Preventive effective of Black cumin and Caster plant oils on chromosomal aberration in Onion Allium cepa root Galawezh O.O. and Kazhal M. S.

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Abstract :

KeyWords: Black cumin,

Black cumin, Caster plant, Onion Allium cepa

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A present study investigates the mutagenic effects of Ethyl Methane Sulphonate (EMS) and Preventive effective of Black cumin (Nigella sativa) and Caster plant (Ricinus communis) oils on the root tip cells of onion (Allium cepa) using three concentrations of EMS (10,20, and 30 µg /L). Several cytological abnormalities were found ,such as chromosome bridges ,fragment, deviation and pulverization chromosome. The following results were concluded; The ability of EMS to increase chromosomal aberration in root tip cells of onion such as Chromosome bridge, fragment, deviation and pulverization chromosome. The third concentration of EMS has more effective than other concentrations. The use of antimutagenes of Black cumin to treat the 1st con of EMS leading to lowering the effective of EMS by decreasing the level of chromosome aberration including fragment, deviation, bridge and pulverization. The use of anti mutagen Ricinus leading to lowering the level of chromosome aberration but not as Nigellia in lowering the level of chromosome aberration. The use of 2nd con. of Black cumin and Caster plant leading to lowering the level of chromosomes aberration more than 1st con., high significant effect of Black cumin will observed. The use of third con. Of anti mutagen lead also to lowering the effect of EMS and chromosome aberration specially deviation and pulverization. We concluded that the effect of anti mutagen of Black cumin in all cons leading to lowering the effect of EMS and decrease the level of chromosome aberration.

التاثيرات المانعة لزيت الحبة السوداء والخروع على التشوهات الكروموسومية في قمة جذر البصل

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الخلاصة :

الدراسة الحالبة تبحث عن التاثير ات التطفرية لمادة ابثابل مبثان سلفونيت على خلايا القمة النامية لجذر ا ليصل الكلمات الدالة : ,حيث تمت استخدام ثلاث تراكيز من هذه المادة المطفرة(10,20,30) ملغم| لتر. اظهرت عدة تشوهات كروموسومية مثل زيت الحبة السوداء ، الجسر الكروموسومي, القطع الكروموسومية, الانحر افات الكروموسومية وخلايا محطمة الكروموسومات, ثم استخدمت مضادات الخروع ، جذور البصل الطفرة مثل زيت الحبة السوداء وزيت الخروع. تم استنتاج النتائج التالية: قابلية ايثايل ميثان سلفونيت على زيادة التشوهات الكروموسومية في قمة جذر البصل مثل الجسر الكروموسومي, القطع الكروموسومية, الانحرافات الكروموسومية وخلايا محطمة الكروموسومات. تم إستنتاج أن التركيز الثالث للمادة المطفرة هي أكثر التراكيز المؤثرة على التشوهات الكروموسومية. ان للمر اسلة : إستخدام مضاد الطفرة زيت حبة السوداء لمعاملة التركيز الأول من المادة المطفرة أدت إلى إنخفاض تأثير التطفري بواسطة كلاويز عبيد عثمان قسم علوم الحياة ، كلية تقليل من مستوى التشوهات الكروموسومية و يتضمن الجسر الكروموسومي, القطع الكروموسومية, الانحرافات الكروموسومية التربية ، جامعة اربيل وخلايا محطمة الكروموسومات. إن إستخدام مضاد الطفرة زيت الخروع أدت إلى إنخفاض مستوى التشوهات الكروموسومية لكن ليست كما في زيت الحبة السوداء. إن إستخدام التركيز الثاني من زيت حبة السوداء و زيت الخروع أدت إلى إنخفاض مستوى التشوهات الكروموسومية أكثر من التركيز الأول. إن إستخدام التركيز الثالث من مضاد الطفرة أدت إلى إنخفاض مستوى التشوهات الكروموسومية خاصة الإنحرافات الكروموسومية و خلايا محطمة الكروموسومات. تم إستنتاج بأن تأثير مضاد الطفرة زيت الحبة السوداء بكل التراكيز أدت إلى إنخفاض من مستوى تأثير المادة المطفرة و تقليل مستوى التشوهات الكر وموسومية.

Introduction

A group of chemicals are reported to induce chromosomal aberration. These chemicals are commonly known as chemical mutagens having specific and limited action, and found to induce specific mutation or aberration in organisms. Chemical mutagens are being used in inducing variability in plant breeding programmes. Geneticists are using chemical mutagens as potential tools and it is reported that a number of chemicals influence the sensitivity as well as increase the frequency and spectrum of mutations (Zaman and Saleh., 2005). The studies of a number of compounds and the development of chemical mutagenesis have been reported by different workers (Legator 1970; Liang and Liang 1972; Prasad 1972; Bose and Dutta 1973; Raghubansi et.al. 1978; Alam et. al. 1981; Rao and Rao 1983). In view of these research aspects, many mutant varieties have been developed through mutagenesis. Among them 94% were following the treatments of physical mutagen, 5% through chemical mutagen and the remaining 1% through a combined treatment of physical and chemical mutagens (Singh 1993). Considering these research attributes the present study was undertaken to investigate the mutagenic effect of a chemical mutagen i.e. Ethyle mythyle sulphate (EMS) on somatic cells of Onion (Allium cepa) root tip.

MATERIALS AND METHODS

Mutagen effect Allium cepa chromosome aberration test: To perform, 12 commercial equal-sized *Allium cepa* onion bulbs of 3-4g per concentration were carefully unsealed, placed on top of test tubes filled with tap water and allowed to germinate in the dark at lab Tem. After 48h, two onions with the most poorly growing roots were removed and healthy onion bulbs rooted (1-2cm long). in tap water were exposed to three different EMS concentration(10, 20and $30\mu g/l$)for 2hr. After the completion of treatment.

2-Anti mutagen effect.

After exposure onion bulbs were treated with three different cons. of Nigella and Ricinus oil (0.01, 0.02, 0.03) for 24 h, EMS As positive control and tap water as negative control after the completion of treatment the root of bulbs the roots of each bulb were treated with 0.1% colchicine for 1hr and the roots were fixed in 3: 1 (Ethanol: acetic acid). After fixation, the roots were hydrolyzed in 1 N HCI for 2 min and stained with 2% ocean stain. Root types were squashed in 45% acetic acid and examined microscopically for Mitotic Index (MI) and cells with chromosomal aberrations. Chromosomal aberration was determined by scoring cells with bridges, fragments, pulverization and deviation. Five slides were examined per onion, slide are scanned from right to left, up and down.

Results and Discussion

The experiment was performed in controlled condition, we observed significant differences between means when onion roots treated with three different con. of EMS (10, 20, 30 μ g/l). The results shown that the third con. Was most effective to causes chromosomal aberrations, like fragmentation , deviation, bridge, and pulverization.

Our result is agree with study (Asianturk& Celik,2005)Showed that the effect of EMS which is alkalizing

Agent most frequency aberration were fragment chromatid bridges, polar deviations, stickiness, µnucleus formation. Scheiderman et al., 1971 have suggested that the reduction in the mitotic activity could be due to inhibition of DNA synthesis. In a study by(Othman ,2002)on albino mice showed that a significant effect were found between con, on chromosomal aberration ,the highest con, was most effective to cause all type of chromosomal aberration ,this may be due to the more sensitivity of cells to higher con., than lower con., because higher doses of mutagen causes a rapid and accumulation of mutagen within cells ,which lead to appearing more genotoxicity (AL -Hafar, 1987). Also Linuron was tested from a low of 10 ppm up to 300 ppm, but it was found that 20 ppm was very toxic and induced cell death. In Vicia faba, (M e -zarroyo,et.al.,1990).

The use of antimutagenes Nigella & Ricinus oil with different con.(0.01,0.02,0.03) to treat the root tip cells in order to repair the mutation and used as preventive, the result was shown that in 1st con of anti mutagen all types of chromosomal aberration was decline ,while the more effective con. Was 2nd con that leading to decrease chromosomal changes. In a study showed that fungicide captan induced chromosomal aberration, included disturbed and sticky metaphase stickiness and anaphase bridges, bi and tri nucleated cells. Chromosomal sickness was observed as all concentric of the Fungicide through concentrations itself seems to have no effect however, with increasing exposure time to the fungicide stickiness'as prophase and metaphase was found to increases .Anaphasic bridges were recorded at various concentrations of the fungicide, but their frequency did not differ with the concentrations (Kumer,L.p.&Panesselvan,N.2008)The present result shows that, Nigella & Ricinus oil has preventive effect although its effects decrease above a particular dose level. Also describes the technical procedure of the Allium cepa chromosome aberration assay. The most

important advantage of the Allium test is that it is a" low budget" method, Which beside being fast and easy to handle also gives reliable results. (Rank J.,Nielsen



Fig (1) The effect of 1st con. Of anti mutagen on repair chromosomal aberrations.

1998).To determine the mutagenety of alkalyting substance and antimutagenic effect further researches should be per formed.



Fig (2) The effect of2nd con. Of antimutagenes on repair chromosomal aberrations.



Fig (3) The effect of2rd con. Of antimutagenes on repair chromosomal aberrations

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