Sustainability Issues for the Brazilian Orange Juice Industry

The CitrusBR Carbon Footprint Study
AIJN Business Session
May 19th, 2011
About CitrusBR

CitrusBR was founded in June 2009 by the biggest Brazilian producers and exporters of citrus juices and derivatives: Cutrale, Citrosuco (Fischer Group), Citrovita (Votorantim Group), and Louis Dreyfus Commodities.

Its main objectives are:

• to defend the collective aims of citrus exporters in both the national and international extents
• promote the sector's image
• disclose updated, clear and reliable information
• interact with other agribusiness entities
Consecitrus

Pricing model established by the industry and growers
- to be used as reference for price formation, following the model successfully adopted by the Brazilian sugarcane and ethanol sector
- Voluntary entry
CitrusBR Current Agenda

Transparency and Information
- Commitment towards increased transparency with all stakeholders
- First crop forecast announced
- Website

Other Issues affecting our sector
- Tax credits
- Institutional agenda - with government, other entities and sectors with common interests (i.e: forest code revision)
- others
CitrusBR - Current Agenda

• Project with Apex - started on 2010, includes:

- **Institutional Actions** – sustainability studies, institutional material about the whole Brazilian citrus chain

- **Actions targeting the consumption decline in the main markets** – development of a communication platform called “I feel orange”, integrated with social networks to update the image of the orange juice, making it attractive for new generations and associating it with creativity, inspiration and health. Launched this month

![I feel orange](image)
Brazilian Orange Forecast - 2011/2012

Know more about the differences between orange juice, nectar and drink.

Visit our Library and check CITRUSBR publications

Much more than Vitamin C

Besides the known functions of reinforcing the immunologic system and combating the flu, studies show that orange juice offers many other benefits to human health, such as the support in controlling...
Background - Carbon footprint study

The idea was to have one number for the Brazilian Sao Paulo production of orange juice being delivered in Europe, considering the four CitrusBR associates: Citrovita, Citrosuco, Cutrale and Louis Dreyfus, whose production represents almost the entire production of Brazil.
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The consulting firm DeltaCO2, specialized in the quantification of greenhouse gases (GHG), provided the technical support, following the Publicly Available Standard 2050 (PAS 2050), the GHG Protocol and ISO norms 14040 and 14044 (Life Cycle Assessment).

Were calculated the emissions of Carbon Dioxide (CO2), methane (CH4) and Nitrous Oxide (N2O), expressed as equivalents of CO2 (CO2eq), according to their potential for the global warming.
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This carbon footprint assessment encompasses the following product lifecycle stages:

Raw Material  Industrial Processes  External Logistics
Raw Material:
Includes seedling production, planting, cultivation, fertilization, harvesting and transport of fruit to the industrial plants.

The greenhouse gas sources included are: soil emissions from the application of fertilizers and limestone; emissions from burning fossil and renewable fuels (in agricultural machinery, transport of farm workers and fruit); purchased electricity and upstream emissions in the production and transport of fuels and agricultural inputs.
Raw Material:

Issues relating to land use were not considered in this study, since production increases were achieved through productivity gains rather than orchards expansion.

Source: Elaborated by Markestrat - University of São Paulo with data from IBGE (Brazilian Institute of Geography and Statistics), 2010
Industrial Processes:
Include receiving the fruit, processing, pasteurization or pasteurization + concentration, storage at the plant, road transport to and storage at the Brazilian port (Santos).

The combustion of fuels from stationary and mobile sources, purchased electricity and upstream emissions from the production and transport of industrial inputs and fuel were accounted for in this phase.
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External Logistics:

Includes the transport of juice to European ports in Belgium and the Netherlands, and the storage of juice at the port of destination. The GHG emissions included in this stage came from the production (pasteurization, etc), transport and combustion of fuel in stationary and mobile sources, and purchased electricity.
Whenever possible, the emissions allocation was avoided by analyzing separately the various products and by-products system's production. When it was not possible to analyze separately the inputs or raw material by product, we used the allocation criteria based on mass. The mass yield of products and by-products from orange, calculated for each company in the inventory year, was used as reference (product life cycle).
The Carbon Footprint of the Orange Juice, in gCO2eq/l, produced in Brazil and delivered in Europe is:

- ☑️ FCOJ: 190 gCO2eq/l
- ☑️ NFC: 314 gCO2eq/l
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FCOJ and NFC Energy matrix:

Most industrial processes are powered by biomass to generate heat, steam and electricity and a few industrial processes are powered by natural gas to replace GMP oil.

Most companies light vehicle runs on 100% ethanol and the Brazilian diesel contains 5% of biodiesel for the road transport.

Furthermore, it is important to highlight that 46% of the energy matrix in Brazil comes from renewable energy sources. In this context, it stands out that 85% of electric power is produced from hydroelectric dams and the gasoline contains an addition of 25% ethanol.
**Sustainability - CitrusBR**

**FCOJ and NFC future:**

Against this background, NFC and FCOJ produced in Brazil are supported by a cleaner energy matrix. Thus, major advances in reducing the carbon footprint of the sector are not expected in the short term.

It is worth remembering that the Greening is a FCOJ / NFC carbon footprint threat. The Greening increases the mortality rate / elimination, forcing the planting rate increase. In this scenario there is a productivity drop and a consequent relative emissions increase (carbon footprint).
CitrusBR Technical Committee considers that we should work on a period of 2 or 3 years in order to build a base line and then, define an average for the carbon footprint of the orange juice.

Considering we are working with a biological (agricultural) business, a longer period may be necessary to reach the best results. Experience in filling the developed templates with two more crop data would be very important.
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Next steps:

Update the numbers including data from 2010 and 2011

Publish an instruction booklet aimed to raise awareness about the need of carbon footprint reduction among the supply chain players

Benchmark the food sector, seeking for applicable good practices to our supply chain, specially, the raw material part
Thank you!

Brazilian Association of Citrus Exporters

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