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Brazil's B4A unveils AI platform that predicts soil biological risks from routine fertility tests

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Biostart leverages artificial intelligence and conventional soil analysis data to identify microbial imbalances, disease risks and nutrient cycling constraints, enabling more targeted soil health management



Brazilian agri-biotech company B4A (Biome4All) has introduced Biostart, an artificial intelligence-powered platform that predicts biological soil risks using data generated through standard soil fertility analyses. The innovation is designed to help growers and agronomists assess soil biological health without the need for additional sampling or specialized laboratory testing.

The platform represents an effort to bridge the gap between conventional soil chemistry assessments and biological diagnostics by extracting deeper insights from data that producers already collect as part of routine agronomic practices.

Built on a proprietary database of more than 14,000 soil samples collected across Brazil's diverse agricultural regions, Biostart applies machine learning algorithms to interpret physicochemical soil characteristics and estimate the biological condition of the soil ecosystem.

The AI model evaluates ten commonly measured chemical parameters and translates them into seven biological health indicators. Based on these relationships, it predicts the likelihood of **19 biological risks** linked to microbial activity, nutrient dynamics and the presence of economically significant soil-borne pathogens.

Among the biological challenges assessed by the platform are limitations in biological nitrogen fixation, deficiencies in mycorrhizal activity, reduced nutrient cycling efficiency and elevated risks from pathogens including Fusarium, Rhizoctonia, Macrophomina, Ralstonia and Agrobacterium.

Analysis of the company's extensive soil database revealed that Fusarium oxysporum was the most frequently predicted biological threat, appearing in more than 40 per cent of evaluated samples. The data also highlighted widespread constraints in phosphorus-solubilizing microbial activity and biological nitrogen fixation—two processes considered essential for improving nutrient-use efficiency and reducing dependence on synthetic fertilizers.

Rather than serving as a replacement for laboratory microbiological testing, Biostart has been developed as a decision-support platform that enables growers to identify areas requiring more detailed biological investigation. By highlighting potential hotspots of biological risk, the system can help optimize diagnostic investments and improve the efficiency of soil health monitoring programmes.

The launch reflects the growing emphasis on biological soil intelligence as regenerative agriculture, soil microbiome research and sustainable farming practices gain momentum worldwide. Although chemical soil analyses have long formed the basis of fertility management recommendations, biological diagnostics have remained relatively inaccessible because of their higher costs and dependence on specialized laboratory infrastructure.

By integrating artificial intelligence with conventional soil testing, B4A aims to democratize access to biological soil assessments, providing farmers, agronomists and crop advisors with an additional layer of agronomic intelligence to support crop management decisions.

The company believes the platform can strengthen biological input programmes, improve disease risk forecasting, enhance nutrient management strategies and guide investments in soil health interventions.

Founded in Brazil, B4A (Biome4All) focuses on microbiota diagnostics for agriculture, livestock and environmental applications, combining metagenomics, bioinformatics and data science to convert complex biological information into practical decision-making tools for agricultural production.