

# Invitro Cytotoxic Effect of Some Commercially Available Soft Drinks on Onion Root Tips, *Allium Cepa*

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**Abstract**— Commercially available soft drinks are known to contain different composition of carbohydrate content ranging from 11g to 15.8 g. Consumed soft drinks were tested on the *Allium cepa* root tip meristem, which induced number of chromosomal changes, such as chromosome breakage, disturbed prophase, elongated cells, bulged chromosomes etc. Mitotic index decreases when compared with the control, indicating mitotic inhibition.

**Keywords**— Soft drinks, carbohydrate content, *Allium cepa*, mitotic index.

## I. INTRODUCTION

*Allium cepa* bulbs are commonly known as onion, the garden onion also known as bulb. onion and Shallot is referred to as *Allium cepa*. (Jones, Henry. A and Louis K Mann., 1963)

*Allium cepa* (2n=16) were chosen for the research work as to understand how far the meristems root have impact on consumable drink, protein and fat at very low percentage.

Soft drinks are non-alcoholic water based flavored drinks containing different composition of carbohydrates content ranging from 11 g -15.8g. They may also contain fruits, fruit juice or salts. (Sandip *et al*, 2014). Some soft drinks also contain other components like preservatives, acidity regulator, food color, sugar and caffeine.

## II. MATERIALS AND METHODS

*Allium cepa*: *Allium cepa* bulbs were brought from local market and was grown in the laboratory conditions for the roots.

*Soft drinks*: soft drinks with carbohydrate content of different brands were collected from city based super markets as mentioned below:

Soft Drinks Name	Carbohydrate Content
Maaza	13.5g
Sprite	12g
Coke	11g
Pepsi	10g
Mango Sip	15.31g
Apple Fruit Drink	14.2g
Jeera	14.6g
B.Natural	13.9g
Appy	15.8g
Red Bull	11g

*Other materials*: Aceto orcein stain, 45% glacial acetic acid, 1N HCl.

Various concentrations (25%, 50%, 100%) of soft drinks was analyzed on *Allium cepa* assay. After each treatment (24hrs and 48hrs), root tips were taken washed and analyzed for the mitotic squash preparations (Sharma and sharua., 1980) and later photographed.

## III. RESULTS AND DISCUSSION

In our present study, treatment with different soft drinks on *Allium cepa* root meristems showed mitotic effects of chromosomes and also lowered the mitotic activity than control. comparative analysis reveals that the chromosomal changes were high in 100% concentration of different soft drinks (fig. 1) Important types of abnormalities observed were nuclear lesion, stickiness of chromosome, chromosomal breakage, clumping of chromosome catenation ring ,disturbed metaphase and elongation of cells. Decrease in the concentration, lowered the frequency of aberrations (fig. 1).

All the changes mentioned earlier may occur due to disintegration of proteins, improper functioning of spindle apparatus (Das *et al*, 1968)

Stickiness of chromosome may result from the enlargement of the chromatin fiber which fail to condense properly during the initial stages of mitosis (Mc Gill *et al*, 1974).

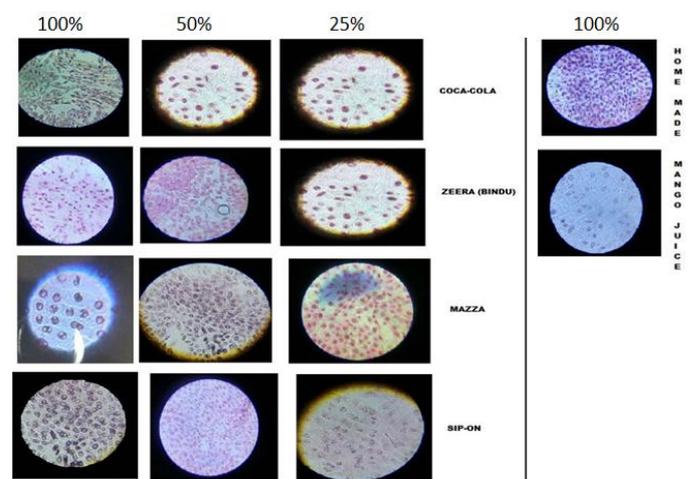


Fig. 1. Microscopic view of cytological abnormalities induced by soft drinks of various concentrations on *Allium cepa* root tip meristem after 24hrs.

Thus it can be concluded that regular intake of soft drinks directly or indirectly disturbs the nucleic acid metabolism and have direct impact on health hazards like obesity heart disease, high cholesterol, high blood pressure, PCOS (polycystic ovarian syndrome) in women, tooth enamel, allergic reaction because of preservatives used in soft drinks and dark colas on regular basis may increases the chance of cancer over a period of life time.



Fig. 2. Onion root tips immersed in different soft drinks.

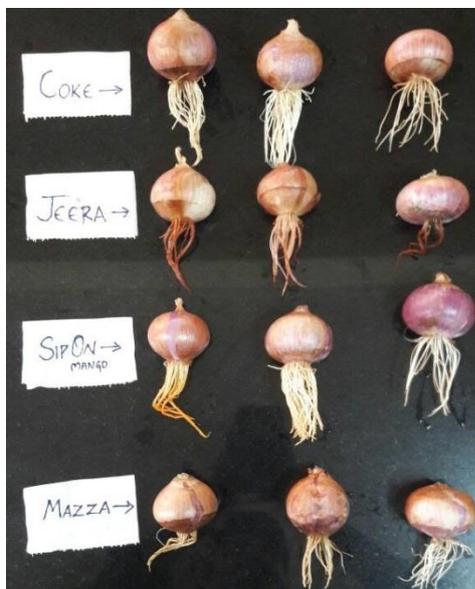


Fig. 3. Onion root tips after 24hrs, immersed in different soft drinks.

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