

# Abstract

With climate change being an increasing problem affecting our planet, the question of food availability increases in urgency. Consequences brought by climate change will affect agriculture, leading to drought and flooding, and ruining fertile soil. Altogether, this might evolve into food insecurity. A possible solution might be to genetically modify crops in order to change their physiological and chemical traits into more beneficial ones for the changing environment. Several different methods can be used to achieve genetically modified crops; ionizing radiation, chemical treatment or site-directed mutagenesis (which is the method of the more famous CRISPR/Cas9). This study aims to analyze if crops genetically modified with roentgen irradiation can be favorable to decrease the growing food insecurity throughout the world.

This will be analyzed through a sustainability model valuing the ecological, social, and economic perspectives equally. The study consists of two parts; a laboratory experiment examining the effect roentgen irradiation has on the physiology of radishes by irradiating the seeds, and a literature review gathering more thorough information on the subject of GM as well as researching the issue of food (in)security.

The laboratory part generated vague results. However, a slight dispersion between the different irradiation doses could be measured, where the mass of the seeds irradiated with 100 Gy showed the largest total mass.

Careful conclusions drawn from the literature review show that ionizing radiation as a GM-method can increase the nutritional value in crops, make crops more resilient against abiotic and biotic stress factors and generate larger harvests. Studies show that the cultivation of GM-crops can prevent food insecurity. It can be economically beneficial for both farmers and companies, but regulation may be a hindrance to this.

## **Keywords:**

Genetically modified organisms (GMO)

Ionizing radiation

Food (in)security

Sustainability

Radish