



Consequence of Transplant Augmentation Hormone Auxin

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Abstract: *Auxin is a growth hormone found in plants. It's is used by plants for growing. It has antimicrobial properties too, found in young plants for growing. Various bacteria promote plant root growth in the rhizosphere, as a measure of securing and enlarging their ecological niche. These interactions are mediated by plant growth regulators (PGRs) such as auxin, and indole-3-acetic acid (IAA) is one of the physiologically active auxins. In this study, we isolated an unusual bacterial strain from food process waste with high efficiency and demonstrated its effects on plant rooting and early-stage growth.*

Keywords: Plant growth regulators (PGRs), Indole-3-aceticacid (IAA), early stage growth, root growth in rhizosphere

I. INTRODUCTION

Matki: Moth beans or Matki is a staple legume in various cuisines across India, often consumed either as a sprout or in the cooked form. Quite popular in the Maharashtrian cuisine, Moth beans are also known as mat bean, dew bean or Turkish gram. These tiny beans oblong in shape, available in brown, reddish brown and green colours are rich in protein and go with the botanical name *Vigna aconitifolia*.

Chana: Chickpea is a cool season legume crop grown world-wide as a food crop. The seed is the main edible part of the plant. It is also called garbanzo gram or Bengal gram. It ranks third (FAO, 2008) among the food legumes after beans and pea. More than 50 countries are reported to grow chickpea; 22 cultivate more than 20,000 ha, and 19 cultivate 10,000 to 20,000 ha. Major chickpea-producing countries are: India (65% of annual production), Pakistan (10%), Turkey (7%), Iran (3%), Myanmar Mexico (1.5%) and Australia (1.5%) (FAO, 2008). Chickpea is a cheap and important source of protein for those people who cannot afford animal protein or who are largely vegetarian. Furthermore, chickpea is also a good source of minerals (calcium, phosphorus, magnesium, zinc and iron), unsaturated fatty acids, fibre and β -carotene. Chickpea also plays an important role in maintaining soil fertility by fixing nitrogen at rates of up to 140 kg/ha/year (Flowers et al., 2010). Therefore, this crop requires relatively low inputs of nitrogen as it derives 70% of its N through symbiotic nitrogen fixation and benefits other cereal crops as well. Chickpea contributes a significant amount of residual nitrogen to the soil and adds organic matter thereby improving soil health and fertility.



Auxin as A Microbial Signal Molecule:

Changes in bacterial gene expression under the influence of IAA were first described for the *ipdC* gene of *A. brasilense* (see earlier discussion, positive feedback regulation of IAA synthesis). In the phytopathogen *A. tumefaciens*, it was shown that IAA is a signal molecule because *vir* gene expression is inhibited by IAA (by competing with the phenolic plant signal for interaction with the VirA/G system). This control mechanism is proposed as a signal for *A. tumefaciens* indicating that plant transformation (transfer and expression of T-DNA) was successful (Liu and Nester 2006). In a follow-up study, microarray analyses revealed that addition of IAA represses the *vir* regulon and *chv* genes of *A. tumefaciens*, and that most of these changes are also induced by the addition of salicylic acid. Expression of a gene encoding an ABC-type transporter, probably involved in the uptake of IAA, was found to be specifically up-regulated by IAA (Yuan et al. 2008).

The question can be addressed whether IAA as an effector molecule for bacterial gene expression is related to indole as a signaling molecule. Indole is well known as a communication signal in *E. coli* (Lee and Lee 2010) and is studied in relation to quorum sensing (Walters and Sperandio 2006; Lee et al. 2007). Indole controls biofilm formation in *E. coli* and *Vibrio cholerae* (Di Martino et al. 2003; Mueller et al. 2009). In a recent study (Lee et al. 2010), it was shown that indole-3-acetonitrile (an auxin) decreased biofilm formation of *E. coli* 0157:H7 and *Pseudomonas auruginosa* virulence. This could be linked with specific effects of IAN on gene expression. However, in cases in which IAA has been found as an effector in bacterial gene expression, no such effect was observed with indole, indicating that auxin effects on bacterial gene expression are distinct from the well-known indole signaling.

II. MATERIAL AND METHODOLOGY

2.1 Materials Sample

Day 1: Mong, chana, matki were soaked overnight and then removed it from water and tied with muslin cloth.

Day 2: 1. Extracted the germinated root from the legumes.

2. Then it was pasted in mortar and pestle.

3. Transferred it in 3 different dilution tubes

Requirements:

1. Micropipettes, spreader
2. Chana,moong,matki
3. Sterile agar plates.
4. Alcohol
5. Culture:E.Coli and S.aureus.
6. Mortar and pestle
7. Cork borer.



2.2 Methods

AGAR WELL DIFFUSION METHOD: A cork borer is also used to punch holes on an agar plate and to perform well diffusion assays in microbiology to study bioactivity. Agar well diffusion method is widely used to evaluate the antimicrobial activity of microbial extracts. Similarly, to the procedure used in disk-diffusion method, the agar plate surface is inoculated by spreading a volume of the microbial inoculum at desired concentration is introduced into the well. Then agar plates are incubated under suitable conditions depending upon the test microorganism. The antimicrobial agent diffuses in the agar medium and inhibits the growth of the microbial strain tested.

2.3 Methodology

1. Take the germinated white part of seed of each moong, matki and chana.
2. Prepare slurry by using mortal pestle, add distilwater.
3. Transfer it to three different test tubes.
4. Take nutrient agar plates, inoculate bacteria i.e. *S. aureus* and *E. coli*, by spread plate technique.
5. Allow organisms to grow for few minutes.
6. Make wells by cork borer,
7. Add the prepared slurry in the wells,
8. And then incubate for 24 hours at 37°C.
9. Observe the results

III. OBSERVATION

Auxin showed clear zone of inhibition, around the well of moong, matki and chana.



Fig.1. Auxin's effect against *S. aureus* bacteria



Fig. 2. Auxin's effect against *E. coli* bacteria

IV. RESULT

After incubation, zone of inhibition was observed around the well of each samples. Auxins showed visible zone of inhibition in both the agar plates under the used bacteria *Escherichia coli* and *S. aureus*.



V. CONCLUSION

We conclude that auxin extracted from chana gives positive result against *S. aureus*. Whereas, the auxin extracted from moong gives positive result against *E. coli*.

VI. BIBLIOGRAPHY

Auxin is involved in many processes of nodule formation by rhizobia in legume plants, such as founder cell specification (auxin transport inhibition mainly by flavonoids), nodule initiation and differentiation (auxin accumulation), vascular bundle formation, and nodule numbers (long distance auxin transport). Because many rhizobia are capable of producing IAA via different pathways, it is assumed that bacterially produced auxin can alter the auxin balance inside the plant. In addition, rhizobia can also indirectly influence the auxin homeostasis by interfering with plant auxin transport

REFERENCES

- [1]. Urzua L, Xochinua-Corona YG, Cuervo-Garcia A 1994. Characterization of two aromatic amino acid aminotransferases and production of indole acetic acid *Azospirillum* strains. *Soil Biol Biochem* 26: 57–63 [Google Scholar]
- [2]. Badenochjones J, Rolfe BG, Letham DS 1983. Phytohormones, *Rhizobium* mutants, and nodulation in legumes. 3. Auxin metabolism in effective and ineffective pea root nodules. *Plant Physiol* 73: 347–352 [PMC free article] [PubMed] [Google Scholar]
- [3]. aca BE, Soto-Urzuu L, Xochinua-Corona YG, Cuervo-Garcia A 1994. Characterization of two aromatic amino acid aminotransferases and production of indoleacetic acid in *Azospirillum* strains. *Soil Biol Biochem* 26: 57–63 [Google Scholar]
- [4]. Badenochjones J, Rolfe BG, Letham DS 1983. Phytohormones, *Rhizobium* mutants, and nodulation in legumes. 3. Auxin metabolism in effective and ineffective pea root nodules. *Plant Physiol* 73: 347–352 [PMC free article] [PubMed] [Google Scholar]
- [5]. Bashan Y, Holguin G 1997. *Azospirillum*-plant relationships: Environmental and physiological advances (1990–1996). *Can J Microbiol* 43: 103–121 [Google Scholar]
- [6]. Bianco C, Defez R 2009. *Medicago truncatula* improves salt tolerance when nodulated by an indole-3-acetic acid-overproducing *Sinorhizobium meliloti* strain. *J Exp Bot* 60: 3097–3107 [PubMed] [Google Scholar]
- [7]. Bianco C, Defez R 2010. Improvement of phosphate solubilization and *Medicago* plant yield by an indole-3-acetic acid-overproducing strain of *Sinorhizobium meliloti*. *Appl Env Microbiol* 76: 4626–4632 [PMC free article] [PubMed] [Google Scholar]