India

Underweight *(no change)*

Highlighted Companies

Jubilant Ingrevia Ltd

REDUCE, TP Rs364, Rs438 close

Jubilant Ingrevia faces several headwinds such as the overall demand for its products falling, product spreads at mean levels, a likely rise in raw material prices, and a risky new product portfolio. We retain our REDUCE rating on the stock with a target price of Rs364.

Laxmi Organic Industries Ltd

REDUCE, TP Rs168, Rs232 close

Laxmi Organic Industries' investors may be holding unrealistic expectations for a commodity-focused business. Our valuation of the stock stands at 30x one-year forward EPS, leading to a target price of Rs168. We maintain our REDUCE rating on it.

Summary Valuation Metrics

P/E (x)	Mar24-F	Mar25-F	Mar26-F
Jubilant Ingrevia Ltd	32.87	30.1	24.22
Laxmi Organic Industries Ltd	59.42	45.3	36.83

P/BV (x)	Mar24-F	Mar25-F	Mar26-F
Jubilant Ingrevia Ltd	2.21	1.9	1.65
Laxmi Organic Industries Ltd	4.03	3.7	3.37

Dividend Yield	Mar24-F	Mar25-F	Mar26-F
Jubilant Ingrevia Ltd	0.36%	0.36%	0.36%
Laxmi Organic Industries Ltd	0%	0%	0%

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Chemicals - Overall

Ketene & diketene – fooled by randomness

- Ketene & diketene-making ability is not innovation as in fact they are more than 130-year-old chemicals. Assigning Laxmi Organic a 50-60x P/E is senseless.
- Laxmi Organics & Jubilant Ingrevia make simple commodity chemicals which, in some cases, don't have scale advantage as well. They are worse than steel.
- Retain our REDUCE rating on Laxmi Organic and Jubilant Ingrevia.

Ketene, diketene & ethyl acetate - fooled by commodity randomness

Ketene and diketene are one of the simplest molecules but they were believed to be high profile speciality chemicals at the peak of the chemical mania. It takes time for the bubble to burst and two of the ketene and diketene manufacturers/users, namely Laxmi Organic Industries (Laxmi Organic) & Jubilant Ingrevia are down 60% and 50% from their peak, respectively. At the peak, it was also claimed that making pyridine and picoline is a strategic advantage but as it happens, the decline in stock prices led to the fall of this hypothesis as well. Normally, these commodity-based equities fall much more from the top once the mania ends. We have been negative on both these stocks for the last three years and hence, missed the mania-driven rally. However, needless to say to the readers of this report that if analysts like us were so smart, then he/she would not have been writing reports.

Laxmi Organic still a primarily ethyl acetate maker (~60% of exports)

Laxmi Organic is still primarily an ethyl acetate maker. Its profitability is primarily determined by this commodity, which is easiest to make, doesn't offer any big scale benefit and in that sense is worse than steel. The stock still garners more than 50x P/E, which is astonishing. The company uses its ketene and diketene manufacturing ability to make specialized chemicals like acetoacetoxy ethyl methacrylate ester, acetyl butyrolactone, ethyl-4-chloro acetoacetate, acetic anhydride, acetoacetanilide, acetoacet-m-xylidine, tert-butyl acetoacetate ester, acetoacet-o-anisidine and methyl acetoacetate ester. However, these chemicals are still too small in the global market and cannot lead to significant earnings growth. The company's fortunes are still driven by ethyl acetate.

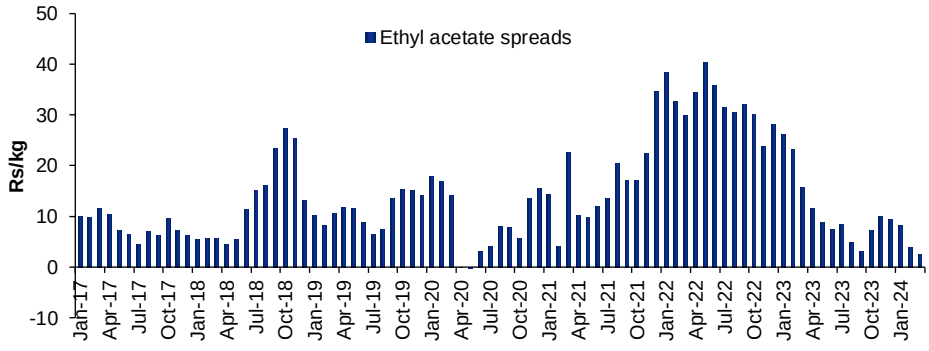
Jubilant Ingrevia is no different

The fortunes of Jubilant Ingrevia are also driven by mainly five-to-six chemicals – ethyl acetate, pyridines, beta picoline, choline chloride, zinc pyrithione, piroctone olamine, acetic anhydride and other simple commodity chemicals.

Retain REDUCE rating on Laxmi Organic and Jubilant Ingrevia

We had downgraded these stocks 2.5 years ago and our thesis remains unchanged. Please see our old reports: IN: Laxmi Organic Industries Ltd - Valuations pencil in leap of faith (REDUCE - Initiate), IN: Laxmi Organic Industries Ltd - Paying for an unproven capability, Reduce (REDUCE - Maintained), IN: Laxmi Organic Industries Ltd - Weak EPS growth; B/S to worsen; REDUCE (REDUCE - Maintained), IN: Jubilant Ingrevia Ltd - Cyclical recovery is far away – REDUCE (REDUCE - Maintained) and IN: Jubilant Ingrevia Ltd - Pyridine getting specialty chemical multiple (REDUCE - Downgrade).

Figure 1: The gross profit of ethyl acetate makers will mirror this graph; however, at the peak, market had assigned 60x PE (on estimated EPS) to Laxmi Organic



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Ketene & diketene – fooled by randomness

Ketene & diketene

Ketene and diketene are one of the simplest molecules but they were believed to be high profile speciality chemicals at the peak of the chemical mania. It takes time for the bubble to burst and two of the ketene and diketene manufacturers/ users, namely Laxmi Organic and Jubilant Ingrevia, are down only 60% and 50%, respectively, from their respective peak levels. Normally, these commodity-based equities fall much more from the top once the mania ends. We have been negative on both these stocks for the last three years and hence, missed the mania-driven rally. However, needless to say to the readers of this note that if Sell side analysts were so smart then he/she would not have been writing notes and making calls to clients to market their thesis.

What is ketene and diketene? ➤

Ketene molecule

1. Ketene, with the formula CH2=C=O, is the simplest ketene. It has a structure with a central carbon atom doubly bonded to an oxygen atom and also connected by a double bond to a methylene group (CH2).
2. Due to its structure with two cumulative double bonds, ketene is very reactive. It readily undergoes reactions with various functional groups.
3. Ketene is not very stable at room temperature and tends to dimerize (form a double molecule) to form diketene. However, under specific conditions, it can be generated and used in organic synthesis.

Diketene

1. Diketene, with the formula CH2=C(O)CH2CO, is a colourless liquid formed by the dimerization (*refers to a chemical process where two identical or similar molecules come together and bond to form a new molecule, called a dimer*) of ketene.
2. Diketene is a more stable compound compared to ketene. It is a useful reagent in organic chemistry for various applications such as acylation (introducing an acyl group) and Diels-Alder reactions (cycloaddition reactions between a diene and a dienophile).
3. Diketene readily hydrolyses (reacts with water) to form acetoacetic acid.

Making ketene and diketene is challenging but human beings have been doing so for at least 100 years ➤

Ketene wasn't exactly 'invented' as it's not a man-made material. However, it was first discovered in 1876 by the French chemist Charles-Adolphe Wurtz.

Wurtz was investigating the structure of benzene when he observed a new gaseous compound forming during the process. He named this compound ketene.

Making ketene can be challenging for some reasons:

1. **Reactivity:** Ketene itself is highly reactive. It readily reacts with other molecules, making it difficult to isolate and purify.
2. **Stability:** Ketene is not very stable at room temperature. It tends to dimerize (form a double molecule) to form diketene, which is more stable. This means you might end up with the undesired product even if you manage to generate ketene.
3. **Preparation methods:** The common methods for generating ketene involve high temperatures or specific reagents that might not be readily available in a basic laboratory setting.

Here's a breakdown of some common methods for making ketene:

1. **Thermal decomposition:** This involves passing a vapourized precursor, like acetone, over a hot surface. However, this method often has low yields of ketene and can lead to decomposition of products.
2. **Using dehalogenating agents:** Reacting a specific molecule with a dehalogenating agent like zinc can generate ketene, but the yields are often not very high.

Overall, while ketene can be synthesized, it's not a straightforward process. Diketene, the more stable dimer of ketene, is often the preferred option due to its ease of handling and availability.

What is the normal example of ketene and its usage? ➤

1. Ketenes are carbonyl compounds that contain the CO group connected by a double bond to a carbon atom. The general formula for ketene is RR′C CO, where R and R′ are hydrocarbon radicals. The simplest ketene, ethenone (CH2CO), is also named as just ketene.
2. Ketenes are used in chemical synthesis as acetylating agents, especially in the synthesis of acetic acid and acetate esters. Ketenes are also used in the production of acrylonitrile, which is used in the production of plastics and synthetic rubber
3. Ketenes are also used in the manufacture of acetic anhydride, sorbic acid, cinnamic acids, and chloroacetyl chloride.
4. Ketenes are highly reactive and readily undergo a wide variety of chemical reactions, including oxidation-reduction and nucleophilic addition. However, they have found only limited applications, as they are not as readily available like other acylating agents.

Ketenes are prepared by heating acetic acid or acetone. They readily polymerize and cannot be shipped or stored. Instead, they are obtained as needed from diketene.

What are the common example of diketene and its usage? ➤

Diketene is an organic compound with the molecular formula $C_4H_4O_2$. It is formed by dimerization of ketene, $H_2C{=}C{=}O$. Diketene is a member of the oxetane family. It is used as a reagent in organic chemistry. It is a colourless liquid.

1. Diketene is an important industrial intermediate used for the production of acetoacetate esters and amides as well as substituted 1-phenyl-3-methylpyrazolones.
2. Diketene is a chemical compound that is used as an intermediate in the production of pharmaceuticals, insecticides, and dyes. It is also used in the production of agrochemicals, such as pesticides, to prevent crops from weeds and pest.
3. Diketenes react with substituted aromatic amines to acetoacetanilides, which are important precursors for mostly yellow, orange or red azo dyes and azo pigments.
4. Diketene is also used in the synthesis of: Vitamin C, antibiotics, perfume ingredients, acetoacetic acid derivatives, and β-substituted propanoic acids.

Global demand for ketene and diketene grows at a very low pace ➤

According to IndustryARC, the global demand for ketene is expected to touch US$1.5bn by 2026F, growing at a CAGR of 4.5% over 2021–2026F. The global demand for diketene is expected to touch US$624.4m by the end of 2032F, growing at a CAGR of 4.7%.

Laxmi Organic makes a variety of molecules which will use ketene or diketene as a step in the manufacturing process

1. **Acetoacetoxy ethyl methacrylate ester (AAEM**) - It has a more complex structure that incorporates both acetate and methacrylate groups. It's the product of a reaction between diketene and hydroxyethyl methacrylate.
2. **Acetyl butyrolactone** - Cyclic molecule with a ring of carbon atoms, containing a carbonyl group (C=O) and an ester group (C-O-O-C)cyclic molecule with a ring of carbon atoms, containing a carbonyl group (C=O) and an ester group (C-O-O-C).
3. **Ethyl-4-chloroacetoacetate (ECA) -** Ethyl-4-chloroacetoacetate (ECA) is commonly manufactured through a two-step process:

   Chlorination:

   Diketene (CH2=C=C=O) is used as the starting material. Chlorine gas (Cl2) is introduced under controlled conditions to react with diketene.

   This reaction replaces a hydrogen atom on the diketene molecule with a chlorine atom, forming a chlorinated intermediate.

   Esterification:

   The chlorinated intermediate from step 1 reacts with ethanol (CH3CH2OH) in the presence of an appropriate catalyst.

   This reaction converts the intermediate into the final product, ECA (C6H9ClO3), by attaching an ethyl group (CH3CH2-) to the molecule.
4. **Acetic anhydride -** Conventional method of making acetic anhydride uses ketene but a new method doesn't use ketene or diketene.

   Conventional method:

   The most common industrial process for acetic anhydride production involves the reaction of acetic acid with ketene. However, handling ketene itself is challenging due to: A) **High reactivity**: It reacts readily with various components in the reaction mixture, leading to complex product mixtures and reducing the yield of the desired product (acetic anhydride). B)**Unstable nature**: Ketene readily polymerizes (forms long chains) at room temperature, making its handling and storage difficult.

   Alternative approach:

   To overcome these challenges, industrial production often utilizes a two-stage process that avoids using ketene directly:

   Dehydration of acetic acid: This step involves removing the water from acetic acid using a catalyst.

   Carbonylation: The dehydrated intermediate reacts with carbon monoxide (CO) under pressure to form acetic anhydride.
5. **Acetoacetanilide**: The acetoacetanilides synthesis does use diketene. This molecule is formed by the reaction of aniline (C6H5NH2) with diketene (CH2=C=C=O) in a process called acetoacetylation. **Diketene's role:** It acts as a reactive intermediate that transfers the acetoacetyl group (CH3COCH2CO-) to the aniline molecule.
6. **Acetoacet-m-xylidide**: Synthesis follows the same principle as acetoacetanilide - it likely uses **diketene.**
7. **Tert-butyl acetoacetate (t-BAA):** Ester synthesis typically uses diketene, not ketene. Here's the breakdown:

   Diketene's role: It acts as a reactive intermediate that transfers the acetoacetyl group (CH3COCH2CO-) to tert-butanol (t-BuOH) in an esterification reaction.

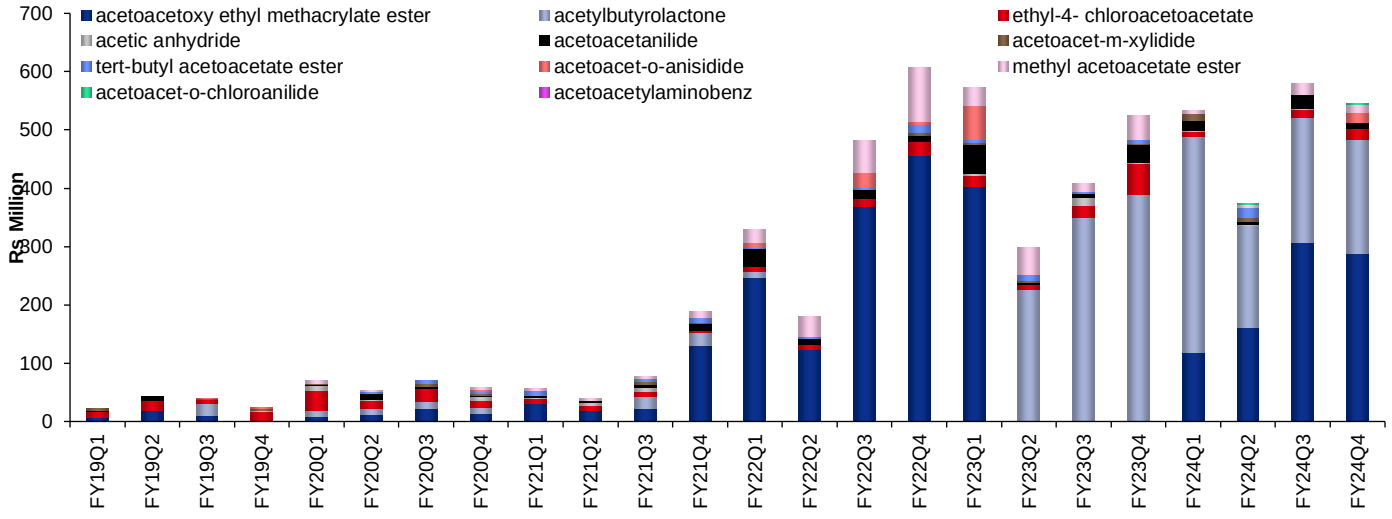
   Esterification: This reaction involves the formation of an ester bond between the carboxylic acid group (COOH) of the acetoacetyl group and the hydroxyl group (OH) of tert-butanol.

8. **Acetoacet-o-anisidide synthesis:** Most likely uses diketene**,** not ketene. Here's why there is **diketene's role:** It acts as a reactive intermediate, transferring the acetoacetyl group (CH3COCH2CO-) to o-anisidine (C6H4(OCH3)NH2) in an acetoacetylation reaction. This reaction results in the formation of the target molecule, acetoacet-o-anisidide.
9. **Methyl acetoacetate ester (also known as methyl acetoacetate or MAA):** Commonly uses diketene for its industrial production. Here's the breakdown:

   Diketene's role: It acts as a reactive intermediate that transfers the acetoacetyl group (CH3COCH2CO-) to methanol (CH3OH) in an esterification reaction. This reaction results in the formation of MAA (CH3COCH2COOCH3).
10. **Acetoacet-o-chloroanilide:** Synthesis most likely utilizes diketene, not ketene. **Diketene's role:** It acts as a reactive intermediate, transferring the acetoacetyl group (CH3COCH2CO-) to o-chloroanilide (C6H4ClNH2) in an acetoacetylation reaction. This reaction forms the target molecule, acetoacet-o-chloroanilide
11. **Acetoacetylaminobenz (likely referring to acetoacetylaminobenzene):** Diketene is the more probable choice. **Diketene's role:** It acts as a reactive intermediate, transferring the acetoacetyl group (CH3COCH2CO-) to aminobenzene (C6H5NH2), also known as aniline, in an acetoacetylation reaction. This reaction results in the formation of acetoacetylaminobenzene.

Overall exports of all these molecules have been on the rise over the past few quarters ➤

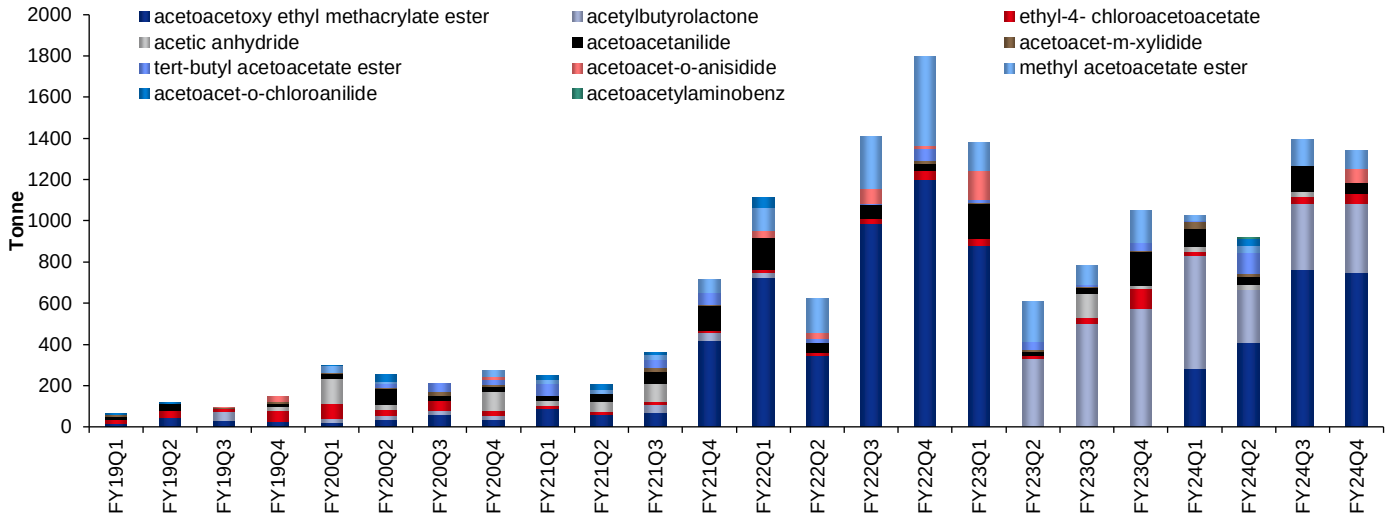
Figure 2: Laxmi Organic makes a variety which uses its expertise in ketene/diketene; exports of such molecules are given below



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Export tonnage has come down after peaking in 4QFY22 ➤

Figure 3: Tonnage of ketene/ diketene-based molecules has fallen from its peak of 4QFY22; please note that FY22 sales were never real as they were mainly driven by supply chain filling; now China is back in the fray and it is setting prices and at the same time, the zero Covid policy-related shutdowns are a thing of the past



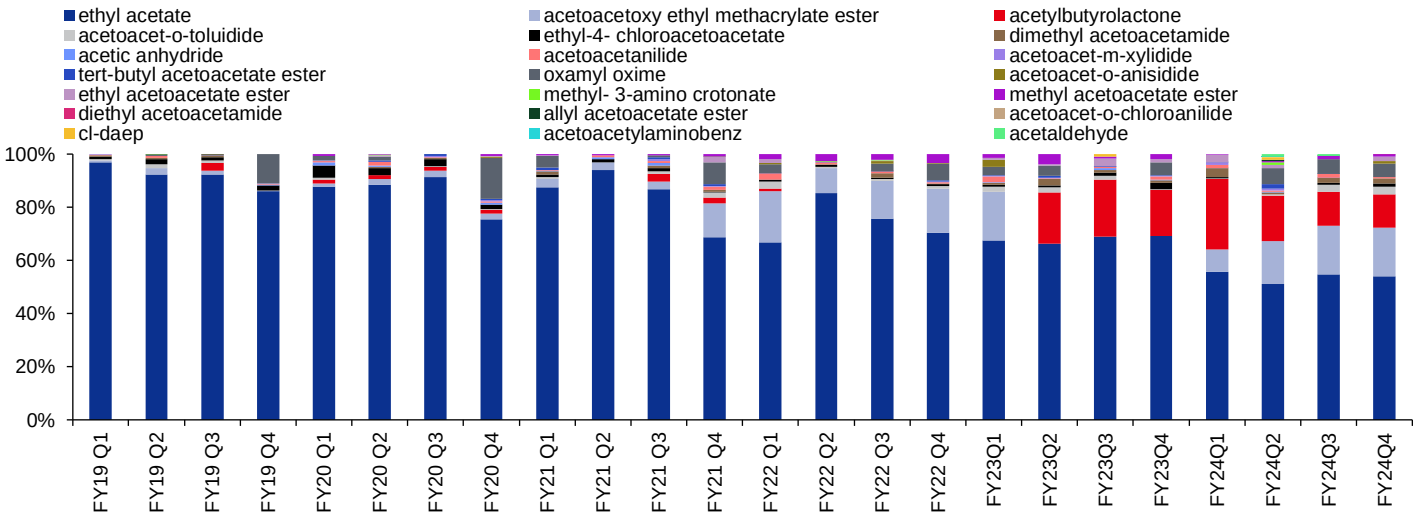
SOURCE: INCRED RESEARCH, COMPANY REPORTS

There is no intrinsic advantage for Laxmi Organic in these molecules ➤

Almost all molecules which Laxmi Organic makes by using ketene or diketene doesn't have any intrinsic advantage vis-à-vis competition. Chinese companies have been manufacturing these molecules since long and Indian companies are also joining the competition.

Laxmi Organic is still primarily an ethyl acetate maker ➤

Figure 4: Approximately 60% of Laxmi Organic's exports (in value terms) are still made up by ethyl acetate



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Ethyl acetate spreads are coming down »

Figure 5: Ethyl acetate spreads are falling to an all-time low; we have always said that ethyl acetate is worse than steel

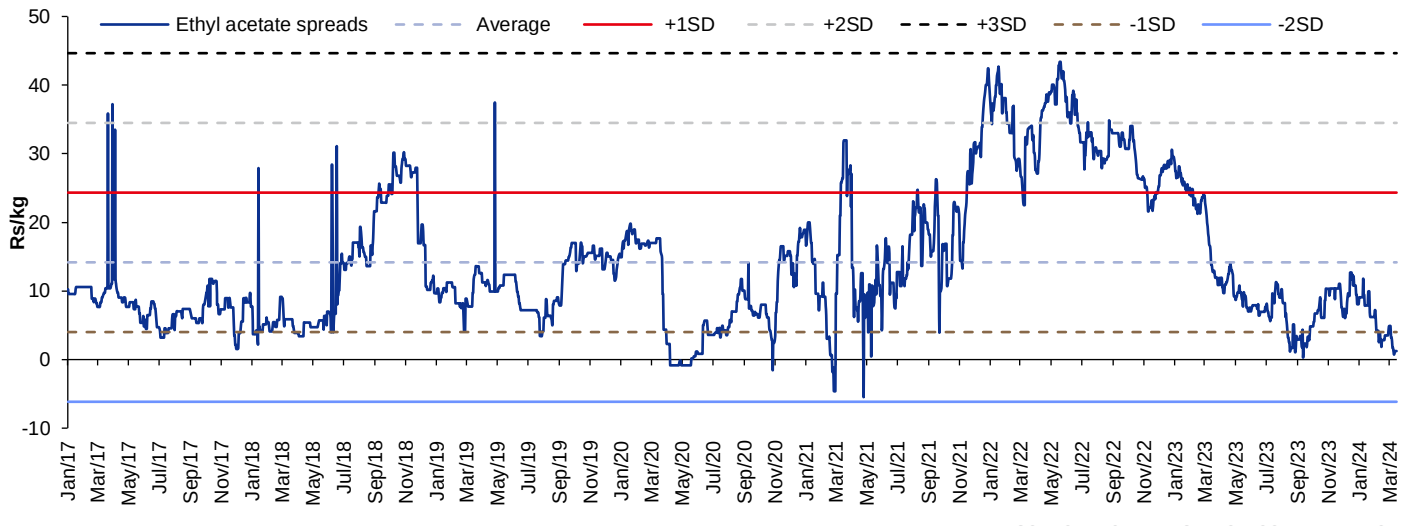


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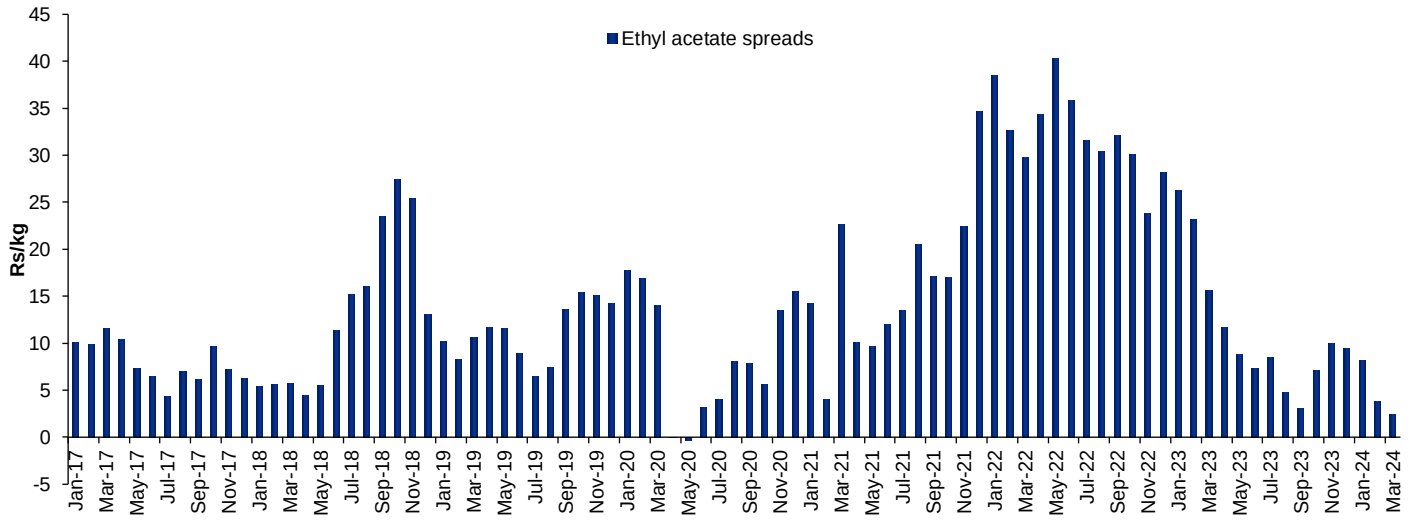
Figure 6: Monthly acetate spreads are forming a nice normal curve with lower and lower averages



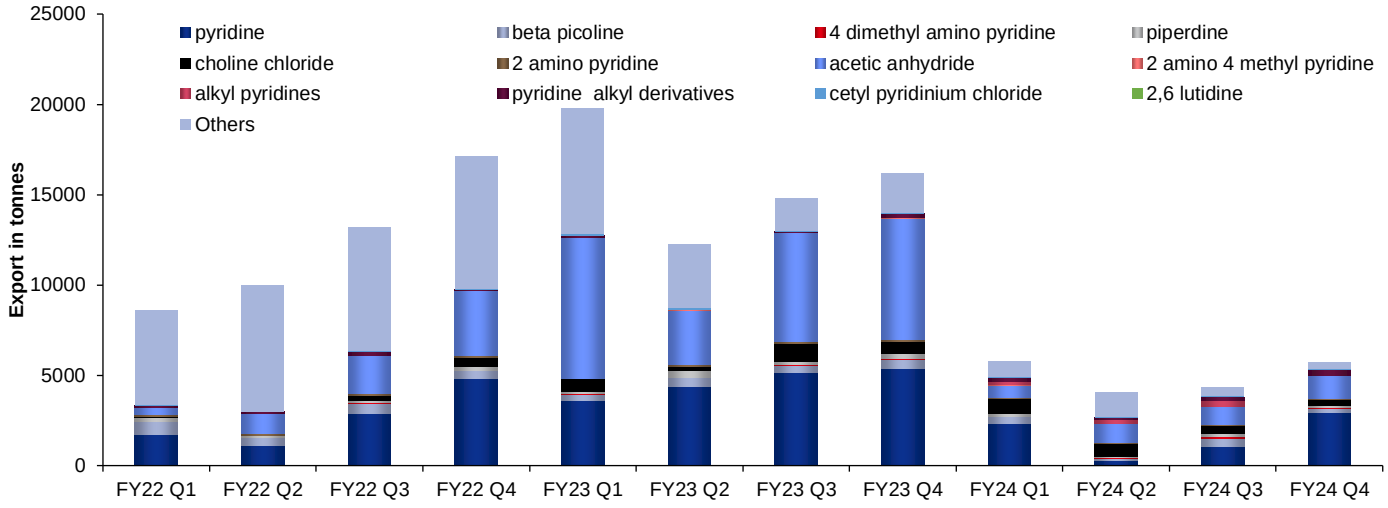
SOURCE: INCRED RESEARCH, COMPANY REPORTS

On the other hand, Jubilant Ingrevia is primarily a pyridine maker with a small quantitiy of ketene/ diketene usage

Jubilant Ingrevia also makes a significant quantity of ethyl acetate, but it sells almost all of that in the domestic market. To the outside world, it sells pyridines, picoline, niacin, choline chloride, piroctone olamine and even zinc pyrithione.

Exports of Jubilant Ingrevia or JIL mainly comprises pyridines whose exports are coming down because of a slowdown in agrochemicals ➤

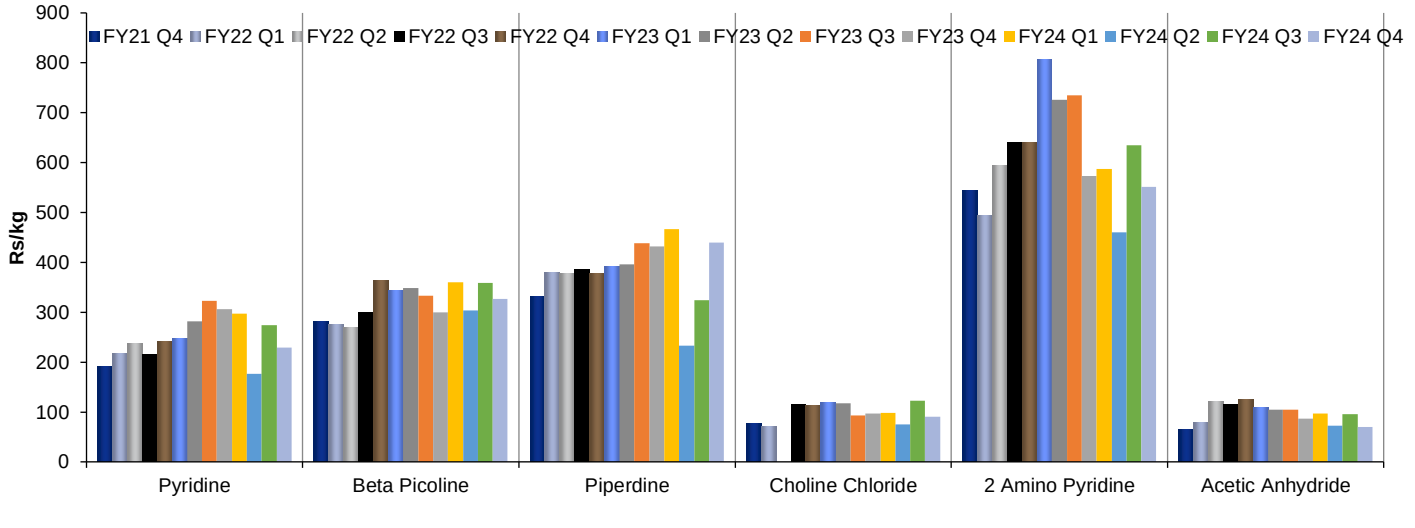
Figure 7: JIL's exports of pyridines, picoline, etc. are coming down as the world is facing a slowdown in agrochemicals



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Realizations of important export molecules are coming down ➤

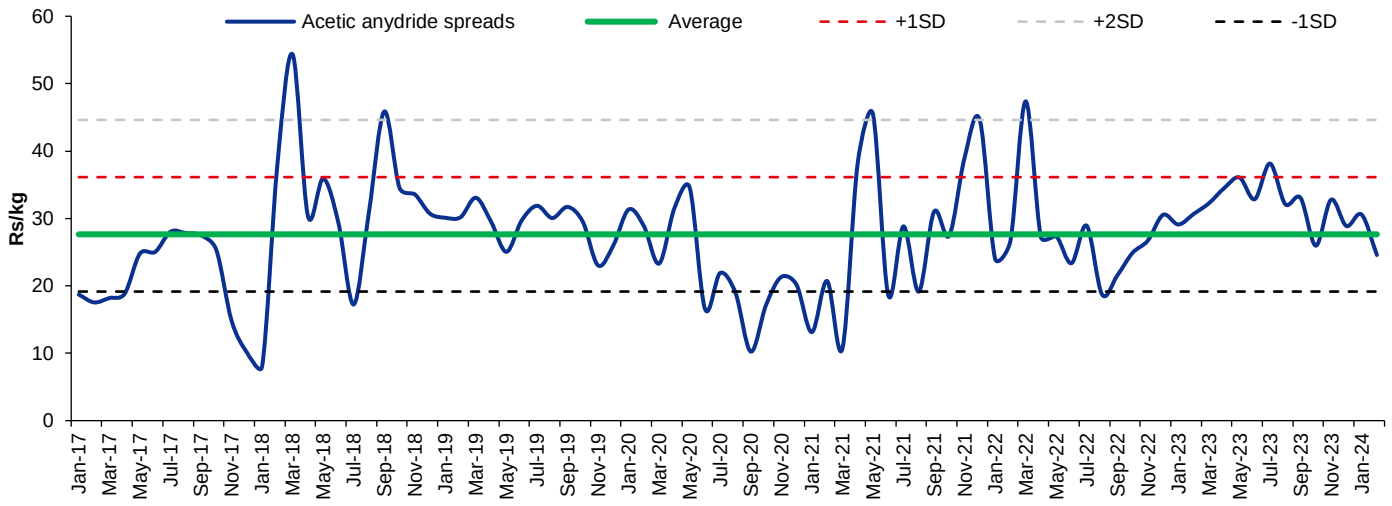
Figure 8: Export realizations of almost all important export molecules are coming down



SOURCE: INCRED RESEARCH, COMPANY REPORTS

JIL depends a lot on the profitability of acetic anhydride, but its spreads are collapsing ➤

Figure 9: Acetic anhydride's spreads over acetic acid are collapsing



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Even pyridines, niacin and choline are showing no signs of any recovery ➤

Figure 10: Vitamin B4 prices are till under stress

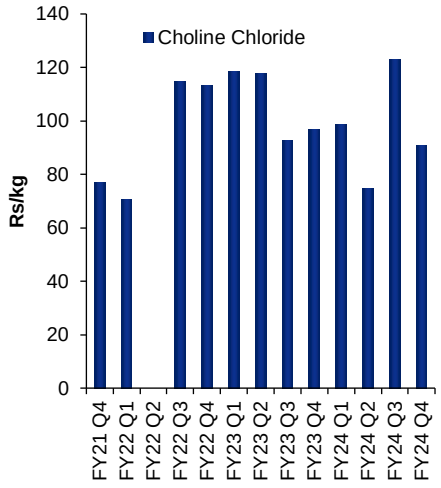


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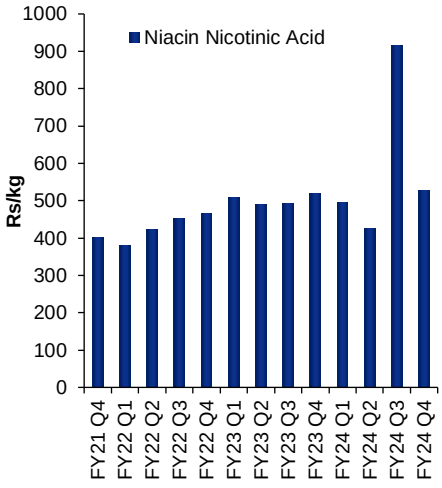
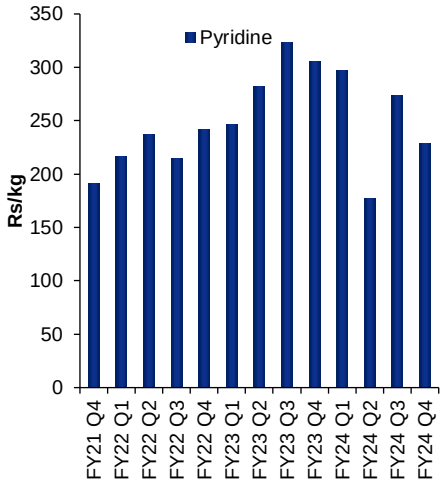
Figure 11: After a brief bounce, niacin prices are falling



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 12: Pyridine prices are also not showing any signs of a recovery



SOURCE: INCRED RESEARCH, COMPANY REPORTS

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any other material conflict of interest at the time of publication of the research report or at the time of public appearance	NO	NO
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been engaged in market making activity for the subject company	NO	NO

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