
# A&L CANNABIS & HEMP NEWSLETTER SEPTEMBER 2021

**IN THIS ISSUE**



## NEW Analytical Packages from A&L

**A&L Canada Laboratories** has added new analytical packages:

| CANNABIS ANALYSIS | CODE | AMOUNT | TAT |
|---|---|---|---|
| **New Microbiological Rapid Methods** | | | |
| Rapid USP/EP Herbal Micro Package (Y&M 3M Petri-films) (3 business days) | BMRPDMM | 12-17 g | 3 days |
| qPCR Package Y&M – validation in progress | - | - | 3 days |
| **Heavy Metal – Topicals Antimony (Sb)** | E4 | 2g | 3 days |

| CANNABIS MICROBIOLOGICAL PACKAGES | CODE | AMOUNT | TAT |
|---|---|---|---|
| **2.0 Product Micro Analysis** | | | |
| ***Extracts and formulated products:*** | | | |
| Oral Film/Strip Micro Package (Orodispersible – report per film)<br>(TAPC, TYMC, *P. aeruginosa, S. aureus, E. coli)* | BFILMM | 16 Films | 5 days |
| **Supplies Available to Order** | | | |
| 3 M Sponge swabs. One package contains 25 swabs<br>3M quick cotton swab | BSWAB<br>B3MQSWAB | | |

## CANNABIS DISEASE DIAGNOSTICS

| | | | |
|---|---|---|---|
| **Cannabis Other Pathogen Tests** | | | |
| Beet Curly Top Virus | VBCTV | 1-2 g | 3-5 days |
| We are the Canadian Agdia dealer for supply test kits see www.agdia.com order through www.alcanada.com or clientcarecannabis@alcanada.com | | | |

## A&L LABS ADDITIONAL SERVICES FOR CANNABIS PRODUCTION

| | | | | |
|---|---|---|---|---|
| **Water/Fertigation Solution – Greenhouse Complete Package** | | | | |
| | **Total Suspended Solids:** | GSSW245 | Included | 1 day |
| | | | | |
| **Plant Tissue Nutrient Analysis Package** | | | | |
| | **Chloride** | ICLW030 | Included | 1 day |
| | **Silicon** | PSI | Included | 1 day |
| | **Molybdenum** | PMO | Included | 1 day |
| | | | | |
| **Growing Media Package** | | | | |
| | Molybdenum | SMO | Included | 3 days |
| | Silicon | SSI | Included | 3 days |

GROWUP

The **GrowUp Industry Awards Gala** is a national annual event honouring cannabis professionals and companies and recognizing excellence and innovation in our industry.

**We would like to say thank you to everyone who voted for us! We have been nominated for the Testing/Laboratory Equipment Company of the Year for the GrowUp 2021 Awards Gala!**

**Now is the time to vote! Voting is open until Thursday, September 30th, 2021**

**Link: www.growupawards.com/vote**

DISEASE DIAGNOSTICS

# NEW AgDia Products for Cannabis

## A&L Canada Laboratories is the Canadian Distributor of AgDia Products

### Rapid Isothermal Assay for Detection of Emerging Pathogen in Industrial Hemp

Agdia, Inc. (is happy to announce the commercialization of a rapid, user-friendly, DNA- based assay, on their AmplifyRP® XRT platform, for the detection of *Beet curly top virus*.

Curly top disease affects numerous commercially important hosts, including common bean (*Phaseolus vulgaris*), cucumber (*Cucumis sativus*), industrial hemp (*Cannabis sativa*), pepper (*Capsicum annuum*), potato (*Solanum tuberosum*), spinach (*Spinacia oleracea*), squash and pumpkin (*Cucurbita pepo*), sugar and table beet (*Beta vulgaris*) and tomato (*Solanum lycopersicum*). This disease is caused by *Beet curly top virus* (BCTV), a *Curtovirus* (family Geminiviridae), existing as a complex of strains differentiated genotypically, causing symptomology on the hosts mentioned above. Additionally, strains of BCTV are known to infect more than 300 species of plants in no fewer than 44 families, many of which are asymptomatic, weedy hosts.

Symptomology of *Beet curly top virus* was first observed in the late 19$^{th}$ century in the western U.S. on sugar beets. It was, however, not recognized as being caused by a specific pathogen until 1915, when leafhopper transmission was proven, and viral etiology was proposed. Since then, BCTV has spread throughout North America where hosts are cultivated, including several states in the American West and Southwest, southwestern Canada and Mexico. Furthermore, BCTV has been identified in parts of South America and several countries in the Mediterranean basin. All strains of BCTV are considered pathogens of quarantine importance in Canada, Israel, Mexico and the European Union.

*Beet curly top virus* is transmitted efficiently by the beet leafhopper, *Circulifer tenellus* (Order Hemiptera), in a persistent circulative manner. The virus can be acquired within minutes of feeding, and insects are known to remain viruliferous for up to a month. *Beet curly top virus* is phloem- limited, and the leafhopper must feed on infected phloem to acquire and transmit the virus to healthy plants. *Circulifer tenellus* is the only known vector in North America; however, in Europe, *C. opacipennis* is also known to vector the virus. The robust dynamics of the host-virus-vector relationship facilitate epidemics in parts of the world where leafhopper populations are high. Furthermore, the movement of infected propagative materials can spread the virus across great distances. Mechanical transmission through infected plant sap has been accomplished under experimental conditions. Nevertheless, this scenario is not thought to contribute to the epidemiology of naturally occurring curly top infections. Seed transmission of BCTV is not known to occur in the host species listed above.

Symptoms of curly top disease vary according to host and are typically more severe when plants are infected at earlier growth stages; many plants die before reaching maturity. Symptoms of curly top include stunted and distorted plant growth; leaf curling, crumpling, yellowing, vein swelling and distortion; and necrosis and hyperplasia of the phloem (**figure 1**). On beets, phloem tissue becomes necrotic, and exudate appears on the leaf surface. On tomato and pepper, fruit set is greatly diminished, and fruit that does form ripens prematurely. Furthermore, veins become purple.


**Figure 1: *Beet curly top virus* symptoms in outdoor tomato cultivation. Used with permission from Whitney Cranshaw, Colorado State University, Bugwood.org**

Industrial hemp has reemerged as an important crop within several U.S. states, due to federal legalization and the demand for fiber, seed and cannabidiol. As production has increased, the list of disease organisms infecting this crop has grown to include several fungal, bacterial, viral and viroid pathogens. *Beet curly top virus* has been confirmed infecting industrial hemp and appears to be widespread on this crop throughout regions where vectors are present. There is a scarcity of research on this specific pathosystem; however, the understanding of the epidemiology of BCTV on cannabis is burgeoning, along with the crop. Symptoms of infection on industrial hemp include stunting leaf deformation and chlorosis **(figure 2.)**.

**Figure 2: *Beet curly top virus* infection showing both yellowing and strong leaf curling in *Cannabis* spp. Used with permission from Whitney Cranshaw, Colorado State University, bugwood.org**


Agdia's new AmplifyRP® XRT assay for detection BCTV is based on recombinase polymerase amplification (RPA). This technology promotes the rapid amplification and detection of nucleic acid targets, DNA or RNA, while maintaining a single operating temperature of 39 – 42 °C. The AmplifyRP® XRT products achieve target sensitivity and specificity comparable to PCR, while having clear advantages over the lab-based technology. AmplifyRP® XRT products do not require a nucleic acid purification step; crude sample extracts are prepared using a simple extraction buffer and tested directly. This makes the testing process simple and saves the end user valuable time. Furthermore, this facilitates the implementation of this technology at remote locations with limited resources. When paired with Agdia's AmpliFire® isothermal fluorometer, the XRT system is a rapid, user-friendly tool that can be implemented in the field or the lab by personnel with limited experience in molecular diagnostics.

Agdia states their assay was screened against a diverse collection of confirmed strains, including those infecting beets, industrial hemp, peppers and tomatoes, detecting all true positives. Furthermore, no cross-reactivity was observed with an extensive panel of viral and viroid pathogens, including *Alfalfa mosaic virus*, *Cucumber mosaic virus*, *Hop latent viroid*, *Hop stunt viroid*, *Tobacco mosaic virus*, *Tobacco ringspot virus*, *Tomato brown rugose fruit virus*, *Tomato mosaic virus*, *Tomato ringspot virus*, *Tomato spotted wilt virus* and *Tomato yellow leaf curl virus*. Sensitivity for this assay is greater than that

observed with the published RT-qPCR assay and conventional RT-PCR assay to which it was compared. This product was developed to test leaf, stem and petiole tissue.

The introduction of this product brings Agdia's catalog to 25 assays on the AmplifyRP® platform. High levels of market demand for field-deployable, plant pathogen detection products have driven this output, and Agdia maintains they will continue to expand their product offerings.

## OUTDOOR GROWERS – CHECK OUT THE SOIL MANAGEMENT WEBINAR ON SEPTEMBER 16th


**A&L Canada Laboratories is holding a Soil Management Webinar on September 16th, 2021, from 1:30 pm to 3:00 pm**

Join the A&L Team for this **complimentary** 1 ½ hour virtual workshop to be held on Zoom.

**Presentations:**

- **Why Soil Test** – Richard Robbins, Agronomy Customer Service Rep
- **Sampling Tips** – AJ Mickle, Agronomy and Precision Agriculture
- **How to Interpret Your Soil Test** – Chris Meier, Agronomy & Business Development Manager, Central and Eastern Ontario

At the end of the Presentations there will be a **Q&A Session with the A&L Team**.

**Please register today at**
**https://us06web.zoom.us/webinar/register/WN_3cf2y0KmSnS88YcG7B7LhQ**

# PLANT NUTRIENTS

## FOR IMPROVING & PROTECTING PLANT HEALTH

### NITROGEN
Nitrogen is an essential component of amino acids for building proteins, nucleic acids and chlorophyll which converts the sun's energy into sugars. It is vital for plant metabolism, growth and health.

### PHOSPHORUS
Phosphorus is vital for energy storage &transfer and membrane integrity in plants. Particularly important in early growth stages, it promotes tillering, root development, early flowering and ripening.

### COBALT
Cobalt is an essential component of some enzymes and co-enzymes that can affect the growth and metabolism of plants. It is also necessary for nitrogen (N) fixation which occurs within the nodules of legumes. Cobalt can increase seeds' drought tolerance and reduce plant stress.

### POTASSIUM
Potassium has major functions in enzyme activation, transpiration & the transport of assimilates (the products of photosynthesis). It helps plants to retain water during droughts, provides strength to plant cell walls and decreases susceptibility to diseases & insects.

### CALCIUM
Calcium is needed for biomembrane maintenance. It helps in cell wall stabilization as an enzyme activator, in osmoregulation and in the cation-anion balance & thus also plays important roles in resistance to diseases and abiotic stresses such as drought, heat & cold.

### SULFUR
Sulfur is integral to all living plant cells and helps to produce amino acids involved in chlorophyll production, proteins & vitamins. It contributes to plant growth & seed formation, improves winter hardiness & helps plants resist diseases.

### MAGNESIUM
Magnesium is central to the production of chlorophyll which is needed for photosynthesis and healthy green leaf tissue. It reduces crop stress caused by exposure to the sun and high temperatures, while a deficit can often cause stunted growth.

### BORON
Boron is required for cell wall synthesis and cell expansion. Boron deficiency disrupts reproductive growth, shoot & root growth & pollen viability and hence influences seed set and yield. A lack of boron can result in deformed leaves and poor quality of harvested product.

### CHLORINE
Chlorine improves plant productivity, plays a role in photosynthesis and is needed for osmosis and ionic balance. It can help to minimize water loss during stressful dry periods and enhance disease resistance.

### NICKEL
Nickel is important in plant seed germination, photosynthesis, enzyme functions & nitrogen metabolism. A deficiency affects plant growth, antioxidant systems and response to stress.

### ZINC
Zinc participates in chlorophyll formation, is needed to activate many enzymes in plants and is needed for plant immune responses. As a result, it is important for increasing plant resistance to diseases & pests.

### SELENIUM
Because selenium is chemically similar to sulfur, it is taken up inside plants via sulfur transporters inside the roots. Studies show that selenium improves plant growth and increases tolerance to biotic and abiotic stresses.

### IODINE
Iodine has been found to be associated with enzymes in plants. Research suggests that it is important for biological processes such as photosynthesis, energy metabolism and calcium-signaling. Iodine deficiency delays flowering and disrupts root, leaf & fruit development as well as plants' environmental and climatic stress defences.

### SODIUM
Sodium is essential in transporting CO2 during photosynthesis for a limited number of plants. For other plant species, because it is chemically and structurally very similar to potassium, it can also fulfill many of the roles played by potassium, including metabolic ones.

### COPPER
Copper plays a key role in nitrogen & hormone metabolism and is needed for many enzyme activities in plants, as well as for chlorophyll and seed production. Deficiencies can lead to crop failure and increased susceptibility to diseases such as ergot.

### IRON
Iron is another essential component for creating chlorophyll and also serves as a catalyst for cell division which is central to plant growth. Many plants also use iron for their enzyme functions. A lack of iron results in yellowing leaves and poor fruit quality & quantity.

### MANGANESE
Manganese plays a key role in a variety of plant functions including photosynthesis, enzyme activation, respiration and nitrogen assimilation. Deficiencies can cause weaker structural resistance against pathogens and less tolerance to drought & heat stress.

### SILICON
Silicon increases plant vigor and improves tolerance to abiotic stresses such as drought, salinity or heavy metals. It enhances plant cell walls' strength and structure, increasing resistance to plant diseases & insect pests. Good silicon nutrition stimulates photosynthesis & improves grain production.

### MOLYBDENUM
Molybdenum is used by plants to reduce nitrates into usable forms & for biological nitrogen fixation by certain species. Insufficient molybdenum means some plants can't fix nitrogen from the air to make proteins & can hinder normal plant growth.

Soil2Oil™ A&L CANNABIS LABS
clientcarecannabis@alcanada.com
www.alcannabislabs.com

Source: International Fertilizer Association (IFA) 2020

## A&L and Hawthorne held a complimentary webinar "Unlock Your Plant's Potential" highlighting best management practices for production of Cannabis

If you would like to watch the webinar again, or missed it the first time, please click on the attached links to view on the A&L YouTube channel.

**PLANT NUTRIENT TESTING - Importance, Method, Timing, Results, Interpretation**
Greg Patterson, CEO and Certified Crop Advisor (CCA), *A&L Canada Laboratories Inc.*
https://youtu.be/1hHJ-uc7VGQ

**MEDIA AND WATER MANAGEMENT - Importance, Best Management Practices**
*Jean Pierre Fortin,* Technical Sales Support, *The Hawthorne™ Gardening Company*
https://youtu.be/eU1vvaQevQI

**LIGHTING - Light Distribution & Type, Spectrum Optimization, Heat Loads, ROI**
*Brandon Robinson,* Technical Service Engineer, *The Hawthorne™ Gardening Company*
https://youtu.be/2tYCY2ziMd8

If you have questions or are interested in more information, please visit:
www.alcanada.com
www.hawthornegc.com/
www.hawthornegc.ca/
https://fafardpro.ca/en/growers/products/cannabis/




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# Upcoming Industry Events

### Cannabis Expo Montreal
September 14 - 15, 2021 – Montreal, Quebec
https://www.cannabisexpomontreal.com

### Canadian Hemp Conference 2021 – Virtual
November 16 - 18, 2021
https://www.hemptrade.ca

### Lift & Co. Expo
November 18 - 21, 2021 – Toronto, Ontario
https://liftexpo.ca

**Notice of New Dates for the Grow Up Conference & Expo:**


### Grow Up Conference & Expo
November 30 to December 2, 2021 – Niagara Falls, Ontario
https://growupconference.com


Join Brian Coutts, Strategy and Business Development Manager, for a discussion on the important topic of Hop Latent Viroid (HPLv) disease affecting the cannabis industry

**Review of all cannabis samples analysed by A&L in the past 12 months indicates very high prevalence of Hop Latent Viroid (HLVd).** Over thousands of samples analysed from across Canada, a positive rate of over 25% for HLVd has been confirmed in samples tested for this viroid. This high incidence rate reinforces the need to assess plants for disease early in the growth cycle so preventative measures can be taken.

DISEASE DIAGNOSTICS

# HOP LATENT VIROID (HLVd); Positive detection rate of 25%

**Review of all cannabis samples analysed by A&L in the past 12 months indicates very high prevalence of Hop Latent Viroid (HLVd).** Over thousands of samples analysed from across Canada, a positive rate of over 25% for HLVd has been confirmed in samples tested for this viroid. This high incidence rate reinforces the need to assess plants for disease early in the growth cycle so preventative measures can be taken.

A&L's Cannabis Disease Diagnostics Services provides testing services for Hop Latent Viroid (HLVd) – and we understand how important it is to get quality results back quickly. For HLVD testing, **results are available in 3 business days**.

A&L Canada Laboratories has been providing Plant Disease Diagnostics (PDD) for over thirty years in row, horticultural and greenhouse crops. A&L offers complete pest diagnosis and services for the detection of plant pathogens including fungi, bacteria, viruses, and nematodes in association with plant tissues, soils, composts and water. Our expert team use many different technologies for our customers to meet their rigorous testing requirements.

A&L's Disease Diagnostics team works closely with each customer, from researchers to diagnosticians and growers, both in the greenhouse and field, to provide their results in the most cost effective and rapid way while maintaining customer confidentiality.

To learn more about Plant Disease Diagnostics (PDD), visit the A&L Plant Disease Diagnostics website at www.pdd.alcanada.com, or email clientcarecannabis@alcanada.com.

**PATHOGEN TEST: Hop Latent Viroid**

CODE: BVHLVD
AMOUNT: 0.5-1 grams
TAT: 3 days

*"Hop Latent Viroid in cannabis is a very serious and costly issue causing stunting, malformation or chlorosis of leaves, brittle stems, and reduction in yield and THC content. Additionally, cuttings taken from the infected plants for clonal propagation is cause for reduced rooting success rate."*

- Dr. Keri Wang
Microbiology Laboratories Director
Senior Scientist
A&L Canada Laboratories Inc.

HLVd is primarily spread through mechanical transmission, meaning it can be easily controlled when using clean starting materials and best practices for cleanliness in your growth rooms.

# A&L Cannabis Labs Contact Information

**For Cannabis or Hemp related questions, please email:** clientcarecannabis@alcanada.com

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