CHAPTER-I
INTRODUCTION

The seed spices are a group which denotes all those annual whose dried fruits of seed used as spices. The seed spices mostly used in pulverized state. Primarily for seasoning or garnishing food and beverages. They are characterized by pungency, strong odour, sweet or bitter taste. Spices play an important role in human dietary because of their agreeable flavor and aroma to food and add greatly to the pleasure of eating. There are about 20 seed spices grown in India and among them coriander, cumin, fennel, fenugreek, dill seed, ajawin etc. are vital rabi seed spices for arid and semi-arid regions of the country. Gujarat and Rajasthan together contribute more than 80 per cent of total seed spices production in country and thus, both the state together are known as “seed spices bowl” of India. Among the seed spices, coriander popularly known as “dhania” is one of the oldest known and most widely used seed spices by mankind as a condiment throughout the world.

Coriander is an important seed spices crop mainly grown in grown in winter (rabi) season in India for its leaves as well as seed. In India, it is mainly grown in Rajasthan, Gujarat, Madhya Pradesh, Assam, Andhra Pradesh, West Bengal, Orissa, Maharashtra and Tamil Nadu with an area of 6.63 lakh hectares at produced of 6.09 lakh tonnes and productivity of 920 kg ha-1 during the year 2016-17. Gujarat is the leading producer of coriander after Rajasthan in India with an area of 1.21 lakh hectares having annual production of 1.90 lakh tonnes and average productivity of 1570 kg ha-1 during th year of 2016-17 (Anon., 2017a). In Gujarat state, Junagadh district ranks first with growing area of 53530 hectares having a production of 77619 tonnes and productivity of 1450 kg ha-1 during the year of 2016-17 (Anon., 2017b).

Coriander (Coriandrum sativum L.) is an annual herb, which belongs to the family Apiaceae (Umbelliferae) and possess 2n=22 chromosomes with cross-pollination as mode of reproduction. It is native of the Mediterranean region near Eastern region and is now commercially grown in India, Morocco, Russia, Hungary, Poland, Romania, Czechoslovakia, Guatemala, Mexico and the USA. It is one of the earliest spices known to mankind for its intrinsic and fragrant qualities of both seed and leaves. Dried, ground seed of coriander is a major ingredient of Indian cuisine.
The seed type is dicot and having epigeal germination. It is extensively cultivated in arid and semi-arid region of India during *rabi* season. This spice is used by man as common flavoring substances. It is not only added flavor and taste to our food but also enhance keeping quality of food. The fresh green herb, called Cilantro or Chinese parsley, is also very popular all over the world for the usefulness in soups, salads, dressing of vegetables, seasoning and chutney. The stem, leaves and grain have a pleasant aroma. Coriander seed have aromatic odour and taste of coriander fruits due to an essential oil. The seed contains 16.15% fatty oil, 14.1% protein, 21.6% carbohydrate, 32.6% fibers, 11.2% moistures and 4.4% mineral matters and coriander leaves are very rich in Vitamin A and Vitamin C. (Singh, 2014).

Coriander also has medicinal value. Fruits of coriander are used against stomach-ache. Whereas the dry fruits are said to have carminative, diuretic, and aphrodisiac properties. The seeds are rich in carbohydrate and protein content. The aromatic nature of the plant is due to the presence of an essential oil (terpene tertiary alcohol i.e. linalool 60%) present in seeds and leaves. The oil is used in perfumery, confectionery, cosmetics, for flavouring liquors, beverages and to mask the offensive odour in pharmaceutical preparations.

Agricultural research, till now, has been primarily concerned with increasing crops yield by use of fertilizers, pesticides, irrigation, better crop management coupled with variety development and genetic improvement. Exogenous application of growth regulators and micronutrient also offer unique opportunities of scaling plant and quality.

Plant growth substances have key role in different physiological processes related to growth and development of crops. It is obvious that changes in the level of endogenous hormones due to biotic and abiotic stress alter the crop growth and any sort of manipulation including exogenous application of growth substances would help for yield improvement or at least sustenance of the crop. Plant growth hormones are organic substances produced naturally in the higher plants, controlling growth or other physiological functions at a site remote from its place of production, and active in minute amounts.

Hormones usually move within plant from a site of production to site of action. Phytohormones are physiological intercellular messengers that are needed to control the complete plant lifecycle, including germination, rooting, growth, flowering, fruit ripening, foliage and death. In addition, plant hormones are secreted
in response to environmental factors such as abundance of nutrients, drought conditions, light, temperature, chemical or physical stress. Hence, levels of hormones will change over the lifespan of a plant and are dependent upon season and environment.

During recent years the use of plant growth regulators (PGR’s) may be one of the best possible ways to achieve spectacular progress in crop production and productivity. Application of plant growth regulators has been reported to induce higher physiological efficiencies including photosynthetic ability of plants which resulted in better growth and yield of agronomic crops without substantial increase in cost of production.

Exogenous application of PGR’s has been reported to improve the growth and yield of various crops (Bharud et al., 1988). It is well known that all the PGRs regulate the physiological functions of plant. Some workers highlighted that spraying of PGR’s on crop plants improves growth, yield and quality attributes (Deore and Bharud, 1990; Paspatis, 1995; Gott and Thomas, 1986; and Geetha et al., 2000). Among different PGR’s NAA and GA3 have been reported to boost the growth, yield and quality attributes in dill (Fisher and Pyshtaleva, 1974 and El-Khateeb, 1994); fenugreek (Bharud et al., 1988 and Alagukannan and Vijaykumar, 2003); coriander (Pareek, 1996); and cumin (Omer et al., 1997 and Keltawi et al., 2000). Cycocel (CCC) plays a vital role in restricting the plant growth while triacontanol (TRIA) improves leaf size and dry weight. Thereby increasing the number of branches, umbels per plant and seed yield of coriander (Kumar et al., 2007). Foliar application of NAA is known to induce higher physiological efficiency including photosynthetic ability of plants and has also been shown to enhance growth and yield of several vegetable and agricultural crops without substantial increase in the cost of production (Sumeriya et al., 2000).

In coriander crop to apply the plant growth regulators in 25 and 50 days after sowing intrinsic and extrinsic factors effect on growth, development and secondary metabolites biosynthesis of medicinal and aromatic plant. Photosynthesis and plant growth regulators (PGR’s) have been defined as one of the main factors influences plants growth and their primary and secondary metabolites pool. The use of PGR’s in the field of agriculture has become commercialized. Plant growth regulators (PGR’s) have emerged as magic chemical that could increase agricultural production at an
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The role of plant growth regulators in various physiological and biological processes in plants is well known, which enables a rapid phenotypic change in the plant. Plant growth regulators are known to affect seed germination, vegetative growth, flowering, seed setting, seed development, seed maturity and seed yield. Keeping these facts in view, a field experiment entitled “Effect of plant growth regulators on growth and yield of coriander (Coriandrum sativum L.)” is proposed to undertake at Instructional Farm, Department of Agronomy, College of Agriculture, Junagadh Agricultural University, Junagadh during the *rabi* season of the year 2016-17 with the following objectives:

1. To study the effect of foliar sprays of plant growth regulators on growth, yield and yield attributing characters of coriander.

2. To study the effect of foliar sprays of plant growth regulators on content and uptake of nutrient by coriander plant.

3. To examine the economic feasibility of different treatments on yield.