


Bali, Indonesia, Aug. 26-29, 2013

**Comparative Advantages and
Competitiveness of
Chinese Rabbit Sector**

**Laping Wu, Ronghua Ju
Longxian Liu**

**China Agricultural University
Email: wulp@cau.edu.cn**



国家兔产业技术体系
NATIONAL RABBIT INDUSTRY TECHNOLOGY SYSTEM

Laping WU
during his presentation



Comparative Advantages and Competitiveness of Chinese Rabbit Sector

Laping Wu¹, Ronghua Ju¹, Longxian Liu²

¹*College of Economics and Management, China Agricultural University, Qinghua, East Road, Haidian District, Beijing, 100083, PR China*

²*Library, China Agricultural University, Qinghua, East Road, Haidian District, Beijing, 100083, PR China*
Corresponding email: wulp@cau.edu.cn

ABSTRACT

Since the 1990s, Chinese rabbit industry has been experiencing a fast growth. Due to saving land and feed grain, less investment and easy to manage, rabbit farms have attracted more and more farmers, in consequence, the rabbit industry keeps high in growth rate. From 2001 to 2010, Chinese rabbit meat production surged from 406 thousand tons to 690 thousand tons, the growth rate reaches 70%, while pork production increased only by 25%, beef by 28% and poultry by 37%. Based on the theory of comparative advantages and competitiveness, by cost-benefit analysis and the market share analysis, this paper analyzed the rabbit industrial competitiveness in both domestic and international markets. Theoretically, the rabbit industrial competitiveness includes potential competitiveness and revealed competitiveness. The potential competitiveness, also referring to the comparative advantages, mainly comes from the superiorities of rabbit meat, rabbit fur and rabbit skin, resource endowment and technological progress. Revealed competitiveness refers to performance in markets. It shows that there is a relatively large increase in rabbit meat production. The production growth is mainly driven by demand, and the increased demand is mainly caused by preference change due to the food safety problems of other meats. It shows that the profit margin of rabbit-raising is higher than others except for pig, however, if taking government subsidy into account, it would be higher than pig-raising. From the international perspective, this paper used data from UN-Comtrade database to study market share of Chinese rabbit meat. It shows that Chinese rabbit industries possess stronger competitiveness. The prices of live rabbit and rabbit meat in China are the lowest among major rabbit producing countries, thus China has significant price advantage in rabbit industry. In conclusion, rabbit meat has incomparable nutritional advantages when compared with other animal products (pork, beef and poultry). As to rabbit technology and productivity, China has been achieving great progress. From perspective of international competitiveness, Chinese rabbit stock accounted for more than 30% of the world total. In recent years, the slaughter rabbit and rabbit meat output both accounted for more than 40% of world total, with meat output reached 45%. Compared with the developed EU countries, Chinese rabbit industry is still in its early stage, it still faces certain challenges, including the increasing cost of feed and labor, slow advances in technology and less developed processing and marketing ability of rabbit processing countries and traders. Finally, some policy suggestions are provided to improve rabbit industry development.

Key Words: Comparative Advantage, Competitiveness, Rabbit Sector, China

INTRODUCTION

Industrial competitiveness is an important driver of industrial development. The industrial competitiveness is not only affected by technology and investment from the production perspective, but also by the market demands. Under the background of the market orientation and internationalization, market demand plays more and more important role. This paper will analyze the Chinese rabbit sector from both the domestic and international perspectives.

THE DOMESTIC COMPETITIVENESS OF RABBIT SECTOR IN CHINA

China has a long history of rabbit raising, the earliest record can be dated back to pre-Qin dynasty, more than 2000 years ago. Since 1990s, Chinese rabbit sector has entered a rapid development stage. Recently, rabbit farming has been paid more and more attention because of the characteristics of land saving, grain saving, less investment and easier to manage. Meanwhile the rabbit products are becoming more and more popular because they can satisfy the increasingly diversified

consumer demand by providing fur-skin and healthy meat. Thus, it faces a promising future for rabbit sector in China (Laping Wu et al. 2012).

Potential competitiveness of rabbit sector

The advantages of rabbit products

Rabbit meat is highly nutritious, which is characterized by high protein, low fat, low cholesterol, easy to digest. Therefore, consumers praise rabbit meat as the meat of health, the meat of longevity. The annual per capita consumption of rabbit meat is about 3-5 kg in developed countries such as France, Italy, Spain, while the annual per capita consumption of rabbit meat in China is less than 1/10 of above countries. It can be found that there is huge space for rabbit sector; The rabbit can be prepared to make fur and leather, especially the Rex rabbit fur is short, fine, dense, flat, aesthetic and firm, its fur length is only about 1.6 cm. With bare bristle, neat hair, more than 20 kinds of color type, pure and shiny color, the tanned fur is soft and elastic. The fur clothing, hats, vests, shawls, gloves and other clothing have huge market. The rabbit fur is a kind of up-market raw textile material, which is white, light, soft, warm, aesthetic, and thus are favored by more and more people both at home and abroad. The insulation properties of rabbit fur are 31.7% higher than wool, 90.5% higher than that of cotton.

Because of the advantages which rabbit products have, the rabbit sector is drawing more and more attention. Currently, the rabbit

sector has become an important part of China's livestock industry.

Fast increase in rabbit productivity

From the view of farms, the production performance of the rabbit has developed fast. The slaughter age of China's commercial rabbit shortened from 90-100 days to 80-90 days; at the same time, slaughter rate improved from 48% to 51%, close to the level of developed countries in Western Europe; The rabbit wool productivity increased from 600 grams per head to 900 grams per head, the high-yield group produced more than 1500 g, the superior leather proportion of rabbit has also improved from less than 20% to 40%.

According to field research in 401 rabbit farms, each female rabbit gave birth to 32 rabbits. Although this number is less than that in developed countries, it has been greatly improved compared to the past. From the national point of view, the rabbit production level can be reflected by slaughter rate and meat yield rate. Figure 1 shows that the slaughter rate has been increasing year by year from 1985, rising from 0.714 in 1985 to 2.161 in 2010 and reached 2.325 in 2011. As can be seen, meat yield rate of rabbit has also been rising since 1985. Over past decade, due to diversification of rabbit farming and the increasing number of Rex rabbit, Angora rabbit and pet rabbit farming, the proportion of meat rabbit (mainly produce meat) is becoming smaller, and the growth of meat yield is becoming slow. Rabbit meat yield is about 1.505 kg meats in 2011, compared to 0.948 kg in 1985.

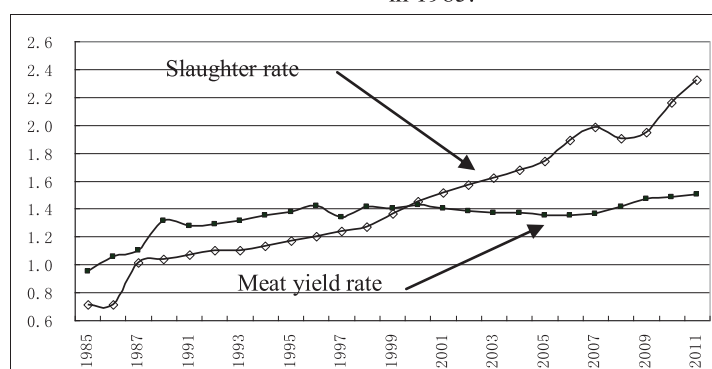


Figure 1. The rabbit slaughter rate and meat yield rate

Source: Calculated based on China Animal Husbandry Yearbook, Chinese Agricultural press

Revealed competitiveness of rabbit sector

Fast growth of rabbit meat output in China

Pork has been the dominated meat over the past several decades. The consumption of rabbit meat appears to be negligible when compared with pork. Rabbit meat output only accounts for 1% in the entire meat output in 2011. But the growth rate of rabbit meat is much higher than others, the output of rabbit meat surged from 406 thousand tons in 2001 to 731 thousand tons in 2011 (Table 1), with a growth rate of 80%, while the growth rate of pork, beef, mutton and poultry are respectively 24.7, 27.3, 44.6 and 41.2%. It's believable that the production and consumption of rabbit meat will continue to maintain fast growth due to the health awareness of consumer and market diversification.

High return of rabbit production

Comparing the cost of rabbit and other animal production (Table 2), it can be seen that the cost of rabbit is 2.24 \$/kg, which is almost the same as hog (2.10\$/kg), but lower than cattle (2.38\$/kg) and sheep (3.15\$/kg), only higher than broiler (1.65\$/kg).

Profit-cost ratio is a key indicator to measure production effect. The Profit-cost ratio

of rabbit in 2013 is 30.11%, which is only lower than 32.22% of hog, but higher than 28.57% of cattle, 22.12% of sheep and 12.54% of broiler. If taking the subsidies to hog production into consideration, the profit-cost ratio of rabbit should be the highest, which indicates that rabbit sector is the most attractive for farmers.

But so far, its potential advantages haven't become the real competitiveness. Rabbit meat production accounted for only about 1% of total meat output in 2011. The major reason is the constraint of processing and marketing, this need to do further research.

International competitiveness of Chinese rabbit sector

Rabbit meat production in China kept rising quickly in past two decades, which makes China a major rabbit producer in the world. The average annual rabbit meat output in China is 56,500 tons from 1978 to 1985, which maintains the stable share of 6-7% in the world market. In recent years, rabbit production in China ranked the first in the world, accounting for 45% of world total production. In addition, along with the increasing demand for processed products from rabbit, the trade on rabbit fur is also becoming increasingly active.

Table1. Meat output and growth rate from 2001 to 2011 (×100 tons)

Year	Pork	Beef	Mutton	Poultry	Rabbit meat
2001	4051.7	508.6	271.8	1210	40.6
2002	4123.1	521.9	283.5	1250	42.3
2003	4238.6	542.5	308.7	1312	43.8
2004	4341.0	560.4	332.9	1351	46.7
2005	4555.3	568.1	350.1	1464	51.1
2006	4650.5	576.7	363.8	1507	54.5
2007	4287.8	613.4	382.6	1448	60.2
2008	4620.5	613.2	380.3	1534	58.8
2009	4890.8	635.5	389.4	1595	63.6
2010	5071.2	653.1	398.9	1656	69.0
2011	5053.1	647.5	393.1	1709	73.1
Growth rate	24.7%	27.3%	44.6%	41.2%	80.0%

Source: China Rural Statistical Yearbook (various years), China Statistics Press

Table 2. Cost-benefit analysis of animal products in 2011 Kg, USD, %

Item	Rabbit (100 heads)	Hog (head)	Cattle (head)	Sheep (head)	Broiler (100 heads)
Product output (kg)	225.0	112.6	400.7	41.7	225.2
Total output value	656.4	312.5	1226.0	160.4	418.1
Main product value	647.5	310.2	1217.4	156.1	413.7
By-product value	8.9	2.3	8.6	4.4	4.4
Total cost (USD)	504.5	236.3	953.5	131.4	371.5
Material and services	438.0	218.8	863.4	93.6	346.8
Labor cost	57.5	17.1	89.9	37.8	23.8
Land cost	8.9	0.4	0.2	0.0	0.9
Profit (USD)	151.9	76.2	272.5	29.1	46.6
Average cost (USD)	2.24	2.10	2.38	3.15	1.65
Profit-cost ratio (%)	30.11	32.22	28.57	22.12	12.54

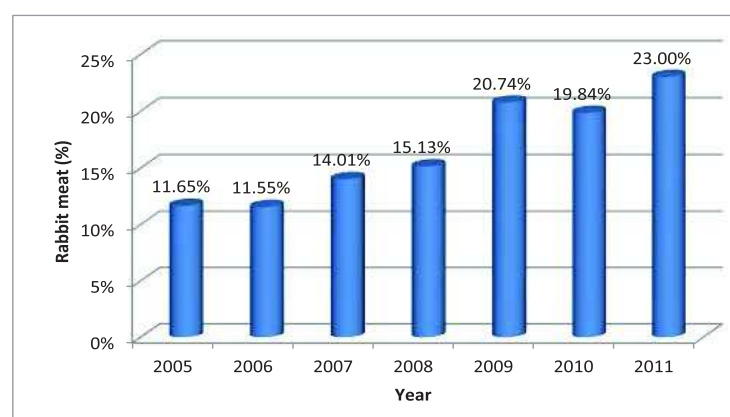
Source: Rabbit data from the estimation of survey data and also from National Agricultural Costs and Returns Series 2012

International competitiveness of rabbit products in China

There are different ways to calculate international competitiveness; the simplest and most intuitive one is market share (Lloyd & Toguchi 1996). International market share refers to the proportion of export value of one good of a country to the world total export of that good (Jensen et al. 1995; Klasra & Fidan 2004).

As can be seen from Figure 2, international market share of rabbit meat of China are all higher than 10%. It climbed from 11.65% in 2005 to 23.74% in 2011. The international

market share of rabbit meat of China has risen from top 3 in 2006 to top one. Although there was a slight decline in 2010, it does not affect the position of the biggest rabbit products exporter. As the largest rabbit meat exporting country, France ever ranked at the top one with the market share of 18.85% in 2008 and had been declining since then, but still maintain the second position. The market share of Hungary had gone through a V-shaped period, gradually declined from 2006 to the trough in 2008, only ranked the fifth in the market with the share of 13.6%, then caught up and now at the fourth place.

**Figure 2.** International market share of rabbit meat in China

Source: Uncomtrade (<http://wits.worldbank.org/wits/>)

Factors affecting the international competitiveness

Based on Michael Porter's Diamond Theory, the international industrial competitiveness of a country is mainly determined by four factors: First, production factor conditions, including both endowed factors (human resources, natural resources, capital and others) and developed factors by R&D investment; Second, related and supporting industries such as upstream rabbit breeding, feed mill and downstream processing etc.; Third, corporate strategy, structure and rivalry, such as marketing strategy, brand marketing etc. Fourth, demand situations, such as domestic demand. In addition, the role of government as well as opportunities also has significant influence (Michael 1990). Next part will mainly focus on production cost and demand to do detailed analysis.

Comparison between domestic and international cost

Firstly, feed cost. Based on the survey by us in 493 rabbit farms from 12 provinces in 2011, feed, labor, depreciation of fixed assets and death losses are major four parts of rabbit production costs, which respectively accounted for 69, 13.5, 5.1 and 4.9% respectively. The others only accounted for 7.4%. The biggest one is feed cost, which is close to 70% of total. It is obvious that feed cost will affect costs and benefits directly and significantly in different places. Limited to data, we use corn to represent for feed and average wage to

represent labor cost to compare domestic and international production.

For corn cost, producer prices are collected from FAO database. As can be shown from Table 3, corn prices in each countries show fast growth from 2001 to 2010. Among them, United States and Argentina maintained low corn prices because they are major corn producing countries. However, China's corn prices has been higher than other countries, especially in 2006 it peaked at 252.1 U.S. dollars per ton, nearly twice higher than 93.3 U.S. dollars per ton in Argentina.

Thus, feed cost in China is lack of competitiveness, and China face big pressure on rabbit feed cost when compared to the main producing countries such as France, but with the gradual opening up of markets for agricultural products in China, the difference of corn price is shrinking gradually. Meanwhile, for many medium and small scale rabbit farms they often make full use of byproducts of agricultural production so as to save the use of feed grain, this can also save cost.

Secondly, Labor cost. Compared with other major countries, the labour cost in China is the lowest for many years (Table 4). However, due to the industrialization and urbanization, more and more rural labor migrate to urban area and find job in cities, this gradually raise the opportunity cost of rural labors. Rapid growth of labour intensive product export in past 10 years also greatly raised labour cost in China. Therefore, the gap between China and major countries are gradually narrowing, as shown in Figure 3.

Table 3. Corn price in major rabbit producer countries around world (USD/t)

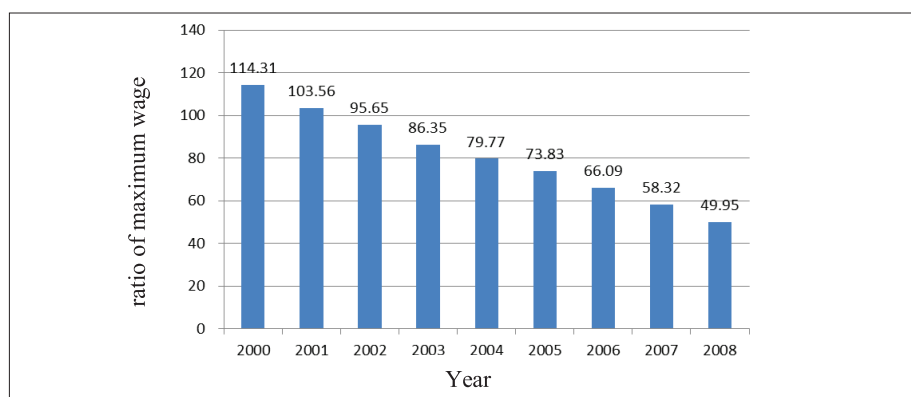
Country	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
China	155.9	146.2	213.8	189.7	189.2	252.1	193.4	218.3	243.0	273.3
France	94.7	93.5	149.0	116.2	128.6	164.9	256.7	180.6	175.4	251.7
Spain	122.1	128.9	167.0	182.8	168.2	190.7	280.3	266.6	200.3	240.5
Germany	103.7	101.6	141.1	170.3	119.6	164.5	260.4	193.4	154.2	227.6
Italy	124.5	120.8	152.9	179.5	156.6	168.4	262.8	273.8	182.4	220.9
USA	78.0	91.0	95.0	81.0	79.0	120.0	165.0	160.0	140.0	213.0
Hungary	68.5	82.7	133.8	116.1	108.8	124.7	249.5	174.0	145.4	181.4
Argentina	84.0	78.3	79.6	81.1	70.3	93.3	118.6	137.8	113.7	135.1

Source: FAO (<http://faostat.fao.org/>)

Table 4. Wage in major rabbit producing countries around the world Unit: USD/hour

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008
Argentina	0.98	0.99	1.02	1.16	1.44	1.74	2.22	-	-
Belgium	17.88	18.64	19.13	19.86	20.74	21.41	21.81	22.16	-
Canada	18.29	18.39	18.62	19.39	20.02	20.56	20.53	21.61	21.98
China	0.16	0.18	0.20	0.23	0.26	0.29	0.33	0.38	0.44
Czech	0.96	-	1.09	1.15	1.24	1.30	1.38	-	-
France	2.74	2.79	2.90	-	-	-	-	-	-
Hungary	0.56	0.64	0.72	0.79	0.86	0.93	0.99	1.08	1.16
Italy	15.08	11.89	12.33	12.40	12.90	13.60	13.70	14.87	14.54
Russian	-	-	-	-	-	0.40	0.48	0.61	0.76
Spain	13.39	13.95	14.63	15.34	16.01	16.54	17.21	17.81	18.74
USA	14.32	14.76	15.29	15.74	16.14	16.56	16.81	17.26	17.74

Source: International Labor Organization

**Figure 3.** The ratio of maximum wage in major producer countries to that in China

Source: International Labor Organization

Price comparison

The cost difference will be eventually reflected in the price. In this part, we will analyze the prices of live rabbit and rabbit meat in domestic and international markets.

Firstly, live-rabbit price is a direct and important indicator to reflect the international competitiveness. This paper compares consumer prices from FAO database (Table 5) among major countries, it shows that live rabbit price from major rabbit producing countries such as China, France, Italy, Hungary has been increasing steadily from 2000 to 2010, except in 2009.

From the horizontal comparison among major countries, the prices of live rabbits in

China have been the lowest, only one-fifth of that in France, with significant advantage in price. Live rabbit prices in France from 2000 to 2010 are higher than all other countries, which is mainly due to the slowdown in rabbit production.

Secondly, rabbit meat price. Table 5 shows that rabbit meat prices in China have been lower than other countries from 1991 to 2010. In comparison, rabbit meat prices of Argentina in 2000 and 2001 are the maximum among major countries, while France took the top one place from 2002 to 2006, followed by Germany replacing French. Therefore, in the process of competing with major rabbit meat exporting countries, China has significant advantage in prices.

Table 5. Live rabbit and rabbit meat price in major producing countries Unit: USD/t

Country	1991	1995	2000	2001	2005	2006	2007	2008	2009	2010
Live rabbit price										
China	415	389	460	441	538	577	715	354	363	960
France	3068	2918	2135	2261	2905	2959	3096	3408	3231	3064
Hungary	1404	1353	1005	1178	1535	1464	1678	2001	1828	1838
Italy	3013	2128	1680	1752	2637	2857	2906	-	-	-
Spain	1902	1330	1033	1157	1429	2188	1995	2597	2451	2249
Rabbit meat price										
China	747	943	1060	962	991	1062	1226	924	952	1270
France	4091	3891	2846	3015	3873	3946	4128	4543	4265	4032
Hungary	2527	2435	1809	2121	2790	2663	2796	3335	3046	3063
Italy	4018	2837	1927	1915	2434	2496	3875	-	-	-
Spain	2881	2016	1566	1754	2165	2188	1995	2597	2451	2249

Source: FAO (<http://faostat.fao.org/>)

Market demand

Even though the demand for rabbit products in China is continuously increasing with the development of economy and increase in income, it is still relatively small when compared with other animal products. The demand is constrained by consumer's habits, limited rabbit sales channel and lacking of cooking skills. Consumers in Sichuan, Chongqing consume more rabbit meat, while in most other regions consumers do not have the habit.

As regard for marketing, the modern circulation, marketing strategy, network marketing and chain operations all are not developed. For example, there are significant differences between rabbit meat and other meat in marketing. During field research, we found that in the same wholesale market, the broiler can be split into dozens of varieties because of the mature market system, while rabbit meat is still mainly sold in the form of whole rabbit.

Related industries and corporate development are also lagged, the major reason is the small scale of production. Now rabbit production mode in China includes: (1) backyard small farming (yearly slaughtered rabbits below 10000). It is the major style of rabbit production, which can make full use of by production of agricultural production so as to keep low feed cost, but this extensive production also cause many disease so as to

increase lose cost; (2) large and medium-scale farming (known as intensive farming, standardized farming, *etc.* yearly slaughtered rabbits above 10000 and below 100000), and (3) modern factory farming (yearly slaughtered rabbits above 100000). The first two styles account for major part in rabbit production, at least 70%.

The lagged slaughtering and processing technology of rabbit products is another constraint for industry development. Rabbit slaughter and processing in China is still the traditional manual ways by small slaughtering and processing enterprises, which cause low productivity and poor quality. For processing, it is mainly dominated by whole cut, frozen, cold meat, less deep processing, such as small bags sauce, stewed, smoked, cured, dried, cooked food packaging products. As for the tanning technology it also lags behind, which decline the competitiveness. Compare rabbit fur to other wool fabrics, it is light, soft, warm, aesthetic and hygroscopic, but its pilling, lint and shrinkage are worldwide problems, which limited the expansion of markets.

In general, the shorter the industrial chain is, the more difficult to generate value-added. At present, rabbit meat trade in China is mainly primary products such as live rabbit. What is more, exported rabbit meat had only been simply slaughtered and processed. Primary products market is not conducive to long-distance transport, neither conducive to

expansion of market. The rabbit sector is low value-added, especially the comprehensive utilization of rabbit (especially rabbit blood, internal organs, etc.) have not yet been solved. Hog, cattle, poultry processing technology has been developed, especially for poultry, while the emerging rabbit meat processing still need to be developed. This has caused low quality of rabbit meat, which in turn affects the development of rabbit sector.

CONCLUSIONS

Overall, compared with European countries, the rabbit sector in China is still in its early stages of development, but this also shows that the rabbit sector in China has huge potential.

For advantages of rabbit products, rabbit meat has incomparable nutritional advantages when compared with other meat products (pork, beef and sheep horse). From the perspective of rabbit technology and productivity, China has been achieving great progress. Therefore, among the domestic livestock industries, the rabbit sector has bright development prospects.

As to international competitiveness, rabbit stock in China accounted for more than 30% of world total in recent years, the rabbit slaughtered and meat output both account for more than 40% of world total, with meat output reached 45%. The exported rabbit meat from China accounted for more than 20% of world total export. The total trade of rabbit meat around the world is 43.0 thousand tons in 2011; the top five are respectively China, France, Belgium, Spain and Hungary, which accounted for 72.16% together, while China accounted for 23%.

Of course, there are certain challenges ahead of the rabbit sector of China, including rising resource costs, upgrading of the breeding patterns, technical progress, the less developed processing and marketing. All these require policy support from both central and local governments.

In 2013, China and Russia signed a memorandum of cooperation in rabbit sector. China gradually opened its door to the international market. It can be believed that the advantages of rabbit sector of China will be strengthened and rabbit sector will become highly competitive industry both at the quantity and quality sides since it has attracted more attention both from governments and consumers.

REFERENCES

- Jensen HH, Voigt SW, Hayes DJ. 1995. Measuring international competitiveness in the pork sector. *Agribusiness* (New York). 11:169-177.
- Klasra MA, Fidan H. 2004. Competitiveness and the trade of livestock products: a comparative study between Turkey and its neighbouring countries. *J Applied Sci.* 4:663-668.
- Wu LP, Gu R, Li XF. 2012. The International Competitiveness of China's Rabbit Sector. Paper presented at the 10th World Rabbit Congress. Held in Sharm El-Sheikh, Septembere 3-6, 2012. Sharm El-Sheikh (Egypt): World Rabbit Congress.
- Lloyd PJ, Toguchi H. 1996. East Asian export competitiveness: new measures and policy implications. *Asian Pacific Lit.* 10:1-15.
- Michael EP. 1990. Competitive Advantage of Nations. *Harvard Bus Rev.* March-April 73-91.