AgroSpectrum Envisaging Future | Updating Present ASIA

Achieving high yields through sustainable controlled release fertilizer technology

21 May 2024 | News

By, Adrian Wong Ling Yung, Director, Kimia Utama and SK Specialties, Malaysia



By, Adrian Wong Ling Yung, Director, Kimia Utama and SK Specialties, Malaysia

Can you elaborate on the polymer-encapsulated fertilizer technique? How beneficial is a controlled release of fertilizers and plant nutrients?

It has long been established that plant nutrition plays an important role in crop production. The method to fertilize crops has changed much over the years. However, the past decades have seen advances driven by convenience and environmental concerns. Our team at SK Specialties is able to develop an ultra thin polymer coating (20 to 100 microns) which we can use to encapsulate on high quality water soluble fertilizers, which we manufacture under the brand name SK Cote. SK Cote contains an ultra thin polymer coating surrounding a water soluble fertilizer inner core. This creates a water impermeable layer protecting the water soluble fertilizer inner core from rapid dissolution. Soil water gradually penetrates the ultra thin polymer coating via its nanometre pores, dissolving the fertilizer nutrients. The fertilizer nutrients then slowly diffuse out from inside of the coating providing nutrition directly to plants. These types of highly advanced fertilizers are called controlled release fertilizers, which is broadly grouped under the Enhanced Efficiency Fertilizer category.

SK Cote can be fine-tuned to match a plant's nutrient requirements over a single growing season. Therefore, only one single application is required for the growing season. This brings convenience to farmers as much labor is saved when compared to traditional methods which requires several applications of fertilizers a season. It also reduces fertilizer leaching which ends up in waterways and thus it is environmentally friendly. Usage of SK Cote is safe also for plants as the ultra thin polymer coating

prevents the plantâ??s roots from coming into direct contact with high salt content fertilizer which can cause salt damage or scorching. All these benefits combined have been shown to contribute to uniform and consistently higher yields while using less fertilizers.

How do Slow Release Fertilizers (SRF) and Controlled Release Fertilizers (CRF) differ from each other? What is the current market outlook for these technologies?

Slow Release Fertilizers (SRF) and Controlled Release Fertilizers (CRF) have been used interchangeably sometimes, however strictly speaking they are different. Both SRF and CRF offer sustained or extended compared to conventional fertilizers and are categorized under Enhanced Efficiency Fertilizers. Both these types of advanced fertilizers try to bring convenience to crop production and to increase yield. However, CRFs are superior to SRFs in one major aspect. The key reason is the release or availability of nutrients to plants from CRFs are only affected by one factor, which is soil temperature. The dissolution of the nutrients to the plants or release pattern can be measured in the lab and consistently reproduced for every batch. Even though technically the release pattern for controlled release fertilizers such as SK Cote are affected by soil temperature and the polymer coating thickness, the polymer coating thickness is set during manufacturing. Therefore, controlled release fertilizers are truly â??controlledâ?• by only one factor. For SRFs, soil temperature, bacterial activity, soil moisture, soil pH and surface area all affect its release. SRFs are usually limited to controlling a few nutrients only at one time. SRFs usually only reduce immediate availability of nutrients, mainly nitrogen, to plants and there is no consistent release pattern as there are too many factors affecting the nutrient availability of the SRF.

How does SK Cote's Controlled Release Fertilizer strategy perform? How does it contribute to the optimal utilization of plant micronutrients and promotes yields?

At the moment, the market for CRFs is growing as there is shortage of labor worldwide. There is also an awareness of pollution from farming, that is leaching of fertilizers into waterways and also release of Nitrous Oxide into the atmosphere. Traditionally, CRFs are mainly accepted in the ornamental industry due to its intensive labor requirements. Usage of CRFs has successfully alleviated labor requirements which is a major cost factor in ornamental production.

SK Cote as a CRF is able to match plant nutrient requirements over its growing season. This ensures precise usage of nutrition by the crop and thus ensures the best plant growth. With optimal plant growth, maximum potential yield can be achieved. This has been shown and observed in various trials around the world.

As mentioned previously, CRFs are widely accepted in the ornamental industry. At SK, we endeavor to bring CRFs into horticulture, agriculture and silviculture. In Malaysia and Indonesia, SK Cote has been used successfully in oil palm plantations for growing nursery seedlings and also field planting. Trial is ongoing on mature yielding oil palms and results have been encouraging. SK Cote has also been used on other crops in these countries such as rice, maize, chilli, eggplants, ginger, sugarcane, tapioca, and many others and yields have been consistently high. We have also successfully introduced SK Cote to the agroforestry industry for forest plantations and reforestation.

SK Cote has also been widely used overseas such as in Japan and South Korea for rice and vegetable production. In Australia and New Zealand, SK Cote has been widely used in pasture, maize, wheat, sugar cane, sugar beet and vegetable farming. In Latin America countries, SK Cote is extensively promoted in horticulture for vegetable and fruit crops and also in the reforestation industry as well. SK Cote is also commonly used as a premium fertilizer for maintenance of turf and greens in many countries such as Malaysia, Singapore, Brunei, Turkey, Qatar, Dubai and many others.

Will external environmental factors affect Controlled Release Fertilizer release rates? What crops/fields are ideal for this approach?

Only temperature affects the release of nutrients for SK Cote. SK Cote has been broadly used in the horticulture industry. With advancement of coating technology, the cost to produce CRF has been reduced and we can begin to introduce SK Cote into the horticulture, agriculture and silviculture industry. SK Cote has already been proven and used in several crops as mentioned above. The main factor limiting SK Cote or CRF being used universally in mainstream agriculture is the price point. We are working hard to bring prices of SK Cote CRF down to a point where it can be accepted widely as compared to the benefits it brings. We believe it is a matter of time as the shortage of labor in agriculture is becoming a major issue worldwide. Not only that, many countries are starting to pay attention to pollution from the agriculture industry. With SK Cote, the volume of fertilizer required is much lesser than that of conventional fertilizers and therefore less wastage will enter the environment causing pollution.

How do you foresee market prospects in Malaysia and the Asia region? What other countries benefit from SK Cote's innovations?

Another major factor with regards to CRFs is the biodegradability of the polymer shell coating. We at SK are aware of this and have taken proactive steps to overcome this. Many CRFs in the market are not biodegradable. We at SK have developed our polymer coating to be biodegradable. SK Coteâ??s coating is ultra thin too, therefore there are more nutrients and less polymer per unit fertilizer. We strive to continue to improve our product to ensure its safety. We see limitless potential for our product and we believe SK Cote will not only bring convenience to farmers but also will increase their income through increased yield.