

# VC® Vitamins China E-News

VOL.4 Issue 1, January,25, 2017





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## Headline

The State Council issued the 13th Five-year Plan for Energy Conservation and Emission Reduction on 5 Jan., 2017, which sets demanding goals for pollution reduction in 2016-2020. This may place increasingly heavy pressure on vitamin producers, and even lead to closedown of small-sized enterprises.

The year 2016 witnessed surged VA price in China, especially in Q1 and Q2. Despite the figures went down slightly in Q3-4, the overall price still stayed much higher over 2015.

In 2016, upward livestock farming industry boosted the production and sales of feed in China, and, further, prices of vitamins. Thanks to this, many vitamin manufacturers predicted significant growth in full-year performance.

Brother Enterprises was ordered to halt production at its northern factory for safety rectifications to be made. A chrome tanning agent plant was involved in this suspension. Given that chrome tanning agent is co-produced with VK3, the company's VK3 production is likely to be influenced as well.

Zhejiang NHU, a leading domestic producer of VA and VE, may realise great financial growth in full-year 2016, thanks to surged VA and VE prices. The year 2016 saw thriving trends domestic VE and VA markets, affected by the reduced production, increased demand at home and abroad and tight supply of raw materials.

Guangji Pharmaceutical, whose leading products are VB2 and VB6, predicted significant increases in 2016 performance. Surged prices of VB2 and VB6 as well as reduced production costs were the two main reasons for its great financial growth.

Zhejiang Medicine predicted its net profit to surge in 2016, thanks to the significantly increased VE price. The year 2016 saw a continual upward trend in the domestic VE market, affected by the reduced supply and increased demand from feed industry.

In Nov. 2016, China's export volume of VB2 almost stood still, while the export price rose markedly, since leading domestic manufacturers raised their quotations and further, pushed up the overall market price. Given the high concentration of VB2 production, leading producers tend to enjoy strong voice in pricing.

In Nov. 2016, China's export volume of VB5 fell slightly over the same period in 2015, while the corresponding export price rose markedly. Affected by stringent environmental regulations, domestic VB5 producers had to cut or suspend production. As a consequence, the overall supply was tightened, boosting the domestic market price and further, the export price.

China's nicotinamide price kept going up for four consecutive months after its rebound in Sept. 2016. This was mainly because supply of 3-cyanopyridine got tightened after China's ban on paraquat AS from 1 July, 2016 onwards. Yet, as increasing new players march into this business, the domestic nicotinamide price may fall in the future.







## Editor's Note

The year 2016 saw significant price hikes of vitamins, especially VA and VE.

Increasingly stringent environmental regulation was a main factor behind the rises. A series of environmental policies were introduced in the year, such as the *Sword-edged Action Plan for Pollution Treatment* and the *Amendments of Water Pollution Prevention and Control Law of the People's Republic of China (draft)*. This significantly restrained production of vitamins. North China Pharmaceutical and CSPC Pharmaceutical were even ordered to suspend production for some time (both have resumed production already). In this context, supply of vitamins in the Chinese market got tightened.

Increased demand from feed industry was another reason. Around 70% of vitamins are used as feed additives in China. In Jan.-Nov. 2016, the output of feed grew by 3.90% YoY, boosting demand for vitamins and, in turn, their prices.

In 2017, national environmental regulations may remain strict. Given this, vitamin producers will have to increase investment in pollution treatment. Meanwhile, supply of vitamins may keep tight. All these factors may support vitamin prices to keep stably high over the coming period.

The USD/RMB exchange rate in this newsletter is USD1.00=RMB6.9498 on 3 Jan., 2017, sourced from the People's Bank of China. All the prices mentioned in this newsletter will include the VAT, unless otherwise specified.



## Governmental Direction

### 13th Five-year Plan for Energy Conservation and Emission Reduction issued

Summary: The State Council issued the *13<sup>th</sup> Five-year Plan for Energy Conservation and Emission Reduction* on 5 Jan., 2017, which sets demanding goals for pollution reduction in 2016-2020. This may place increasingly heavy pressure on vitamin producers, and even lead to closedown of small-sized enterprises.

On 5 Jan., 2017, the State Council issued the *13<sup>th</sup> Five-year Plan for Energy Conservation and Emission Reduction (2016-2020)*, in which it programs goals and key tasks in energy saving and emission reduction during the 13<sup>th</sup> Five-year Plan period.

By 2020, it is expected that:

- **National energy intensity:** down 15% over 2015
- **Total energy consumption:** ≤5 billion tonnes of coal equivalence
- **Emission of chemical oxygen demand (COD):** ≤20.01 million tonnes, down 10% over 2015
- **Emission of ammonia nitrogen (NH<sub>3</sub>-N):** ≤2.07 million tonnes, down 10% over 2015
- **Emission of sulfur dioxide (SO<sub>2</sub>):** ≤15.80 million tonnes, down 15% over 2015
- **Emission of nitric oxides:** ≤15.74 million tonnes, down 15% over 2015
- **Emission of volatile organic compounds (VOCs):** down 10%+ over 2015

The above targets, put forward based on the over-fulfilled 12<sup>th</sup> Five-year Plan (2010-2015) for energy saving and emission reduction, are quite demanding, especially the one for nitric oxides. Previous efforts to control nitric oxides did not work well and improvements have yet to be made, particularly when the whole nation has been choked by increasingly heavy smog recently.

The *13<sup>th</sup> Five-year Plan for Energy Conservation and Emission Reduction* places its emphasis on reducing discharge of main pollutants.

#### - To strengthen control in main rivers and heavily polluting industries

Discharge of main pollutants, such as VOCs and waste water in particular, should be further controlled in heavily polluting industries and main rivers. For instance, enterprises involved in petroleum processing, chemical material manufacturing, pharmaceuticals, chemical fibres manufacturing, non-ferrous metal metallurgy and textile & dyeing should reduce total discharge of industrial waste water, especially the ones situated near the Changjiang River, Yellow Reiver, Pearl River, Songhua River, Huaihe River, Haihe River and Liao River.

Environmental rectification with time limits will be set for some heavily polluting industries, such as chemical, pharmaceutical manufacturing (especially active pharmaceutical ingredients [APIs]), steel, cement, papermaking, non-ferrous metal metallurgy, dyeing and agricultural food processing. Existing urban enterprises engaged in the afore-mentioned businesses will be ordered to relocate or even closed down.

#### - To further reduce industrial pollution



The state will formulate and carry out emission standards for industrial sources of pollution, especially for pesticide, pharmaceutical, automobile, furniture, printing and container manufacturing industries. Producers will be encouraged to follow and meet the emission standards. That aside, VOC comprehensive treatment will be promoted in industries including petrochemicals, chemicals and printing, coating.

Obviously, vitamin industry (categorised into API / pharmaceutical manufacturing) is a key target in the pollution reduction plan in 2016-2020. In other words, domestic vitamin producers will have to increase their investments in pollution treatment and thus face raised production costs. Yet, this may push the enterprises to make business transformation and improve added value of their products.

Meanwhile, the rectification of urban polluting enterprises may force small-sized vitamin producers to withdraw from the market and large-scale ones to relocate, possibly posing impacts on domestic vitamin production and further, the market supply.

## Market Dynamics

### China's VA price runs high in 2016

Summary: The year 2016 witnessed surged VA price in China, especially in Q1 and Q2. Despite the figures went down slightly in Q3-4, the overall price still stayed much higher over 2015.

China's price of vitamin A (VA) ran high throughout 2016. The price hike started in late Jan. when Zhejiang NHU Co., Ltd. (Zhejiang NHU) raised its quoted price for 500,000 IU/g feed grade VA from ≤USD14.39/kg (RMB100/kg) to USD25.90/kg (RMB180/kg), up 80.00%.

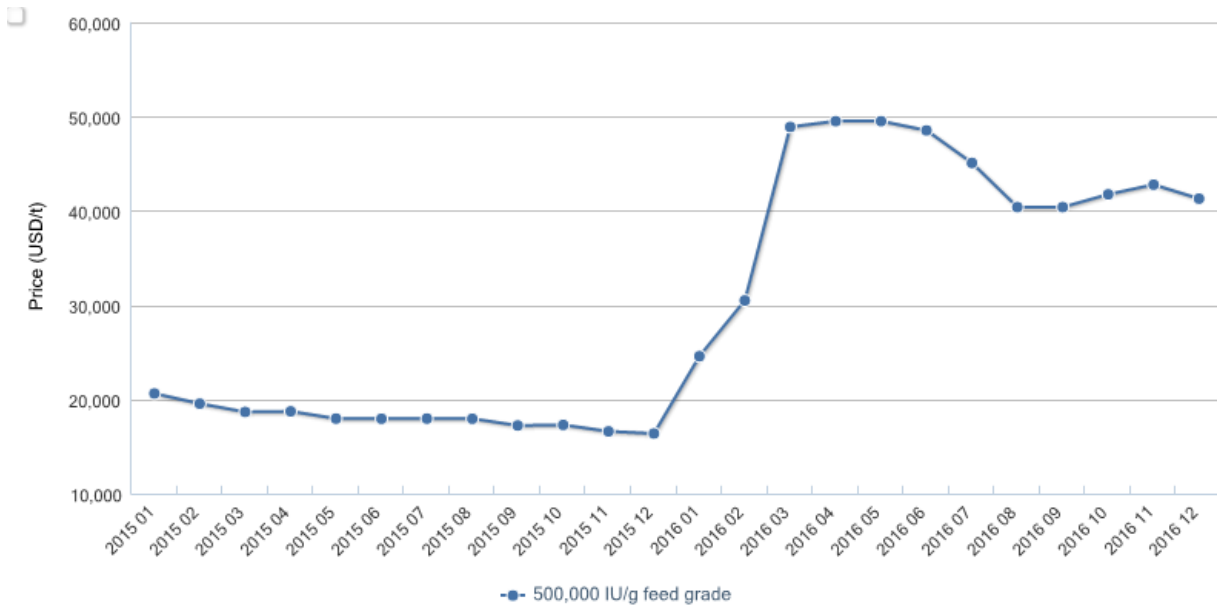
Boosted by this, the market price of VA almost doubled in Q1. According to CCM's price monitoring, the market price of 500,000 IU/g feed grade VA reached USD48,941/t in March, up 98.92% over USD24,603/t in Jan.

Such a price hike between Jan. and March could be ascribed the tight supply and increased demand. Since Dec. 2015, DSM, a global leading VA producer (30% of the global production capacity), suspended production at its Switzerland-based VA plant for maintenance (which lasted for three months). This significantly decreased the supply overseas and foreign purchasers turned to the Chinese market. Then in Jan. 2016, domestic demand also increased as purchasers needed to stockpile in preparation for coming the Chinese Spring Festival (Feb.). Zhejiang NHU, a leading VA producer (5,000 t/a) and exporter (60%+ of the exports from China), took the opportunity to increase its quotations. Supply even further tightened during the Spring Festival when most domestic producers suspend production. In this context, the VA price was boosted to a higher point: a MoM surge of 60.38% in March.

The shortage of VA continued on into Q2, affected by the reduced supply of citral (a raw material for VA). This, coupled with stable demand, supported the VA price to keep running high during this period. Yet, slight falls were seen in Q3 as demand decreased. Then the price went up slightly in Q4. On 17 Oct., an explosion happened to BASF SE's plant in Ludwigshafen, Germany, the largest global production base for citral (around 70% of the global supply). Affected by this, leading domestic VA producers like Zhejiang NHU and Zhejiang Medicine Co., Ltd. suspended offering quotations and bided their time for further development of this accident. Purchasers also showed concerns about the VA supply and thus increased procurements, boosting the price in Oct. and Nov. However, this upward trend didn't continue on into Dec., as market demand became weak again.



Figure 1: Monthly market price of feed grade vitamin A (500,000 IU/g) in China, Jan. 2015-Dec. 2016



Source: CCM

According to CCM's research, the VA price is likely to stay high over the coming period of 2017. China has so far imposed increasingly stringent environmental regulations. As a consequence, VA producers may have to face rising costs for pollutant treatment, which may support them to continue quoting high.

### Surged feed demand boosts performance of vitamin producers in 2016

Summary: In 2016, upward livestock farming industry boosted the production and sales of feed in China, and, further, prices of vitamins. Thanks to this, many vitamin manufacturers predicted significant growth in full-year performance.

Between Jan. and Nov. 2016, China's feed output totalled 262.54 million tonnes, up 3.90% YoY. Of this, the figure in Nov. reached 27.13 million tonnes, up 5.50% YoY.

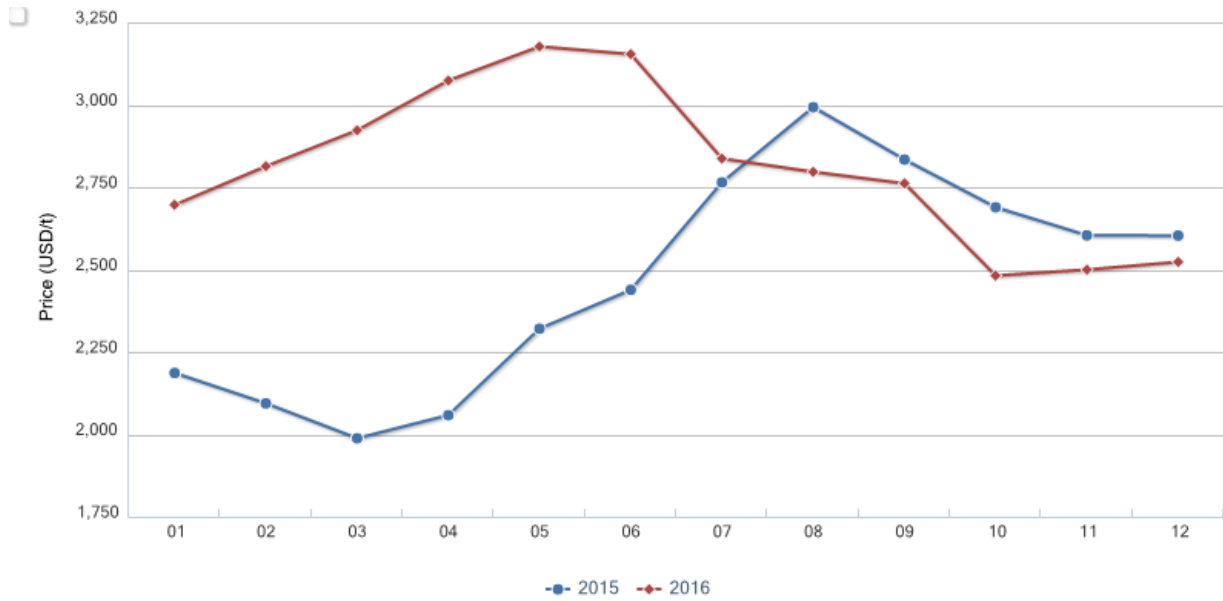
Notably, output of 180 key feed enterprises in Nov. increased by 17.00% YoY and by 3.00% MoM, according to the Ministry of Agriculture of the People's Republic of China. Increases were seen in production of several products, such as pig feed (up 11.00% MoM), feed for poultry for egg (up 6.30% MoM), feed for poultry for meat (up 0.60% MoM) and ruminant feed (up 13.50% MoM), while output of aquatic feed dramatically reduced by 43.70% MoM. No significant changes were seen in figures of other feed.

Such increases were mainly ascribed to the strengthened demand from livestock industry. In 2016, the prices of poultry and livestock ran high, especially that of live pig. According to CCM's price monitoring, the domestic market price of live pig rose by 14.09% YoY. This attracted farmers and farming enterprises to continue purchasing poultry and livestock, boosting demand for feed and, in turn, sales of feed producers. For instance, in H1 2016,

- New Hope Liuhe Co., Ltd.: creep feed for piglets up 20.00%+ YoY, ruminant feed and concentrated feed up 10.00%+ YoY
- Jiangxi Zhengbang Technology Co., Ltd.: a YoY increase of 9.06% to 2.42 million tonnes
- TRS Group Co., Ltd.: a YoY increase of 20.00% to 1.60 million tonnes



Figure 2: Monthly market price of live pig in China, Jan. 2015-Dec. 2016



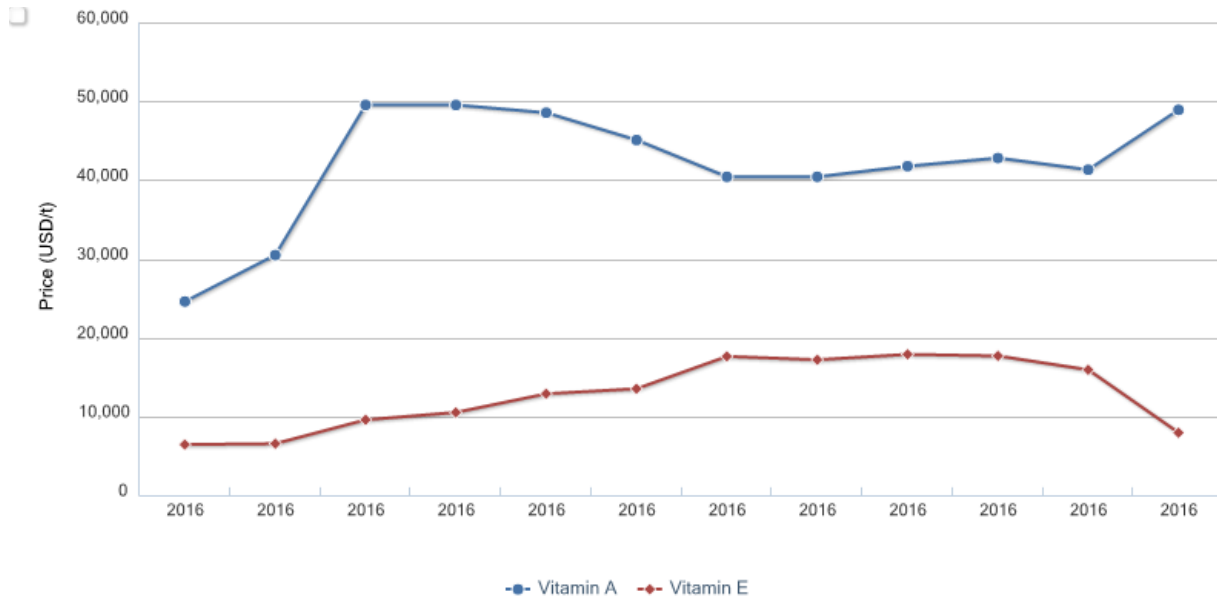
Source: CCM

Vitamins producers also benefited a lot from the increased demand for feed in 2016. In China, around 70% of vitamins are used as feed additives (with the aim of improving stress resistance of poultry and livestock). Strengthened demand for feed pushed up vitamin prices in the year. Vitamin A (VA) and vitamin E (VE) were two typical examples of this – price of VA recorded the largest growth in March, up 60.38% MoM, and that of VE price arrived in Aug. up 30.42% MoM.

In this context, most vitamin enterprises predicted surged profits in full-year 2016:

- Hubei Guangji Pharmaceutical Co., Ltd. (producer of vitamin B2 & vitamin B6): net profit to soar by 593.07%-640.87% YoY
- Zhejiang Medicine Co., Ltd. (producer of VE): net profit to surge by 150.00%-200.00% YoY
- Brother Enterprises Holding Co., Ltd. (producer of vitamin B3 & vitamin B5): net profit to rise by 50.00%-80.00% YoY

Figure 3: Monthly market prices of vitamin A (500,000 IU/g feed grade) and vitamin E (50% feed grade), Jan.-Dec. 2016



Source: CCM

## Company Developments

### Brother Enterprises' VK3 production likely to be restrained

Summary: Brother Enterprises was ordered to halt production at its northern factory for safety rectifications to be made. A chrome tanning agent plant was involved in this suspension. Given that chrome tanning agent is co-produced with VK3, the company's VK3 production is likely to be influenced as well.

On 4 Jan., 2017, Brother Enterprises Holding Co., Ltd. (Brother Enterprises) announced that it had been ordered to suspend production at its northern factory so as to make rectifications. A day before this announcement, the Haining Administration of Work Safety conducted an on-site inspection of the company's northern factory, finding that it was still failing to pass safety checks even after rectification by Zhejiang Tiancheng Engineering Design Co., Ltd. Therefore, production at this factory, which includes a 20,000 t/a leather auxiliary (fatliquoring agent) plant (pilot production was also involved), a 8,000 t/a leather auxiliary plant and a 45,000 t/a chromium powder plant, will not be allowed to continue until the facility passes work safety inspections.

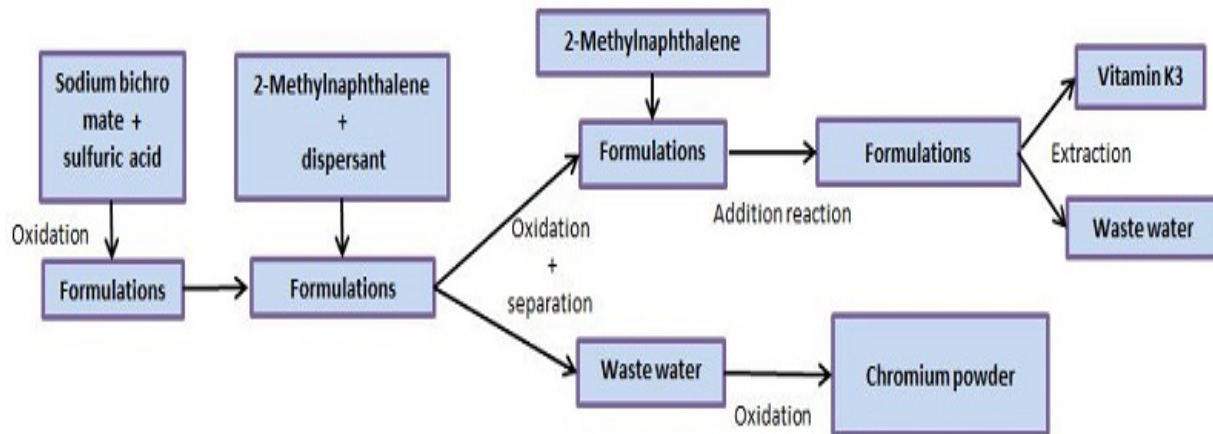
"We have yet to be informed of a specific date for production resumption. If we can't resume in a timely fashion, our financial performance may be impacted," said Brother Enterprises.

In fact, Brother Enterprises' vitamin K3 (VK3) production may also be cut or even halted due to production suspension at the company's 45,000 t/a chrome tanning agent project. This is because the company's VK3 is co-produced with chromium powder.

In general, the production of VK3 generates a large amount of chromium-containing waste water which can cause serious environmental pollution if discharged without any pre-treatment. Therefore, producers are inclined to utilise the chromium-containing waste water to produce chromium powder – from the production of every tonne of VK3, around 20 tonnes of chromium powder can be generated as a byproduct. This co-generation technique not only realises comprehensive utilisation of resources and reduces pollution, but also lowers environmental costs for production of VK3.

Brother Enterprises is the largest manufacturer of VK3 worldwide. If production at its northern factory is suspended for long, its output of VK3 and even the overall market supply may be tightened, which is likely to influence the domestic VK3 price.

Figure 4: Brother Enterprises' co-production route for vitamin K3 and chromium powder



Source: CCM

### Zhejiang NHU expects significant financial growth in 2016

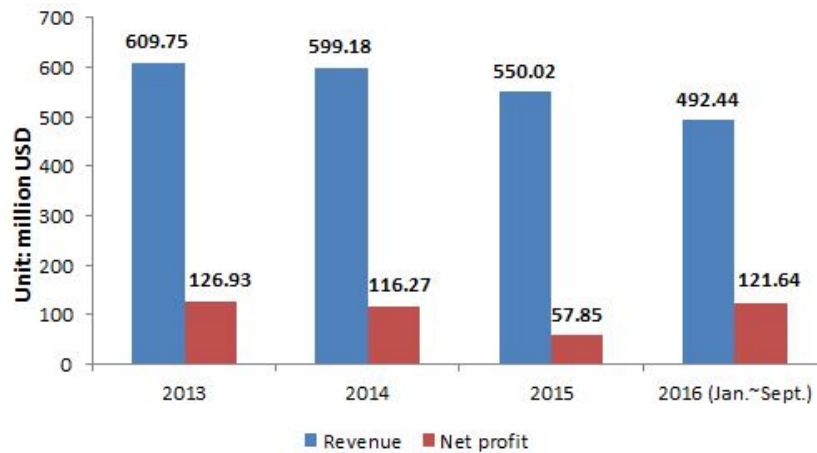
Summary: Zhejiang NHU, a leading domestic producer of VA and VE, may realise great financial growth in full-year 2016, thanks to surged VA and VE prices. The year 2016 saw thriving trends domestic VE and VA markets, affected by the reduced production, increased demand at home and abroad and tight supply of raw materials.

The year 2016 saw continual upward trends in the Chinese vitamin A (VA) and vitamin E (VE) markets. Thanks to this, Zhejiang NHU Co. Ltd. (Zhejiang NHU, stock code: 002001), the largest domestic producer of VA & second largest producer of VE, is expected to achieve excellent full-year performance. In fact, according to its financial report for Q1-3 released on 27 Oct., 2016, the company realised:

- Revenue: USD492.44 million (RMB3.42 billion), up 20.88% YoY
- Net profit: USD121.64 million (RMB845.36 million), up 196.63% YoY

"Raised sales prices of VA and VE are the main driving factor behind such a significant increase," said the company. In particularly, VA recorded the largest price hike among all other vitamins. According to CCM's price monitoring, the domestic market price of 500,000 IU/g feed grade VA averaged USD41,968/t in 2016, up 131.85% YoY, and that of 50% feed grade VE also surged by 66.52% YoY to USD12,832/t.

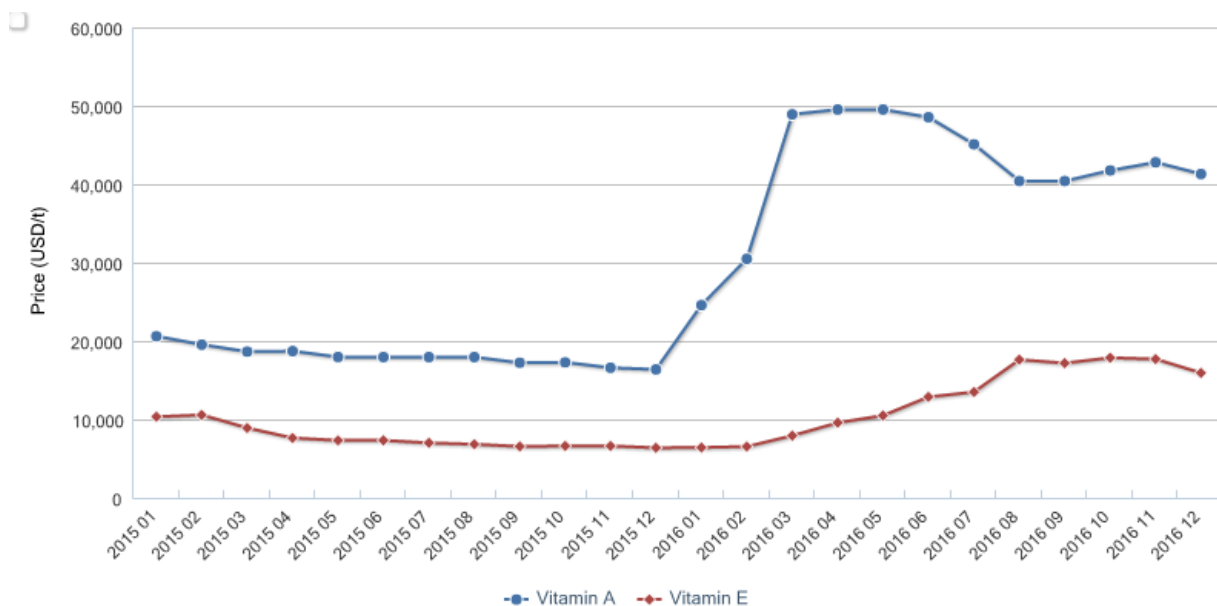
Figure 5: Zhejiang NHU's financial performance, 2013-2015 & Jan.-Sept. 2016



Source: Zhejiang NHU Co., Ltd.

Figure 6: Monthly market prices of vitamin A (500,000 IU/g feed grade) and vitamin E (50% feed grade) in China, Jan. 2015-Dec.

2016



Source: CCM

According to CCM's research, the main factors behind the surges of VA and VE prices in 2016 were as follows:

- 1. Tightened supply of raw materials:** citral (a raw material for VA) was in short supply after the leading supplier BASF cut its production. Diketene (an intermediate for VE) was also in shortage as some leading domestic manufacturer halted production.
- 2. Restrained production:** domestic VA and VE producers had to cut or suspend production as a result of the increasingly strict environmental policies.
- 3. Strengthened demand from downstream industry:** stable production and sales in feed industry boosted demand for vitamins
- 4. Increased exports:** some leading overseas producers were ordered to suspend production for environmental reasons, such as



DSM, the largest vitamin manufacturer globewide (accounting for 30% of the global VA production capacity and VE for 25%). In this context, supply of VA and VE became tight in overseas markets and foreign purchasers had to turn to the Chinese market, boosting exports and, in turn, the prices of VA and VE.

Besides VA and VE businesses, Zhejiang NHU also extended in to new areas for other sources of profits. On 9 Jan., 2017, the company announced that its subsidiary, Shandong NHU Amino Acids Co., Ltd., had finished pilot production of a methionine project on 6 Jan. (trial started in the end of June 2016). It was a great success for production route ran stably and products were qualified.

Methionine and vitamin are both important feed additives that share similar production techniques and target clients. The new methionine project diversified the company's product portfolio. As the project realises mass production in 2017, Zhejiang NHU is expected to enjoy improved profitability.

## Guangji Pharmaceutical: net profit to surge in 2016

Summary: Guangji Pharmaceutical, whose leading products are VB2 and VB6, predicted significant increases in 2016 performance. Surged prices of VB2 and VB6 as well as reduced production costs were the two main reasons for its great financial growth.

On 10 Jan., 2017, Hubei Guangji Pharmaceutical Co., Ltd. (Guangji Pharmaceutical, stock code: 000952) released its financial pre-announcement for 2016. Its net profit is estimated to reach USD20.86 million-22.30 million (RMB145.00 million-RMB155.00 million), up 593.07%-640.87% YoY.

According to the company, main driving factors behind this significant growth included:

### 1. Reduced production costs

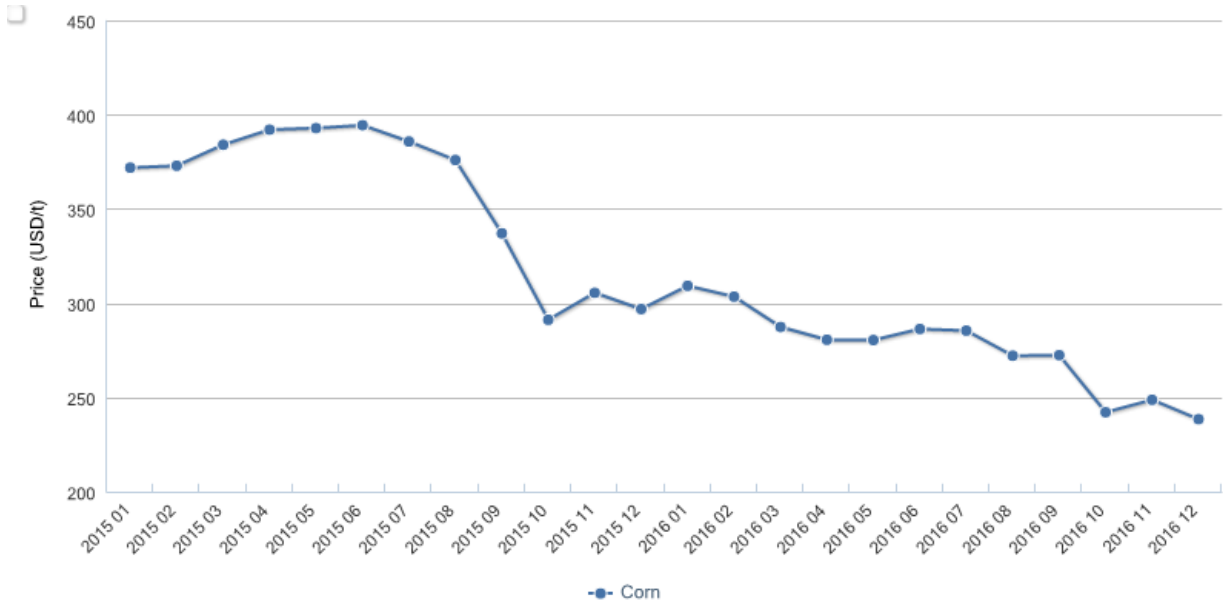
Corn (main raw material) accounts for around 70% of the production costs for vitamin B2 (VB2), Guangji Pharmaceutical's leading product (70% of the company's revenue). In 2016, the domestic corn price slid affected by its huge inventories and oversupply. According to CCM's price monitoring, the full-year market price of corn averaged USD275.68/t, down 25.48% YoY. Thanks to this, Guangji Pharmaceutical reduced its purchase costs and enjoyed higher profitability.

### 2. Raised prices of leading products

Guangji Pharmaceutical is the largest domestic VB2 producer, production capacity given at 4,800 t/a (2,300 t/a in headquarters + 2,500 t/a in Mengzhou branch), 55% of the world's total. Its subsidiary, Hubei Huisheng Pharmaceutical Co., Ltd. (Huisheng Pharmaceutical), is a leading domestic manufacturer of vitamin B6 (VB6, 1,000 t/a). According to CCM's price monitoring, in 2016, the average market price of 80% feed grade VB2 reached USD37,705/t, up 66.79% YoY; that of 98% feed grade VB6 also up 26.92% YoY to USD34,610/t.

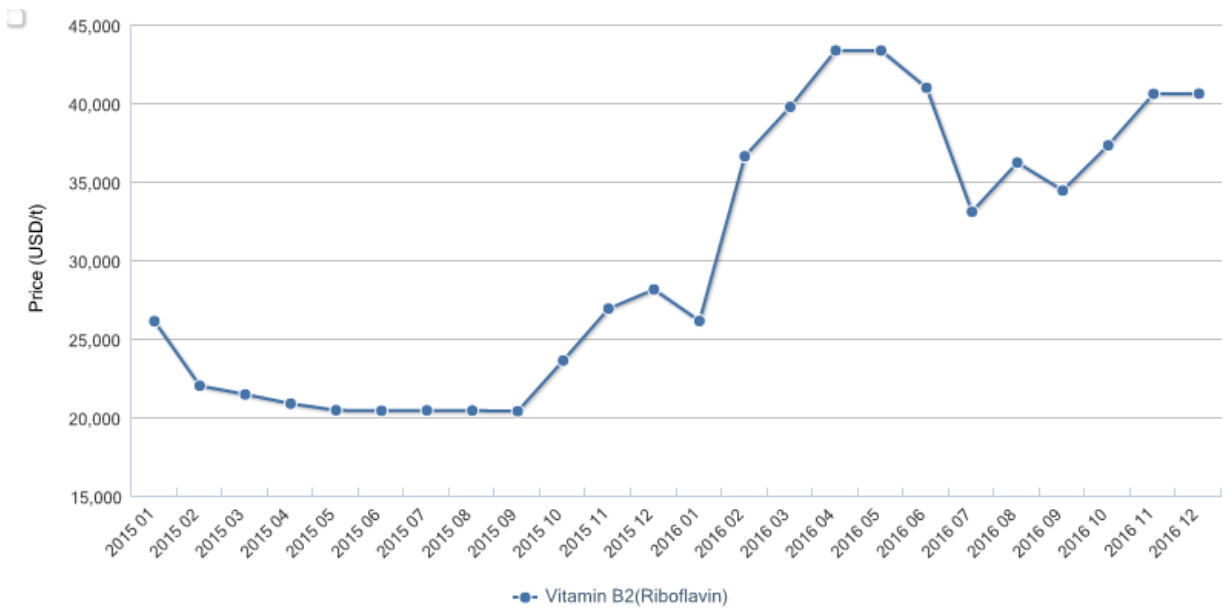


Figure 7: Monthly market price of corn in China, Jan. 2015-Dec. 2016



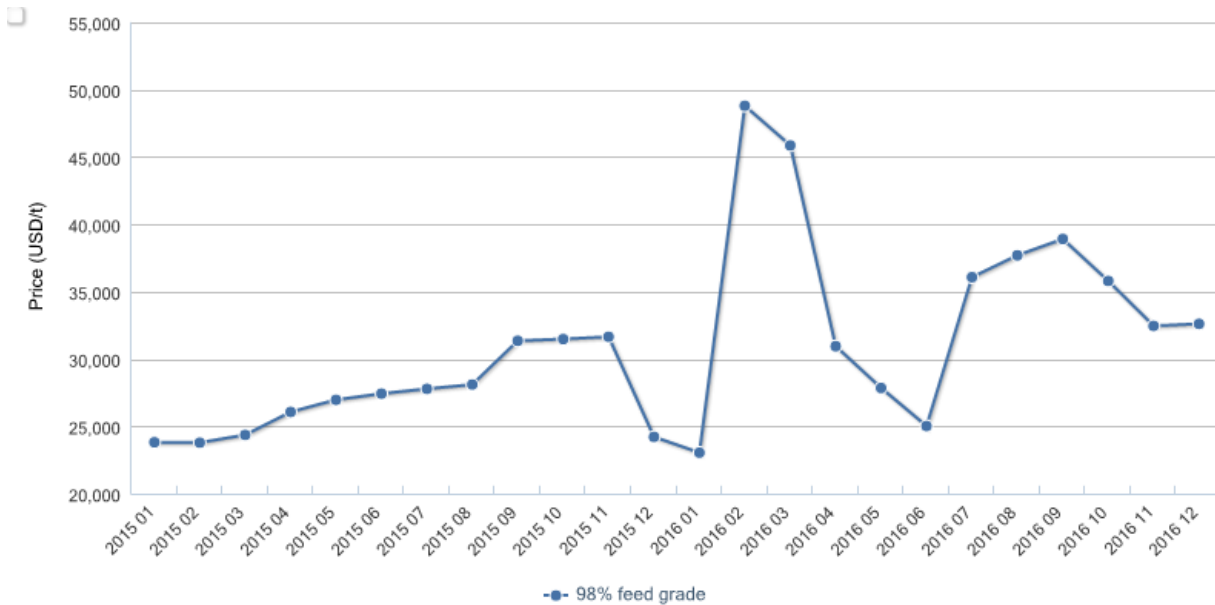
Source: CCM

Figure 8: Monthly market price of 80% feed grade vitamin B2 in China, Jan. 2015-Dec. 2016



Source: CCM

Figure 9: Monthly market price of 98% feed grade vitamin B6 in China, Jan. 2015-Dec. 2016



Source: CCM

Fluctuated as it was, the average domestic VB6 price in 2016 rose over the year 2015, from which producers benefited a lot. The first price hike was seen in Feb., when purchasers stockpile before the Spring Festival – the figure doubled MoM and YoY to USD48,826/t at that time. Yet, in April, Jiangxi Tianxin Pharmaceutical Co., Ltd. (Jiangxi Tianxin) reduced its quoted price, leading to a sharp drop in the overall market price. VB6 production is highly concentrated in China despite the large quantity of producers. Leading manufacturers included Jiangxi Tianxin, Shanghai Hegno Pharmaceutical Holding Co., Ltd., Huazhong Pharmaceutical Co., Ltd., and Huisheng Pharmaceutical. Among them, the largest producer Jiangxi Tianxin (4,000 t/a) accounts for 60%+ of the global sales and therefore enjoys strong voice in pricing. Then, in H2, production of VB6 was restrained by environmental regulations, tightening market supply and thus pushing up the price.

As the state imposes more stringent environmental policies, increasingly small-sized enterprises will be forced to closed business and even large-scale ones may be required to cut production. In this context, the market supply of VB2 and VB6 is expected to further tighten in the future. Meanwhile, given that purchasers like feed enterprises show low sensitivity to increases in quoted prices of VB2 and VB6 (which only account for around 1% of production costs for feed), the market prices may continue running high in the short term.

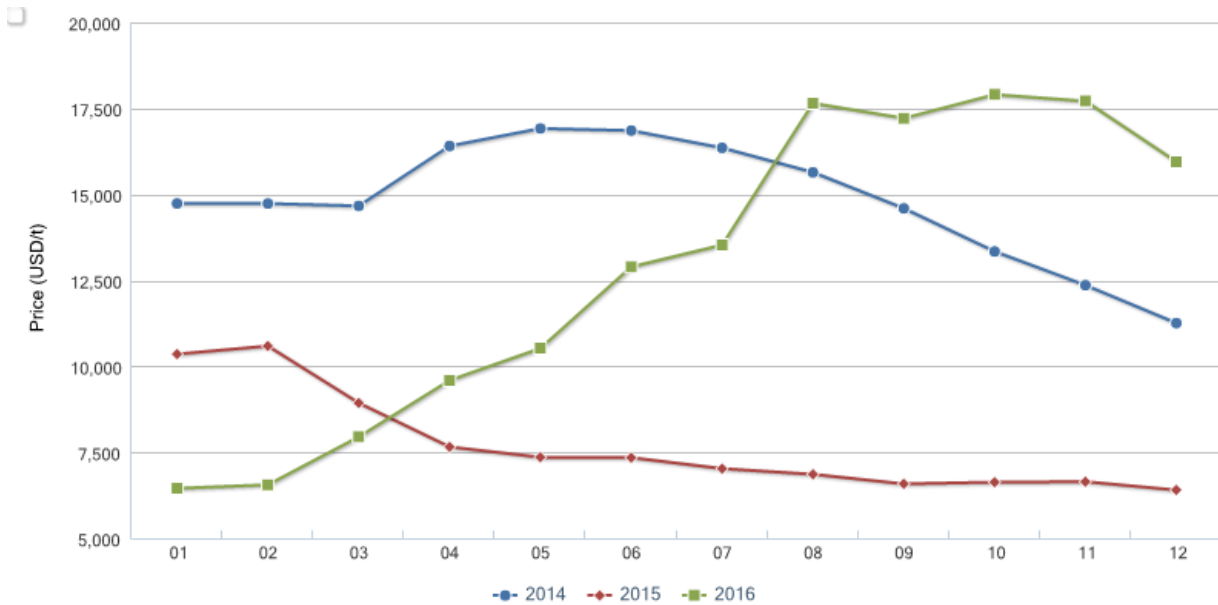
### Zhejiang Medicine: 2016 performance benefits from surged VE price

Summary: Zhejiang Medicine predicted its net profit to surge in 2016, thanks to the significantly increased VE price. The year 2016 saw a continual upward trend in the domestic VE market, affected by the reduced supply and increased demand from feed industry.

On 13 Jan., 2017, Zhejiang Medicine Co., Ltd. (Zhejiang Medicine) disclosed its financial pre-announcement for 2016. Its full-year 2016 net profit is predicted to soar by 150%-200% over USD23.31 million (RMB162 million) in 2015.

As the largest domestic producer of vitamin E (VE, 40,000 t/a), the company benefited a lot from the surged VE price. In 2016, the average market price of 50% feed grade VE powder rose by 66.52% YoY (figure in Jan. even surged by 100%+ over that in Dec.), according to CCM's price monitoring.

Figure 10: Monthly market price of 50% feed grade vitamin E powder in China, Jan. 2014-Dec. 2016



Source: CCM

The price hike in domestic VE market in 2016 was ascribed to the following factors:

**- Reduced supply**

The domestic VE price stated to fall in June 2014 and did not recover until Jan. 2016 after hitting the lowest point in Dec. 2015, at USD6,409/t (vs. USD16,922/t in May 2014). Weakened profitability in these two years forced some small-sized producers to withdraw from the market, tightening the supply but improving overall production concentration.

Stringent environmental regulations in 2016 also restrained supply of raw materials for VE and, in turn, production of VE. In April 2016, JiangSu TianCheng Biochemical Products Co., Ltd., the largest domestic manufacturer of diketene (raw material for VE, 40,000 t/a), was required to suspended production for facility rectification. Later in July, another leading diketene producer Ningbo Wanglong Tech Co., Ltd. also halted production due to a gas leakage accident.

In Aug., DSM's Switzerland-based VE plant suspended production for technical rectification. "Affected by this, its output of VE reduced by about 7,500 tonnes," trade sources disclosed to CCM.

Then, during the 2016 G20 Summit (Sept.), most chemical enterprises in Hangzhou City, Zhejiang Province, and the surroundings, were ordered to cut or halt production. Both Zhejiang Medicine and Zhejiang NHU Co. Ltd. were impacted.

**- Increased demand from feed industry**

Prices of poultry and livestock products ran high in 2016. This attracted farmer and farming enterprises to continue their investment in purchasing poultry and livestock or even to expand production, boosting demand for feed and further, for VE. In this context, VE enterprises like Zhejiang Medicine recorded increased sales volume and raised quote prices.

According to CCM's research, increased sales of vitamin A (VA) and pharmaceutical preparations may also be driving factors





behind Zhejiang Medicine's significant financial growth in the whole of 2016. Financial report in H1 2016 revealed that soared VA price as well as stable growth in sales of key pharmaceutical preparations (Lailixin series, Laikexin, Jialixin and Laiyi) contributed a lot to the improved performance. Notably, the company obtained Drug Production Certificates for its malic acid nemonoxacin API and capsules in June 2016, and then launched the products on 22 Oct. "These two products generated about sales of USD143.89 million (RMB1.00 billion) from the market of drugs for hospital-/community-acquired pneumonia," disclosed an industry insider.

As environmental policies remain strict in 2017, the domestic prices of VA and VE may continue staying high. Given this, Zhejiang Medicine is expected to enjoy continual financial growth over the coming period.

## Import and Export Analysis

### Imports & exports of selected vitamins in China, Nov. 2016

Table 1: Import & export value of selected vitamins (with independent HS code) in China, Nov. 2016

Product	Import value, USD	MoM change	Export value, USD	MoM change
Vitamin A	5,953,339	+11.44%	9,380,766	+78.25%
Vitamin B1	302,629	+436.30%	24,684,051	+30.77%
Vitamin B2	1,990,265	+67.02%	5,419,074	+11.56%
Vitamin B5	649,342	-33.48%	24,433,972	-12.81%
Vitamin B6	99,849	+110.67%	13,233,347	+19.07%
Vitamin B12	3,779,310	-1.91%	10,015,095	-17.60%
Vitamin C	331,727	-15.14%	37,817,925	+40.60%
Vitamin E	8,110,379	+200.28%	36,202,546	-13.49%

Note: Derivatives of each product are also calculated.

Source: China Customs

Table 2: Import & export volume of selected vitamins (with independent HS code) in China, Nov. 2016

Product	Import volume, tonne	MoM change	Export volume, tonne	MoM change
Vitamin A	105.87	+75.69%	248.80	+32.12%
Vitamin B1	7.62	+411.41%	591.45	+29.90%
Vitamin B2	72.26	+71.60%	150.37	+12.58%
Vitamin B5	45.79	-11.53%	959.60	-9.06%
Vitamin B6	2.60	+116.67%	482.69	+20.59%
Vitamin B12	0.09	-96.82%	21.89	-24.78%
Vitamin C	8.30	-52.81%	10,719.34	+30.06%
Vitamin E	538.09	+154.31%	4,010.51	-14.62%

Note: Derivatives of each product are also calculated.

Source: China Customs

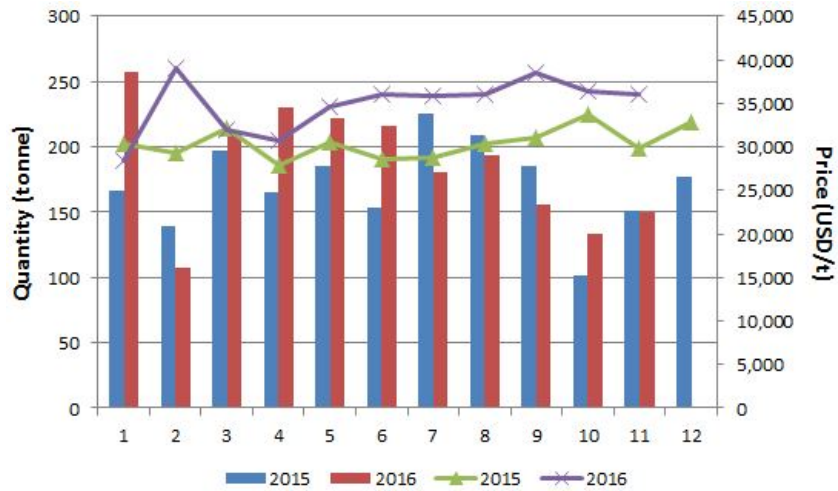
### China's exports of VB2: stable volume but soared price in Nov. 2016

Summary: In Nov. 2016, China's export volume of VB2 almost stood still, while the export price rose markedly, since leading domestic manufacturers raised their quotations and further, pushed up the overall market price. Given the high concentration of VB2 production, leading producers tend to enjoy strong voice in pricing.

According to China Customs, a total of 2,058 tonnes of vitamin B2 (VB2) were exported from China between Jan. and Nov. 2016, up 9.72% YoY, and the corresponding export price stood at USD34,871/t, up 15.30% YoY. Leading export destinations during this eleven months included the US, Germany, India, the Netherlands and Indonesia. Export volume to the top 10 destinations amounted to 1,515 tonnes, 73.64% of the national total. Specifically, the export volume in Nov. decreased slightly by 0.68% YoY to 150.37 tonnes, vs. a significant increase of 20.34% YoY in export value to USD5.42 million.



Figure 11: China's exports of vitamin B2, Jan. 2015-Nov. 2016



Source: China Customs

Surged domestic market price of VB2 was the main driving factor behind the increased export price, according to CCM's research. Despite some fluctuations, the year 2016 saw an upward trend in the overall VB2 price. This was mainly a result of the raised quotations from domestic manufacturers.

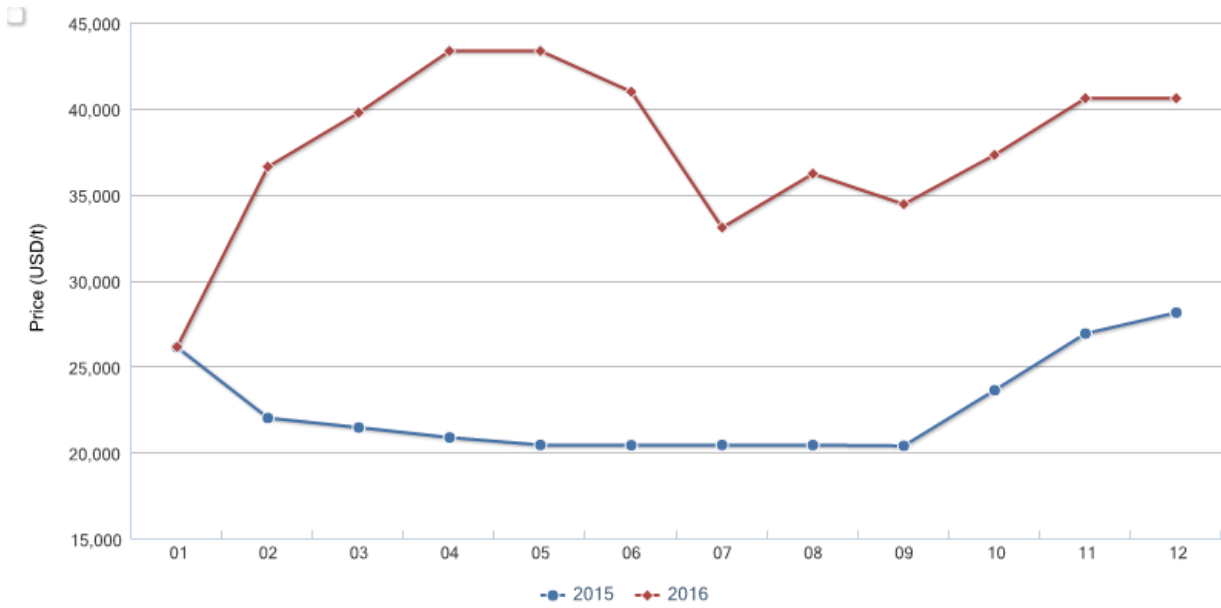
Chinese VB2 producers have strong voice in pricing given the high production concentration in China. Leading manufacturers include Hubei Guangji Pharmaceutical Co., Ltd. (Guangji Pharmaceutical), Shanghai Hegno Pharmaceutical Holding Co., Ltd. (Hegno) and Shandong NB Group Co., Ltd.

Among them, Guangji Pharmaceutical is the largest one, production capacity given at 4,800 t/a (2,300 t/a in headquarters + 2,500 t/a in Mengzhou branch), 55% of the world's total. During H1 2016, the company cut down production for plant relocation, tightening the market supply. Enterprises took this opportunity to raise their quoted prices, thus pushing up the market price. According to CCM's price monitoring, the market price of 80% feed grade VB2 went up from USD26,141/t in Jan. to USD43,351/t in May. Later when Guangji Pharmaceutical resumed production in June, the short supply got relieved and the price fell to some extent.

Yet, affected by the 2016 G20 Summit held in Sept., many vitamin manufacturers were required to suspended production. Guangji Pharmaceutical was also involved and had to halt production for maintenance from 1 Sept. to 10 Oct. Affected by this, coupled with deleting inventories, the market supply became tightened again, leading to a rebound in VB2 price in Q4.

In fact, Guangji Pharmaceutical has played a leading role in VB2 exports. The company, together with another main exporter Hegno, accounts for 90% of VB2 exported from China. Yet, in the recent two years, Hegno has taken up decreasing shares in the export market and Guangji Pharmaceutical has grown into the largest exporter.

Figure 12: Monthly market price of 80% feed grade vitamin B2 in China, Jan. 2015-Dec. 2016



Source: CCM

### China's VB5 export price surges in Nov. 2016

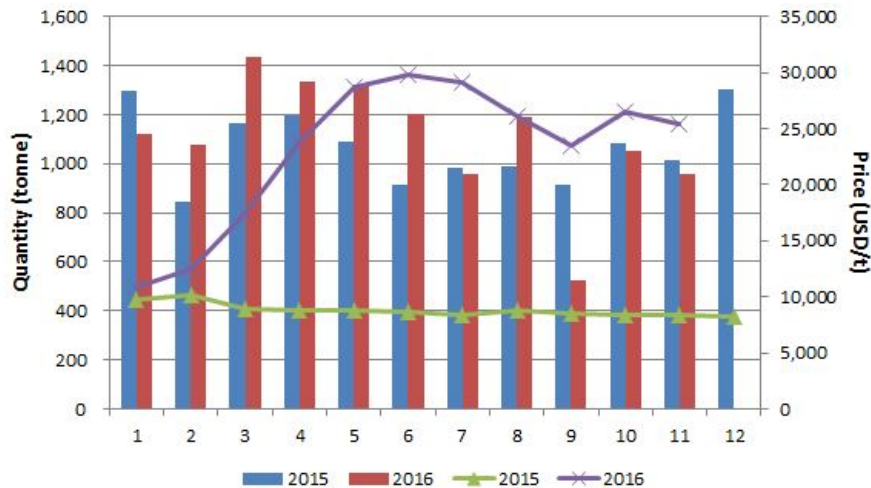
Summary: In Nov. 2016, China's export volume of VB5 fell slightly over the same period in 2015, while the corresponding export price rose markedly. Affected by stringent environmental regulations, domestic VB5 producers had to cut or suspend production. As a consequence, the overall supply was tightened, boosting the domestic market price and further, the export price.

Nov. 2016 witnessed decreased export volume but surged export price of vitamin B5 (VB5) from China. According to China Customs:

- Volume: 959.60 tonnes, down 5.18% YoY
- Price: USD25,463/t, up 203.83% YoY

Thanks to the significant rise in export price, the corresponding export value soared by 188.09% YoY to USD24.43 million.

Figure 13: China's exports of vitamin B5, Jan. 2015-Nov. 2016



Source: China Customs

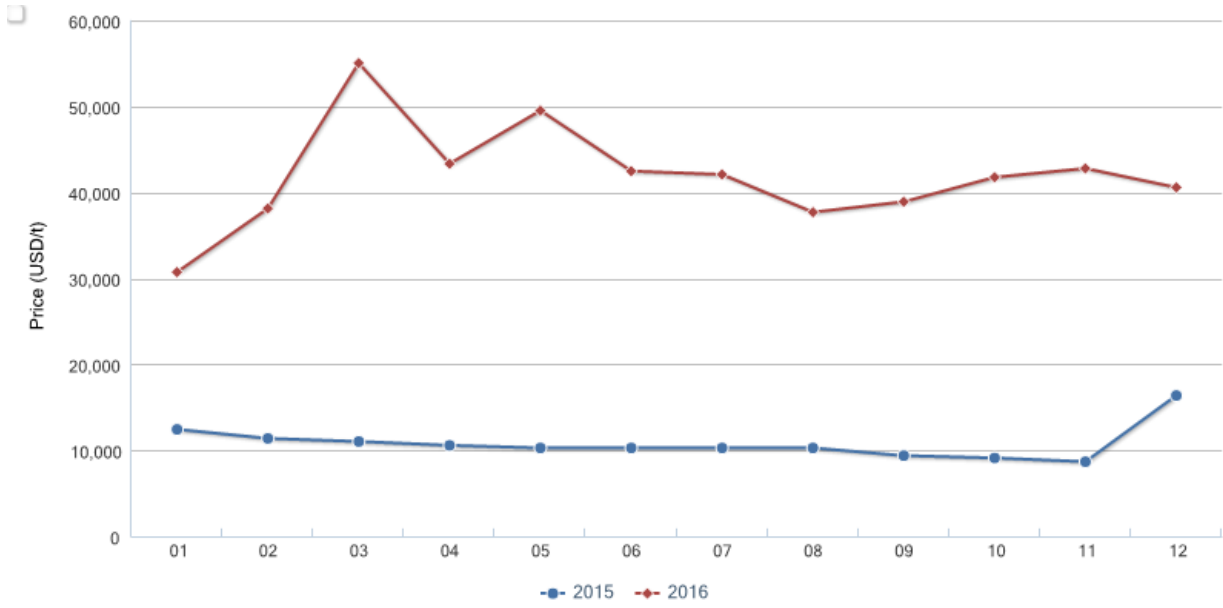
In fact, the export price of VB5 kept running high between Jan. and Nov. 2016, boosted by the upward domestic market price. According to CCM's research, the surged market price of VB5 was mainly as a result of the tightened supply throughout 2016.

Currently, China's production capacity of VB5 accounts for around 75% of the global total. Leading manufacturers include Yifan Pharmaceutical Co., Ltd. (Yifan Pharmaceutical, 12,000 t/a), Shandong Xinfu Pharmaceutical Co., Ltd. (Xinfu Pharmaceutical, 7,000 t/a) and Shandong Huachen Biochemical Co., Ltd. (3,000 t/a). Among the three, Yifan Pharmaceutical and Xinfu Pharmaceutical are the main exporters.

In the end of 2015, Xinfu Pharmaceutical halted production for rectification, tightening the supply and boosting the VB5 price. According to CCM's price monitoring, the average market price of VB5 in Jan. 2016 went up by 146.60% YoY to USD30.22/kg (RMB 210/kg). Yifan Pharmaceutical even raised its quotation to USD33.09/kg (RMB 230/kg). After the Spring Festival in Feb., manufacturers continued raising their quoted prices – Yifan Pharmaceutical even quoted USD51.80/kg (RMB360/kg) in March. The figure fell down slightly due to decreased demand in late March, but still stood much higher over the same period of 2015.

In the following months, environmental regulations became the main driving factor behind the high VB5 price. As the state imposed increasingly stringent environmental regulations, domestic VB5 producers were forced to cut or even halt production, reducing the output. For instance, affected by the 2016 G20 Summit, Yifan Pharmaceutical suspended production from Aug. to Sept. (for around one month). Later in Oct., a group of national environmental inspectors were stationed in Shandong Province, restraining the VB5 production and further intensified the shortage. All these supported the price to stay high and even rose slightly between Sept. and Dec.

Figure 14: Monthly market price of 98% feed grade vitamin B5 in China, Jan. 2015-Dec. 2016



Source: CCM

## Price Update

### Market prices of selected vitamins in China, Jan 2017

Table 3: Market prices of selected vitamins in China, Jan. 2017

Product	Specification	Price in Jan., USD/t	Price in Dec., USD/t
Vitamin A	500,000 IU/g Feed grade	35,972.26	41,329.50
	325,000 IU/g Food grade	43,166.71	46,405.06
Vitamin B1	98% Feed grade	41,727.82	42,054.58
	99% Food grade	53,238.94	52,205.69
	99% Pharmaceutical grade	57,555.61	58,006.32
Vitamin B2	80% Feed grade	38,130.59	40,604.43
	98% Food grade	50,361.16	51,480.61
	98% Pharmaceutical grade	66,188.96	67,432.35
Vitamin B3	99% Feed grade	7,913.90	7,250.79
	99% Food grade	10,791.68	10,876.19
	99% Pharmaceutical grade	11,511.12	11,456.25
Vitamin B5 (calciumpantothenate)	98% Feed grade	40,288.93	40,604.43
	99% Food grade	43,166.71	43,504.74
	99% Pharmaceutical grade	61,872.28	62,356.80
Vitamin B6	98% Feed grade	33,094.48	32,628.56
	98% Food grade	35,972.26	35,528.87
	98% Pharmaceutical grade	53,238.94	52,930.77
Vitamin B7	2% Feed grade	23,741.69	23,202.53
	2% Food grade	28,777.81	27,553.00
Vitamin B9	98% Feed grade	64,750.06	65,257.11
	98% Food grade	79,138.97	79,758.69
	98% Pharmaceutical grade	93,527.87	94,260.27
Vitamin B12	1% Feed grade	31,655.59	30,453.32
	1% Food grade	53,238.94	52,205.69
Vitamin C	99% Powder feed grade	4,172.78	4,205.46
	99% Powder food grade	5,036.12	5,075.55
	99% Powder pharmaceutical grade	5,755.56	5,800.63
Vitamin D2	99% Food grade	33,094.48	33,353.64
	99% Pharmaceutical Grade	2,446,113.56	2,465,268.71
Vitamin D3	500,000 IU/g Feed grade	20,144.46	20,302.21
	100,000 IU/g Food grade	31,655.59	31,903.48
Vitamin E	50% Powder feed grade	14,388.90	15,951.74
	98% Oil food grade	15,827.79	17,401.90
	98% Oil pharmaceutical grade	23,022.25	24,652.69
Vitamin K3	MSB 96% feed grade	9,352.79	10,151.11

Source: CCM

### Nicotinamide price continues going up in Jan. 2017 in Chinese market

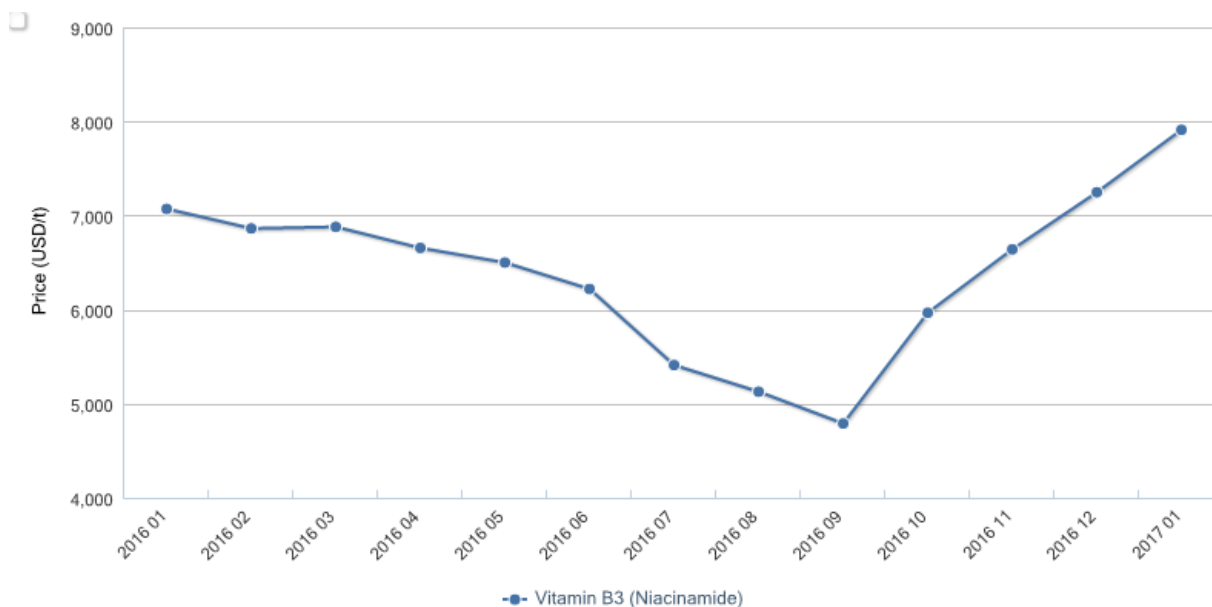
Summary: China's nicotinamide price kept going up for four consecutive months after its rebound in Sept. 2016. This was mainly because supply of 3-cyanopyridine got tightened after China's ban on paraquat AS from 1 July, 2016 onwards. Yet, as increasing new players march into this business, the domestic nicotinamide price may fell in the future.

In Jan. 2017, China's nicotinamide price kept rising. According to CCM's price monitoring, the market price of 99% feed grade nicotinamide averaged USD7,914/t, up 65.15% over Sept. 2016 when the figure hit the lowest point.

Domestic suppliers tended to maintain their price high as inventories depleted and supply became tight. Trade sources disclosed to CCM that Guangzhou Nansha Lonza Co., Ltd. (Guangzhou Lonza), the largest domestic nicotinamide producer (t/a), had suspended production since late Dec. 2016. On 16 Jan., 2017, Guangzhou Lonza raised its quoted price for 99% feed grade nicotinamide to USD9.78-10.07/kg (RMB68.00-70.00/kg). Other nicotinamide producers include Brother Enterprises Holding Co., Ltd., Zhejiang Lanbo Biotechnology Co., Ltd. and Mianyang Vanetta Chemical Industrial Co., Ltd.

Increased price of 3-cyanopyridine (raw materials for nicotinamide) was another driving factor behind the continual price rise, according to CCM's research. After paraquat AS (an important downstream product of pyridine) was banned in China from 1 July, 2016 onwards, producers have continued cutting production of pyridine, leading to decreased supply of its by-products, 3-picoline and 3-cyanopyridine. In this context, prices of the two products were pushed up, thus raising production costs for nicotinamide.

Figure 15: Monthly market price of 99% feed grade vitamin B3 (nicotinamide) in China, Jan. 2016-Jan. 2017



Source: CCM

In fact, the ban on paraquat AS also pushed pyridine manufacturers to extend into downstream industries, such as nicotinamide. China has grown into the largest producer of pyridine in the global market over the past few years, which supports the development of downstream business. For instance, Anhui Ruibang Biotechnology Co., Ltd. (Anhui Ruibang), a subsidiary of Nanjing Red Sun Co., Ltd. (a leading domestic pyridine manufacturer), launched a 20,000 t/a nicotinamide project in May 2015, total investment of which stood at USD64.75 million (RMB450.00 million). This project was divided into two phases (10,000 t/a each). Construction of the first phase completed in June 2016, with an investment of USD33.09 million – RMB230.00 million (including USD1.89 million – RMB13.15 million). This phase was put into pilot production in Aug. and passed environmental acceptance check in Nov. Besides Anhui Ruibang, Shandong Hongda Biotechnology Co., Ltd., another pyridine enterprise, also extended into nicotinamide production.

As increasing new players march into this business, the domestic nicotinamide price may fall in the future. After the new production projects are put into production, domestic overcapacity may further intensified. That aside, the new players from upstream industries (like pyridine) may enjoy certain voice in pricing given their advantages in production costs. Yet, the nicotinamide price is expected to stay stable or even rise slightly in the short run.



## News in Brief

### Brother Enterprises terminates share purchase in Minfeng Chemical

On 29 Dec., 2016, Brother Enterprises Holding Co., Ltd. (Brother Enterprises, stock code: 002562) announced that it had terminated its share acquisition in Chongqing Minfeng Chemical Co., Ltd. (Minfeng Chemical).

Prior to this, Brother Enterprises, together with Chongqing Chemical & Pharmaceutical Holding (Group) Company and Chongqing Tepin Chemical Co., Ltd., had signed an agreement on capital and share increase with Minfeng Chemical on 19 Sept., with the aim of purchasing at least a 70% stake in Minfeng Chemical. However, the two parties failed to reach a consensus and decided to stop this transaction.

Minfeng Chemical is mainly engaged in production and sale of sodium dichromate, chromic acid, chrome tanning agents and vitamin K3 (VK3). Of these, sodium dichromate is an important raw material for chrome tanning agents and VK3. Through this share purchase, Brother Enterprises, a global leading VK3 manufacturer, had aimed to integrate resources of both sides, thus improving market competitiveness.

### Kingdomway's two subsidiaries certified as high-tech enterprises

On 6 Jan., 2017, Xiamen Kingdomway Group Co., Ltd. (Kingdomway) announced that two of its subsidiaries, Xiamen Kingdomway Vitamins Co., Ltd. (Kingdomway Vitamins) and Xiamen Kingdomway Bio-technology Co., Ltd. (Kingdomway Bio-technology), had been certified as high-tech enterprises (first list of 2016, jointly released by Xiamen's Science & Technology Department, Bureau of Finance, Local Taxation Bureau and the State Administration of Taxation). Certificates to Kingdomway Vitamins (No.GR201635100017) and Kingdomway Bio-technology (No. GR201635100099) was issued on 23 Nov., 2016, both valid for three years (2016-2018).

Following this, the two companies can enjoy tax preferences, such as a 15% corporate income tax.

*\* Kingdomway Vitamins is a producer of vitamin A (powder / oil), vitamin D3 (powder / oil), vitamin AD3 powder, vitamin B12, biotin, nicotinamide, copper sulfate, fish growth hormones and other active pharmaceutical ingredients.*







## North China Pharmaceutical and its Shijiazhuang-based subsidiaries resume production

On 10 Jan., 2017, North China Pharmaceutical Co., Ltd. (North China Pharmaceutical) announced that it and its Shijiazhuang-based subsidiaries had been approved to resume production since 8 Jan., after an on-site inspection by experts assigned by the Shijiazhuang Environmental Protection Department and Industry and Information Technology Department.

Prior to this, the Shijiazhuang government released the *Shijiazhuang Air Pollution Prevention and Control Plan* on 18 Nov., 2016, ordering all pharmaceutical manufacturers in the city to halt production. North China Pharmaceutical and its subsidiaries were also impacted, especially their production of pharmaceuticals such as antibiotics and vitamins.

"The production suspension posed no great impacts on our 2016 performance, since our remaining inventories were enough for sale," said the company. According to preliminary estimate made by its financial department, it would generate a net profit of around USD1.58 million (RMB11.00 million), had it not halted production. This, couple with depreciation of fixed assets and labour costs, may reduce the company's 2016 full-year net profit by USD7.90 million (RMB54.93 million).

## Anhui Shunli's 30 t/a MAP VC project progressed

On 4 Jan., 2017, the Environmental Protection Department of Bengbu City, Anhui Province released the latest progress of Anhui Shunli Biology Co., Ltd. (Anhui Shunli)'s 30 t/a magnesium ascorbyl phosphate vitamin C (MAP VC) project.

This project (phase I) was approved to construct in Oct. 2011 and built up in Oct. 2013, with an area of 0.77 ha (11.60 mu) and a total investment of USD1.38 million (RMB9.60 million). Yet, the company failed to realise continual production, due to the late issue of national industrial standards for MAP (which came out on 28 Dec., 2016), adjustment of production facilities and changes in market demand.

Anhui Shunli is a specialised MAP producer equipped with advanced production technology. Its offerings are widely applied in fields of feed, cosmetics, food and pharmaceuticals (products can be directly used as food additives and nutrition supplements), and are now available in many overseas markets, like Japan, the US and Switzerland.

*\* MAP, a derivative of VC, can be taken orally or absorbed through skin and release VC through enzymolysis. It possesses the efficacy of VC as well as features like oxidation / light / high temperature / metal ion resistance (VC is easily oxidant and decomposes in case of light, high temperature and metal ion).*

## Anhui Tiger to construct 1,000 t/a folic acid project

On 3 Jan., 2017, the Environmental Protection Department of Bengbu City, Anhui Province publicised the first environmental impact assessment (EIA) results of Anhui Tiger Biotech Co., Ltd. (Anhui Tiger)'s 1,000 t/a folic acid + 500 t/a guanine co-production project (EIA commissioned to Nanjing Kehong Environmental Protection Technology Co., Ltd.). A public comment period was offered and would be closed 10 days after this issue. With a total investment of USD19.15 million (RMB133.06 million), this project will be constructed in Guzhen Economic Development Zone, Bengbu.

Anhui Tiger is a producer of vitamins, including vitamin C (powder / liquid / coated), phosphoesterified vitamin C, biotin, vitamin E, vitamin B1, gulonic acid and acidifiers.





## Coenzyme Q10 listed in global HS Nomenclature

From 1 Jan., 2017 onwards, the new version of the Harmonized System (HS) Nomenclature developed by the World Customs Organization entered into force. Notably, coenzyme Q10 (active pharmaceutical ingredient) was numbered among the new subheadings. In other words, the product would be classified and identified by an exclusive HS code in future international trades.

As an innovative high-tech product with complicated chemical structure, coenzyme Q10 had been put under different classifications and traded in varied tariffs for long, which resulted in inconvenience and even disorders in international trades. Such problems, as well as risks brought by incorrect classification, will be solved afterwards.

Coenzyme Q10 (vitamin Q) is not only applied in the treatment of cardiovascular diseases, cancers and viral hepatitis, but also used in antioxidant healthcare products. It has so far been approved to be used in fields like pharmaceuticals, food and healthcare products. Global demand stands at around 600 t/a.



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