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# The Effect of Foliar Spraying with Calcium Chloride and Fertilization with Fish Protein Hydrolysate on the Growth and Yield of Some Cucumber Hybrids Grown in Plastic Houses

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## I. Abstract

The effect of foliar application of calcium chloride and fish protein hydrolysate at the 4-5 true leaf stage on cucumber hybrids Sayff, Shady, Darina, Super Faris and Ballistic was studied. The study involved eight factorial treatments. The factorial treatments were combinations of four levels of calcium chloride (3%, 2%, 1%, 0%) for Sayff and Shady hybrids and fish protein hydrolysate (0%, 2%, 4%, 6%) for Darina, Superfaris and Ballistic hybrids. The hybrid Shady is compared to variations based on plant height, stem diameter, fresh weight, dry weight, moisture percentage, average fruit weight, vitamin C content, and potassium ion absorption. Fruits contain 38.97% calcium relative to the Sayff variety. The Sayff variety surpassed the Shadi variety, achieving a 12.92% increase in early revenue inside the plastic home. The plants get calcium chloride as nourishment. The treatment with a 3% concentration demonstrated a significant enhancement in the fresh weight of the plant, exhibiting a 14.73% increase in calcium chloride content of the fruits, a notable reduction in the percentage of potassium ions infiltrating the fruits, and a substantial rise in overall productivity of the house by 19.98% relative to the control treatment. Plants treated with 6% fish protein hydrolysate exhibited considerable superiority in all assessed vegetative characteristics, root and flower development metrics, and overall yield. Darina surpasses other types in both fruiting and yield.

**Keywords:** *Cucumber hybrids, calcium chloride, fish protein hydrolysate, plastic houses .*

## II. Introduction

*Cucumis sativus* L. is one of the most important summer vegetable crops in Iraq. It is grown in two seasons, spring and autumn, and may also be produced in a controlled setting. The fruits are usually eaten fresh or preserved by pickling. The fruit has 96% water content and 0.7 mg protein, 14 calories, 24 mg calcium, 20 IU vitamin A, 0.075 mg riboflavin (vitamin B2) and 0.3 mg niacin per 100 g (Matloub *et al.*, 1989). In 2007, the planted area in Iraq was around 5000 ha, with a production of 480,000 tons and a yield of 8.727 tons/ha (FAO, 2009). In order to increase the production of the plants in the country it is essential to use basic agricultural methods based on good scientific concepts such as

chemical fertilization. Calcium is an important macro-nutrient for plants. It has several physiological functions in plants' growth and development because it helps in the manufacture of pectin molecules linking cell walls and forming the middle lamella. Calcium has an important role in controlling the spoiling during the storage. Higher calcium content in fruits shows more resistance to the microbial infections which cause deterioration after storage. It also enhances the hardness of the fruits by integrating into the composition of the cell wall and serving as a crucial component in the cohesion of pectin, so augmenting the rigidity of the cell wall (Bangerth *et al.*, 1972). Consequently, calcium insufficiency within the minimal threshold results in the cracking of fruits. The phenomenon arises from the characteristics of divalent calcium, which enhances the structural integrity of fruit cell walls by facilitating the formation of pectins that associate with calcium, so augmenting