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ANTI-FROST

Lifting Pressure on Sudden Frost in Out-Door Farming

Non-GMO, Non-Chemical, Non-Pesticides

A Cellular Regeneration Biotech with HQ in Singapore

Official Website: www.ibiostim.com

IN THIS ISSUE

TOUCHED BY GAIA

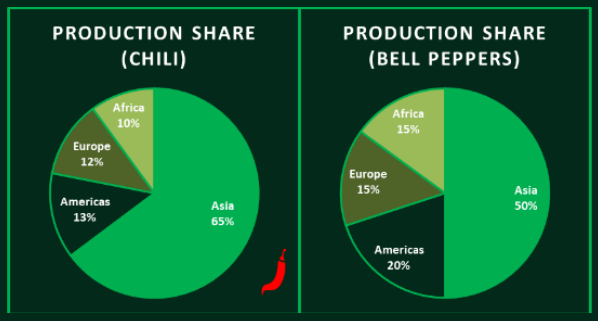
Editor Dr. Jeff Lim

Fieldwork by ChongMing

ECONOMICS OF CHILLI/BELL PEPPERS PRODUCTION

Chilli and bell peppers are staple in an Asian diet, with extension to the rest of the world owing to increasing awareness in nutritional value and health benefits, with major producers as India, China, Thailand, Bangladesh and Pakistan, followed by the US, Europe and then Africa by production. Together, these continents contribute towards the annual global production of ~4.51 million and 36 million metric tonnes for chilli and bell peppers, respectively (FAO, USDA). As with all food crops, chilli and peppers farming comes with its own sets of opportunities.

In this issue, we discuss farming practices and introduce new tools, addressing food security and energy efficiency priorities.



ANTI-FROST FOR FOOD SECURITY AND ENERGY EFFICIENCY

Fieldwork by ChongMing

FARMING PRACTICES ACROSS CONTINENTS

ASIA

(BELL PEPPERS)

- (India): Use of organic fertilizers, drip irrigation, and integrated pest management (IPM).
- (China): Greenhouse cultivation, plastic mulching, and high-density planting.

(CHILLI)

- (India): Similar to bell peppers, with emphasis on organic practices and IPM.
  (Thailand): Use of local varieties, organic fertilizers, and manual weeding.

AMERICAS

(BELL PEPPERS)

- (United States): Use of advanced irrigation systems, plastic mulch, and IPM.
- (Mexico): Greenhouse cultivation, use of shade nets, and drip irrigation.

(CHILLI)

- (United States): Similar to bell peppers, with a focus on pest and disease management.
- (Mexico): Traditional open-field cultivation, use of local varieties, and organic practices.

EUROPE

(BELL PEPPERS)

- (Spain): Greenhouse cultivation, hydroponics, and use of biological pest control.
- (Turkey): Open-field cultivation, use of organic fertilizers, and manual weeding.

(CHILLI)

- (Spain): Similar to bell peppers, with emphasis on greenhouse cultivation and IPM.
- (Hungary): Use of local varieties, organic fertilizers, and manual weeding.

AFRICA

(BELL PEPPERS)

- (Nigeria): Open-field cultivation, use of organic fertilizers, and manual weeding.
- (Ethiopia): Traditional farming methods, use of local varieties, and organic practices.

(CHILLI)

- (Nigeria): Similar to bell peppers, with emphasis on traditional methods and organic practices.
- (Ethiopia): Use of local varieties, organic fertilizers, and manual weeding.

CHILL/FROST & PLANT HEALTH

Chilli and bell peppers follow a C3 photosythetic pathway for food production. Inherently, they are pre-disposed to experience dehydration through photo-respiration. Under sudden chill/frost conditions, particularly below 14 °C/ 57.2 °F, both varieties would succumb within hours to days. Biologically, chilli and bell peppers are not genetically programmed to store sufficient cellular energy (CE) budget to supply into secondary metabolism, a process that is triggered through external stress discussed previously **[ISSUE 1]** as a natural in-plant defence through gene expression. By following a religious regime comprised bio-enzymes and biofertilisers containing stratified organic nitrogen, phospherous, potassium (~1 % by composition per application) and trace micro-nutrients on a weekly basis (tiny doses), the soil microbiome becomes more efficient in symbiosis by lowering the activation energy barrier (AE).

Maintaining healthy metabolism inplant is vital to delivering Ca cations through the "vascular system" to raise flower retention, and improve fruit set rates in a wide variety of C3, C4 and CAM plants. The same principle is also applied to modify feeding insects behavior in **[ISSUE 2]**, by raising compex carbohydrates production. These complex carbohydrates contribute toward the total CE budget supporting energy intensive secondary metabolism in chilli and bell peppers, which explained their ability to thrive even under -3 °C/26.6 °F (first reported in 2024, Japan).

The said case presented inset is characteristic of the resilience iBioStim regime offers to farms and orchards in an open field setting, with zero climate control or overhead shelter. Adverse climatic events allow the advantage of bio-enzymes to shine through, equipping farms and orchards with the confidence to continue business as usual with minimum disruption, thereby matching back to harvest security, food security and energy efficiency goals.

PERFORMANCE UNDER STRESS

With everything being equal, the farm with an existing baseline of ~1.2kg per plant for chilli is now producing >2 kg per plant post intervention, providing clear evidence to the efficacy of iBioStim regime.

GLOBAL IMPACT ON FOOD PRODUCTION AND PRICING

By enhancing the natural frost resistance of chili and bell peppers, the iBioStim regime not only helps farmers manage the risks associated with frost but also contributes to a more stable and resilient global food system and this is how:

Stabilized Supply

- More consistent yields from frost-resistant crops help stabilize the supply of chilli and bell peppers.
- This reduces the volatility in market prices caused by supply shortages due to frost damage.

Improved Food Security

- Stable production ensures a reliable supply of these important crops, contributing to global food security.
- This is especially crucial in regions where chilli and bell peppers are dietary staples.

Economic Benefits

- Farmers benefit from more predictable incomes, reducing the financial risks associated with crop failures.
- Consumers benefit from more stable prices, making these vegetables more affordable and accessible.

SUMMARY

iBioStim continues to turn the tide against climate change and augmenting farmer's perception on crop protection, meeting harvest goals with zero exposure, contributing towards sector GDP longitudinally by building strategic verticals globally.