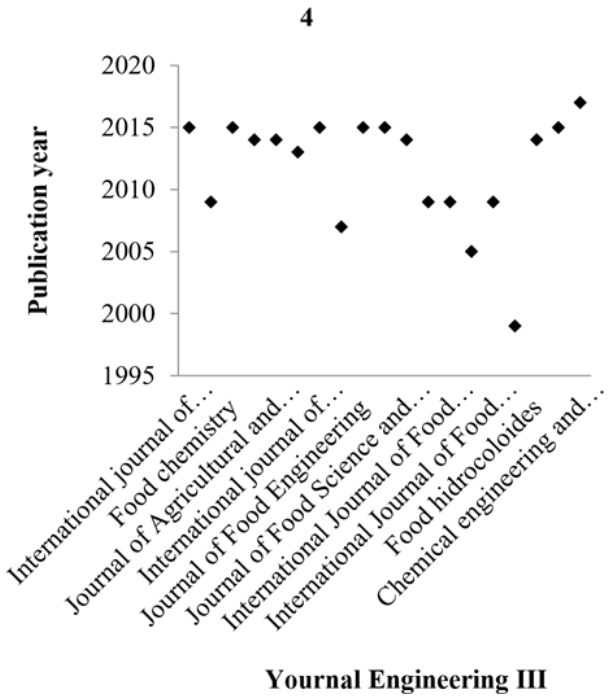


Figure 3: Journals found by year of publication. Source: the authors

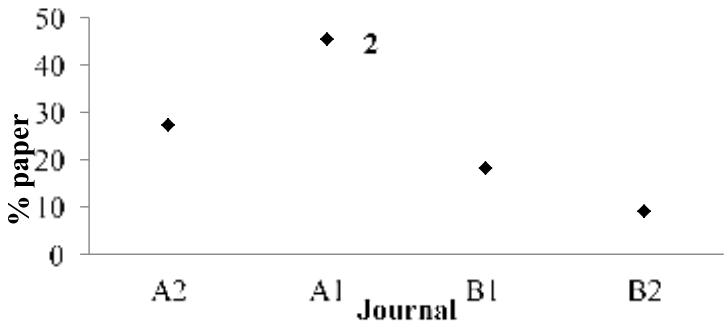


Figure 4: Percentage of Journals by qualis pertaining to Engineering III. Source: the authors

According to Figure 2 and 4, we can deduce that the Journals were included from year 1995 to year 2017. Of them 16 % belong to International Journal of Food Science & Technology. 11 % for each one of the following Journals: International Journal of Biological Macromolecules, Food

chemistry, Food hydrocolloids, Carbohydrate polymers, Journal of food, Journal of Food Science and Technology; in the same way for each one 5 % belong a Journal of agricultural and food chemistry, Journal of food engineering, Brazilian archives of biology and technology and Chemical engineering and processing (Figure 4).

Figure 5: Journals found in other research areas. Source: the authors

Regarding to publications in other areas, 24 % belongs to the Food Science and technology, Journals of high impact A1 y 24 % in the International Journal of Food Science and Technology with impact factor C. The smaller number of found articles was in the Journals such as Agriculture and Agricultural Science Procedia, International Food Research Journal, Food and Bioprocess Technology, Current Nutrition and Food Science, Food Science and Technology International respectively as one is in the Figure (3, 4) and Figure 5.

5. Discussion

The key to the knowledge transfer process is the assimilation of the results and the effects of the application [1] ensures that knowledge can share others that do not have “explicit (objective) and Tacitus (subjective) knowledge” [56].

In this way, knowledge transfer takes place; in addition, it is possible to distinguish by this method, the searches of traditional information, taking place an innovation when using the reference, with technological information software.

This paper demonstrates the search methodology with, case study of hydrocolloids (pectin). Waiting that it could be used as guide for others research as a method to search for information. The “quails” as shown by the results tables are the quality classification and the impact factor of the Magazines; regarding the area of Engineering III in Brazil.

The method “Methodiordinatio” is an extraordinary methodology because it classifies the Journals according to their impact factor, year, number of citations and quails. This method saves time in making decision at the time of choosing the papers. On the other hand, bibliographic references were used, such as Zotero, EndNote, and JabRef, which helps to organize articles in the simplest way. In this case study, diverse theories were found to discuss. During the life cycles of fruit, great coproducts are generated from agricultural processing. For example, in Brazil, 183.5 thousand tons’ metric of solid wastes are generated [57]. In the processing of fruits, a great amount of byproducts, especially seeds and rinds, are discarded in the environment causing organic contamination [24, 58]. An alternative to avoid this problem is to obtain pectin, but we can recognize that seeds have attributed beneficial properties to their possible content in compounds with high added value, especially bioactive isothiocyanates as well as phenolic compounds, that can be used for

application in nutraceutical supplements, dietetic additives. It is possible to find new foods (texturizing additives) and pharmaceutical products in the food industry [58, 59].

In this case study, papaya peel with microwaves extraction for 140 seconds obtained a yield of 25.41 % pectin [31]. In the same way, lemon rinds as a raw material in the extraction yield of HCL of 26.3±1.3 [37].

The classic treatments (grinding, heating) and the different alternative treatments until now used in the industry to proceed easier extractions degrade and alter the structure of the pulp (cellular membranes and walls) uncontrollable, unfortunately, the flesh completely disorganized pulp loses its selectivity and becomes permeable not only for cellular compounds, but also for undesirable compounds (impurities) presents in the extract [58].

Another new promising and effective technology for the pectin extraction is by means of the ultrasound method, using subcritical water have been performance values of yield 26.16% [54, 60]. However, pectins are rich in galacturonic acid [61], FAO and UE stipulate that pectins must consist of at least 65 % galacturonic acid in a dry and ash free of ashes.
Recovery and valuation of the crops, using technologies that include the reduction of losses to improve food security, maintain sustainability in agricultural practice with minimal environmental impact [45].

6. Conclusions

Since it has been described previously, a case study was carried out in the area of hydrocolloids with pectin using key words: “Anthropotechnology, Knowledge management and innovation, technology transfer, pectin. Search was made in the data bases Scopus, CienceDirect y Web of Science, with the methodology “Methodiordinatio”.

Limitations of the investigation

With respect to the amplitude of consultations is it data bases.

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