

How to use potassium chlorate

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The problem.

Unreliable flowering is the major constraint to successful longan production throughout the world. Warm periods during south Florida's winter along with continued leaf flushes reduce or eliminate adequate longan flowering during many years. Potassium chlorate ($KClO_3$) has been used to improve flowering during the normal crop cycle and to "induce" off-season flowering of longan trees in Thailand, Taiwan, other Southeast Asian countries, Florida and Hawaii. However, the appropriate rates, application methods, and timing of $KClO_3$ applications appears to vary with climate, soil, type, application method, time of year and cultivar.

Background and safety issues on the use of potassium chlorate.

Used properly and following safe handling and storage procedures potassium chlorate may be an effective and useful tool in longan crop production. Potassium chlorate is an odorless, solid, fine crystalline, white colored material. A word of caution about potassium chlorate is in order however. This material is a powerful oxidizing agent and used in making explosives, matches, and pyrotechnics. This material can explode if handled improperly. When heated it emits toxic fumes of chloride and potassium oxide. It is categorized as a compound that requires precaution in handling and storage. These precautions include but are not limited to:

1. Must be stored in a dry, well-ventilated location away from direct sunlight, sources of ignition, combustible materials, heat, and incompatible materials. Incompatible materials include other fertilizers, reducing agents, finely divided metal powders, any corrosive materials, and organic materials.
2. Reseal containers immediately after use. Sealed containers with plastic are best. Keep containers dry.
3. Never store $KClO_3$ with fertilizers, pesticides, or other chemicals. They may set each other off causing a fire or explosion.

Potassium chlorate is categorized as an irritant, nuisance dust, and health hazard if improperly handled. Inhalation will cause irritation to the lungs and mucus membranes and symptoms include coughing, choking, and unconsciousness. Eye irritation symptoms include itching, watering, and redness, and possible corneal damage. Skin irritation symptoms include reddening, blistering, scaling, and itching; prolonged exposure may cause ulcerations. Avoid inhalation, dermal penetration, and ingestion. Chronic effects on humans: toxic to blood, kidneys, lungs, nervous system, liver, and mucous membranes. Safely handling the material includes:

1. **Personal protective clothing:** safety glasses or goggles, PVC gloves, impervious boots, apron or coveralls, NIOSH/MSHA approved dust mask/respirator. (Note: do not use

cloth or leather gloves as they will hold the material making the gloves potentially hazardous).

2. Handlers should wash their hands and face before eating, drinking or using tobacco products.
3. Good ventilation.

First aid information includes:

1. Eye exposure: remove contact lenses if present, immediately flush with water for 15 minutes, holding eyelids open. Seek immediate medical attention.
2. Skin/dermal exposure: wash with soap and water; get medical attention if symptoms persist.
3. Inhalation: remove person to fresh air; provide artificial respiration or oxygen if needed.
4. Ingestion: do not induce vomiting get immediate medical attention.

How to apply and rates of potassium chlorate

In order for potassium chlorate to induce flowering in longan trees

1. The shoots on the trees must not be actively growing or have recently (within the last 2 weeks or so) been growing. In other words, trees should be dormant (no shoots growing). Trees with some shoots growing and others not growing will not flower well after application of potassium chlorate, i.e., only those shoots not growing at the time of application may flower. You may not want to apply potassium chlorate to the trees if 50% or less of the shoots is dormant. It may be better to top and hedge all the trees to synchronize the growth of all the shoots. After the new shoots and leaves have grown (matured) and are dormant then applications of potassium chlorate will be successful on most shoots.
2. The tree must be healthy. Trees with signs of iron deficiency or other deficiencies will not flower well in response to potassium chlorate treatment.
3. A working irrigation system to water trees before and after potassium chlorate applications.

If trees are dormant and healthy potassium chlorate will work most of the time. However, if potassium chlorate is applied during late November through February there is a chance that the trees will not flower due to cold weather slowing the uptake and/or physiological reaction to potassium chlorate. Sometimes the trees will flower later. There is also a chance that even if the trees flower during cool weather there will be few set fruit because the pollinating insects (bees) will not fly when temperatures are too cold (below 13°C or 55°F).

Procedures

1. Remove the leaf litter and organic matter from the tree trunk out to the edge of the tree canopy. The organic matter may interfere with penetration of the potassium chlorate or be tied up with the organic matter.

2. If recent rainfall is less than ½ inch then water the grove 1 or 2 days before applying potassium chlorate.
3. The rate of potassium chlorate per tree will vary depending upon tree size.

Tree size/age	Rate of potassium chlorate per tree	Comments
4 to 8 years old*	4 to 7 oz	Usually 1 application only
8 to 15 years old	7 to 13 oz	Usually 1 application only
15 plus years old	13 oz to 22 oz	Some people apply twice to very large trees. The first application may be 16 oz/tree and the second application 30 days later at 8-10 oz per tree.

*, our testing found these rates worked on young trees.

4. Mix the potassium chlorate with at least 5 gallons of water per tree and apply from the tree trunk up to the drip-line (edge of the canopy).
5. After applying the potassium chlorate irrigate the grove for ½ to 1 hour.
6. Irrigate the grove every 3 or 4 days for ½ to 1 hour for the next two weeks.

Usually the trees will begin to respond to the treatment in 30-40 days. Watch the terminal ends of the shoots carefully for signs that new growth (hopefully flowering panicles) is occurring.

(c://ext/handouts/2010/how to use KCl.docx)