

Citrus World



► Florida's Natural is a cooperative of citrus growers who own their own groves in the heart of central Florida, encompassing about 50,000 acres of fine citrus groves.

With corn prices soaring, maybe it's time to look at citrus-based feeds.

story by **Eric Grant**
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For the better part of eight months, Florida's Natural, a Lake Wales-based fruit processing facility, hums with the energy of capitalism.

On any given day, the fruit and processing facility can convert as much as 11 million pounds (lb.) of fresh fruit into juices of all kinds. These products wind up in supermarkets across the country and around the world within a matter of days.

The fruit itself arrives on 240-plus semitrucks that stream in from groves owned by 1,100 cooperative members or cooperative fruit-packing houses.

This process continues every day from

early November until the 4th of July, when the citrus harvest concludes.

The net result of all this economic activity is about 5 million lb. of citrus byproducts — peels, seeds, rag (the white membrane within an orange or grapefruit) and pulp that the facility converts into a pelletized cattle feed.

This product is then exported to European markets or sold to cattle producers in the United States.

At one time, feed production was a fairly lucrative undertaking for citrus processors. It was also good for the environment to find a

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Feeding & Feedstuffs



► Citrus harvest for Florida's Natural begins in early November and continues until about the 4th of July.



► **Above:** On any given day, the Florida's Natural fruit and processing facility at Lake Wales, Fla., can convert as much as 11 million pounds (lb.) of fresh fruit into juices of all kinds.

► **Right:** When given the choice of raw product, which is also a common practice in Florida pastures, cows are said to prefer grapefruit to oranges.



► The entire cooperative is made up of more than 1,000 grower members who own more than 50,000 acres of fine citrus groves.



The lowdown on Florida's Natural

Florida's Natural is a cooperative of citrus growers who own their own groves in the heart of central Florida. It is one of the largest organizations of growers and producers, with a membership base of 13 grower associations. The entire cooperative is made up of more than 1,000 grower members who own more than 50,000 acres of fine citrus groves.

The cooperative, the first of its kind, was organized in 1933 by a group of growers to market their crops.

In the 1940s, America's wartime needs led the cooperative to build a concentrate plant on its property in Lake Wales, Fla., which produced juice for the military during World War II.

In the same decade, the cooperative also signed a licensing agreement with the Walt Disney Co., to establish the Donald Duck® brand of orange juice. The cooperative also expanded its marketing efforts behind 100% juices, including a national promotion of the Donald Duck brand by Clarence "Ducky" Nash, the original voice of Donald Duck.

Growth since that time has been significant.

In 1934, the company, known as Citrus World, was capable of processing only 3,000 boxes of fruit per day. Today the company routinely processes 120,000 boxes in a day. It also produces 40 million cases of juice annually under the names Florida's Natural®, Growers Pride®, Bluebird®, Texus®, Adams®, Vintage® and Donald Duck.

Florida's Natural products are sold in almost every major U.S. supermarket and in more than 60 countries around the world.



► The fruit itself arrives on 240-plus semitrucks that stream in from groves owned by 1,100 cooperative members or cooperative fruit-packing houses.



► Above, below: The fruit is washed before entering the processing facility.



Citrus-based energy?

U.S. Department of Agriculture (USDA) research is currently under way to determine the feasibility of using citrus byproducts for production of ethanol.

The Florida citrus industry, which produces about 5 million tons of byproducts every year, could produce as much as 55 million gallons (gal.) of ethanol each year, says Bill Widmer, a chemist at the USDA Citrus and Subtropical Products Laboratory in Winter Haven, Fla.

Widmer says processors could earn three times more money from ethanol than they currently get from selling waste product as cattle feed, which earns them from 2¢-4¢ per pound.

USDA recently built a 10,000-gal. pilot facility where it produced four gal. of ethanol for every 100 gal. of liquid waste pulp. Widmer believes the process could be profitable at that level.

Many fruit processors, however, remain skeptical of the economics of ethanol production — and it could be many more years before ethanol production has the same effect on citrus feed prices that it's had on corn prices this winter.

"There's a lot of work that still needs to be done," Beasley says.

use for citrus byproducts instead of placing it in landfills.

Although recent high-energy costs have put a crimp in efficient production of citrus-based feed, it's still cheaper — and better for the environment — to make it into feed than it is to haul it off to the landfill, Bruce Beasley, final product blending manager for Florida's Natural, says.

"The whole intent of our feedmill," Beasley remarks, "is the least-cost disposal of this material."

Generally speaking, citrus-based feed is about 6%-8% protein. Cost fluctuates between \$70 and \$100 a ton. It's gone as low as \$40 a ton when citrus harvests were large.

Now that feed prices in the United States have skyrocketed, U.S. cattle producers may soon be giving their European counterparts



► Once the Florida's Natural facility peels the fruit and the juice is extracted, the seeds, peels, rags and pulp — about 40%-50% of a typical fruit's weight — are placed in a bin where the conversion from waste material to livestock feed begins.

some competition for citrus-based feed, especially as they look for ways to reduce their feed formulation costs.

“Like everything else, we’re competing with this product in a worldwide marketplace,” Beasley says.

The process

Once the Florida’s Natural facility peels the fruit, and the juice is extracted, the seeds, peels, rags and pulp — about 40%-50% of a typical fruit’s weight — are placed in a bin where the conversion from waste material to livestock feed begins.

“The key challenge to converting citrus byproducts to feed is extracting moisture from that material,” Beasley says.

On average, the material starts out at about 82% moisture, but it needs to be 11% when it’s finally made into feed.

To make that possible, the first step is to apply lime to the material. The lime reacts with the pectin that’s already in the fruit byproduct, and enables the material to release moisture more efficiently.

The material is run through a hammer mill, which reduces the particle size.

Next, the material moves through the pug mill, which is essentially a large screw auger that properly mixes the lime with the citrus material.

After the pug mill, the material moves through a series of presses, which reduce the moisture to about 72%. Much of the liquid released from this process is then sent to a storage tank, where it provides the “feed stream” for the waste-heat evaporator.

“We try to recapture all the energy produced in the natural-gas-fired dryers by directing it to the waste heat evaporators before it is released into the atmosphere,” Beasley says. “We’re trying to use as much of the energy as we can.”

During this process, the facility also captures the sugar solids, which become citrus molasses. This molasses is then sold to distillers for use in production of citrus alcohol, an ingredient in popular alcoholic beverages such as Smirnoff Ice.® A secondary recovery process captures D-limonene, which is used as a cleaning solvent for electrical components and floors, and is also an additive in the manufacturing of spearmint flavors.

“We try to make something out of everything,” Beasley says.

Once these liquids have been removed, the citrus material is then placed into natural gas driers where it’s heated to about 220° F. It emerges from the gas driers in a flaked form, and contains about 15%-16% moisture at this time.



► **Above:** On average, the citrus pulp material starts out at about 82% moisture, but it needs to be 11% when it’s finally made into feed.

► **Left:** The first step in dehydrating the citrus pulp is to apply lime to the material.

► **Below:** After several drying stages, the citrus material is placed into natural gas driers where it’s heated to about 220° F. It emerges from the gas driers in a flaked form at about 15%-16% moisture.



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“The material then goes through a pelletizer,” Beasley says. “This takes it down from 15%-16% to about 13%.”

Because the newly formed pellets remain hot, they’re dropped into counter current flow coolers where fans circulate air through them until the feedstuff reaches the targeted moisture level of 11%.

Once this process is completed, the pelleted feed is placed in storage bins before it’s loaded onto semi trucks or trains and hauled off for livestock consumption.

“We only have about a day and a half of storage space, so we move this inventory pretty quickly,” Beasley says.

About 70% of the feed winds up on ships bound for European markets.

To keep this market, the cooperative’s European customers require adherence to strict quality controls, and each year the European Union (EU) conducts audits and inspections of the facility.

“In essence, we have to follow guidelines that are very similar to those that govern food processing,” Beasley says.

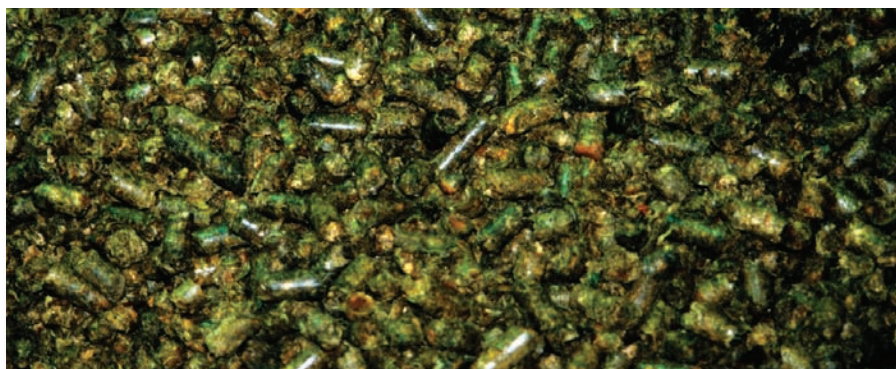
Industry analysts believe citrus-derived animal feeds could become increasingly important in the United States, where increased usage of grain in ethanol production has left feed prices skyrocketing this winter.

“The message is that cattle producers here should consider citrus feed as a good source for fiber when formulating their feed rations,” Beasley says.

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► **Left:** The pelletizing process reduces moisture from 15%-16% to about 13%.



► **Above:** Fans during the cooling process help reduce the moisture content of the pelleted feed to 11%.



► **Left:** “The whole intent of our feedmill,” Bruce Beasley remarks, “is the least-cost disposal of this material.”