

# KGS-2:

## Plant Growth and Biofungicide Products

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KGS Group is an employee-owned, multidisciplinary engineering consulting firm serving clients throughout North America. The company's R&D activity in the bioremediation sector has created applications for the agriculture industry.

Several of the bacteria strains that have been isolated by the company demonstrate a potential utility in agriculture, specifically plant growth, development and biocontrol. KGS is in the process of commercializing a number of strains as microbial inoculants for agriculture.

### **TECHNOLOGY AND APPLICATION**

KGS Group has developed novel agricultural beneficial strains that were isolated from Manitoba soils. KGS-2 is a novel plant growth promoting and Phosphate Solubilizing Bacteria (PSB) with psychrotrophic (cold tolerant) properties ideal for cold prairie soils.

KGS-2 associates with plants as an endophytic organism. The company is developing seed coating formulations and foliar application methods for wheat. To date, they have found robust survivability of the strain during the process of seed inoculation (i.e., atomization at high pressure, drying) and during exposure to organic compounds, metals, and salts found in seed coating products. We have conducted 4 years of crop trials on wheat, yield increases range from 6-24%. As a part of the increase in yield, total protein per acre increases by almost the same amount. KGS Group notes that the protein % in wheat is not diminished while yields increase substantially. In 2020 we developed a direct seed coating process for wheat which lowered the effective concentration needed on wheat to  $10^6$  Colony Forming Units (CFU) per seed. KGS-2 appears to be an ideal candidate for direct seed coating of Wheat.

## TECHNOLOGY READINESS LEVEL: 4-5

The company has accumulated five years of lab and greenhouse data. The primary goals for 2021 are:

1. Continue the process of licensing KGS-2 through the Canadian Food Inspection Agency (CFIA) as a plant growth promoter
2. Expand the crop trial program to gather more crop year data in a variety of agriculture regions and climates.
3. Potentially engage agricultural company working with high crop value on vertical or greenhouse farming.
4. Refine seed coating and foliar application methods and inoculant production scale-up for KGS-2
5. Work on shelf-life stability issues

## INTELLECTUAL PROPERTY

The company has filed a patent and PCT Application for KGS-2. USA Patent 16/008,404, approved on July 7, 2020. Canadian Patent 3,008,344, approved on August 17, 2020. PCT Application CA2018/051479, filed November 23, 2018, 30-month deadline is May 23, 2021.

KGS is interested in either partnering to commercialize its crop inoculant lines or licensing IP to another company. KGS is also interested in adding its strain to an existing seed coating treatment.

## MARKET NEED

To increase profits, Canadian farmers need to sustainably intensify their cropping methods. Non-GMO microbial inoculants are a valuable tool to accomplish this goal, especially in organic farming. KGS-2 is a powerful growth stimulator of Wheat and other crops, to our knowledge no microbial product with cold tolerance properties ideal for Canadian prairie farmers with cold spring soils has been commercialised.

## COMPETITION

To our knowledge, BASF SE, Bayer CropScience, Sumitomo Chemicals Company Ltd. (Japan), Monsanto (NOW Bayer), Syngenta AG, Corteva, Certis USA LLC and CHR. Hansen Holdings are working with PGP bacteria. To the best of our knowledge endophytic and psychrotrophic characteristics have not been featured for one single inoculant product. KGS Group maintains that the strains are unique in their function and are protected through patent applications.

## TECHNOLOGICAL ADVANTAGE

KGS-2 shows powerful growth promotion on wheat, especially in cold prairie soils where it exhibits psychrotrophic properties. KGS-2 interacts with many different crop host including Canola, Barley, and Corn. The broad host range allows for wide applicability, including other high value crops such as vegetables, hemp, cannabis and flowers.

## REGULATORY

KGS Group is currently aiming to achieve a license for KGS-2 through the Canadian Food Inspection Agency due to its plant growth promoting properties.

## CONTACT INFORMATION

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