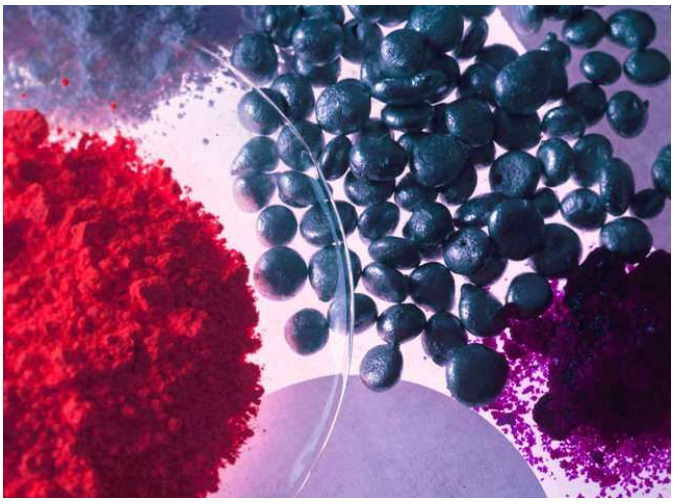
THE FIGHT AGAINST WORLD HUNGER CAN BENEFIT FROM CHEMISTRY

Sunita Singh

Globally, hunger is one of the most pressing challenges facing humanity today. According to the latest report from the Food and Agriculture Organization of the United Nations (FAO), more than 800 million people are malnourished, and nearly 2 billion people suffer from moderate or severe food insecurity. The COVID-19 pandemic has exacerbated this situation as economic losses, lockdowns, disruptions, and inequalities impact livelihoods and food supply systems. In response to this global crisis, the United Nations established the Sustainable Development Goals (SDGs) to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture by 2030. This goal, known as Zero Hunger, requires collective action from all stakeholders, including governments, civil society, the private sector, and academia. hemistry, as the science of matter and its transformation, has a vital role to play in addressing the challenges and opportunities associated with this goal.

In recent years, chemistry has been important in many areas. For example, the discovery of opabactin (OP) and quinabactin, which are similar to compounds of abscisic acid (ABA), has helped some plants become more resistant to drought. These compounds exhibit good water-holding capacity in tomatoes and wheat.



Technologies to recover and reuse phosphorus through the development of new models and mechanisms in livestock and wastewater are also an important development in the fertilizer sector. Nanoscale iron particles are used to increase the bioavailability of phosphate ions and help restore them. One of the studies reported recovering important nutrients such as nitrogen and phosphate from cow manure through hydrothermal carbonization. Hybrid ion exchange is also used as a reuse tool for nutrient recovery. Several methods are currently being used to discover new insecticides for crop protection. Controlling plant pests is an important step in the global food supply.

There are many examples of agrochemicals based on natural products that account for a significant share of the pesticide and fungicide markets. Avermectins and spinosyns, both naturally occurring, are commonly used insecticidal macrocyclic lactones. The synthesis of spinosyn mimics with high insecticidal properties represents a solution and a key aspect for sustainable crop protection, and with the help of chemistry, extending the shelf life of food products is an achievable goal.

The development of edible films using polysaccharides, proteins, and lipids from various natural sources is a potential candidate in the field of food preservation. Researchers have developed a smart film that changes color when exposed to high concentrations of ethylene, a gas that speeds up fruit ripening. Currently, near-field communication technology integrated into smartphones is used to detect meat spoilage, which is directly related to biogenic amine content. The discovery of a dual-color ratiometric composite sensor provides a tool for visually detecting spoilage in seafood products.

Chemistry plays a vital role in achieving the zero-hunger goal by enabling sustainable and efficient agricultural practices. From improving soil fertility and crop protection to food processing and preservation, chemistry offers a range of solutions to increase agricultural productivity, reduce waste, improve nutritional quality, and promote sustainable agriculture. Harnessing chemistry-based innovations and fostering collaboration between scientists, policymakers, and farmers will be key to creating a future where hunger is a thing of the past.

Chemistry can boost agricultural output, minimize waste, improve nutrition, and promote sustainability. A world without hunger requires collaboration between scientists, policymakers, and farmers.

The author is presently working as an assistant professor of chemistry at a government-aided degree college. Her expertise includes essential oils and their applications. She has published 27 research articles in journals of national and international repute. She has authored and coauthored eight book chapters with national and international publishing houses. She has attended a total of 35 conferences and webinars of national and international repute and delivered more than 20 invited talks and oral presentations. She is also an active member of the Association of Chemistry Teachers (India), the International Clinical Aromatherapy Network, and the Global Harmonization Initiative.
email address: deptofchemistrynkmv@gmail.com