DISCUSSION
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From the results it is obvious that as the temp increases (17.1 - 47.7°C) or the RH decreases (45.5 - 35.5%) NO level decreases at JNU (8.05 - 4.71 μg/m³) and Motinagar site (42.42-31.01 μg/m³). In case of NO₂ the same was true i.e. as the temp. increases (21.6 - 29.5°C) or RH decreases (53.8 - 37.6%) the NO₂ conc at both JNU (19.82 - 13.67 μg/m³) and Motinagar (77.69 - 73.38 μg/m³) decreases. That means from this observation generalised fact is that, oxides of nitrogen conc. decreases as the temp. increases or RH decreases. Temp inversion might be the contributing factor towards the higher NOx in winter (15 Oct-29 Jan).

As far as O₃ conc. is concerned, here the case was slightly different. The conc. of O₃ increases (27.91 - 35.26 μg/m³ at JNU and 50.65 - 64.57 μg/m³ at Motinagar) with increase in temp (28.2 - 32.4°C) or decrease in RH (40.1 - 28.6%). The NO, NO₂ and O₃ conc. at JNU was always less than that at Motinagar. This was obvious because JNU is comparatively free from pollution (less traffic, no industries) while the Motinagar site has various industries besides high traffic density. NO conc. was always less than that of NO₂. This might be due to the fact that the NO always occur at higher temp. (at source) but as it moves away from the source (encountered with less temp. in ambient air) it oxidises forming stable gas i.e. NO₂. The pollutants concentrations were in the decreasing order in both winter and summer season at control and polluted site as -
Ascorbic acid

NO: At no urea, the per cent loss in AA of NO treated leaf occurred gradually reaching maximum at 105 days while at remaining urea, the rate of per cent reduction over control reached maximum at 90 days for S. oleracea (Fig. 10). In all the cases, after maximum loss in AA in NO treated spp., the rate of reduction declines upto 120 days. In case of T. foenum-graecum (Fig. 18), gradual declination (abrupt declination after 75 days) in AA occurred, the rate of reduction reaching maximum at 120 days at all urea treatments. At all levels of urea the per cent AA (mean) reduced more in T. foenum-graecum indicating the more susceptibility of AA in T. foenum-graecum than that of S. oleracea (Table 73).

NO₂: When both the spp exposed with NO₂, AA reduced gradually, the rate of reduction increases as the dose increased reaching at highest level at 90 days in S. oleracea (Fig. 10) (at all urea) and at 120 days in T. foenum-graecum (Fig. 18) (except at no urea where it was at 75 days) but the rate of reduction further declined gradually in the former spp. after 90 days even if the dose increased. At all levels of urea the AA content (mean) loss in T. foenum-graecum was more compared to that in S. oleracea (similar to NO effect) signalling the more effect of NO₂ on AA
of *T. foenum-graecum* than that in the other spp. (Table 73). The loss of ascorbic acid due to NO₂ fumigation was also observed by Prasad (1980).

O₃ : When *S. oleracea* (Fig. 10) was exposed with O₃, per cent AA continuously reduced at all the ages of plant, loss being highest at 90 days at no urea or more than optimum urea but at optimum urea, the maximum loss was at 75 days. After this maximum loss, the rate of per cent reduction declined gradually upto 120 days. In case of *T. foenum-graecum* (Fig. 18) the values of AA increased at 15 days (similar to NO₂ effect) in O₃-exposed plant compared to control (Lee et al., 1984), the reason for which is not understood, but after 15 days, the rate of reduction increased, maximum loss being at 120 days. The reduction of AA in our investigation is also supported by the work of Handson et al. (1970), Pippen et al. (1975), Thompson and Kats (1976) in vegetable crops, and Agrawal et al. (1982). Except at no urea (where AA in *T. foenum-graecum* reduced more), at two levels of urea, AA (mean) in *S. oleracea* (Table 73) reduced more compared to that in *T. foenum-graecum*. The reason for such differential reduction in AA at different level of urea is beyond our understanding.

At optimum urea AA (mean) in *S. oleracea* affected more than that in *T. foenum-graecum*. The reason of such differential response of AA to O₃ action could be explained on the basis of
following study where AA can induce the tolerance (e.g. *T. foenum-graecum*) in plant by preventing the breakage of cell membrane (Freebairn, 1960; Freebairn and Taylor, 1960; Menser, 1964; Handson *et al.*, 1970; Garg and Kapur, 1972) or by quenching the organic free radicals with AA (Tappel 1973; Packer *et al.*, 1979; Cababbrese, 1980; Lebovitz and Siegel, 1980; Klaui and Pongracz, 1982).

**NO+NO\(_2\)+O\(_3\)**: At all the levels of urea, the rate of AA per cent reduction increased continuously reached at highest level (similar to NO\(_2\) effect) at 90 days (Fig. 10) in *S. oleracea* (after which it declined upto 120 days even if the dose increased) while it reached at 120 days in *T. foenum-graecum* (Fig. 18). (In this case similar to NO effect, the rate of reduction increased suddenly after 75 days). At no urea or more than optimum urea, per cent reduction (mean) value was more in *T. foenum-graecum* while at optimum urea AA reduced more in *S. oleracea* compared to the former spp. (Table 73). The reason of such differential response of AA at 3 levels of urea is not understood.

At any of the urea, the effect of NO+NO\(_2\)+O\(_3\) on AA content was less-than-additive compared to the sum of the individual pollutant effects.

In *S. oleracea* (Fig. 26) NO+NO\(_2\)+O\(_3\) causes highest per cent reduction in AA (mean) while NO showed lowest at all levels of
urea. In case of *T. foenum-graecum*, at no urea, NO effect on AA was highest while *O_3* effect was lowest (Fig. 27); at optimum urea, *O_3* effect was highest while NO effect was lowest and at more than optimum urea, NO+NO_2+O_3 effect was maximum while that of O_3 was minimum. Reason of such behaviour is not clear.

**Ambient air**: At 15 and 120 days at no urea there was no change in AA of *S. oleracea*. No such change was also observed by Miller *et al.,* 1969; Barnes, 1972. At zero and optimum urea the rate of per cent reduction of AA was maximum at 90 days while at more than optimum urea, it was maximum at 75 days in *S. oleracea* (Fig. 13). In case of *T. foenum-graecum*, the per cent reduction was continuous reaching maximum at 120 days at all levels of urea (Fig. 21). Rate of reduction became abrupt after 75 days (similar to NO and NO+NO_2+O_3). At all levels of urea AA (mean, Table 73) reduced more in *T. foenum-graecum* (Fig. 28) compared to that in *S. oleracea*.

Impact of pollutants (Fig. 29) on AA content in two spp. (at optimum urea) was in the order of

*S. oleracea*, *O_3* > NO+NO_2+O_3 > Ambient air(MN) > NO_2 > NO

*T. foenum-graecum*, NO+NO_2+O_3 > NO_2 > ambient air(MN) > NO > O_3

The reason for such behaviour is not understood.
Protein

NO: At no urea, the maximum per cent reduction in protein reaches on 105 days while in rest of the treatments of urea, it reached on 90 days when *S. oleracea* fumigated with NO (Fig. 11). In case of *T. foenum-graecum*, the maximum reduction was observed at 120 days at all levels of urea (Fig. 19). At zero urea, protein in *S. oleracea* reduced more than that in *T. foenum-graecum* while in the remaining treatments of urea, it was reduced more in *T. foenum-graecum* than in the other spp. (Table 73).

NO₂: When *S. oleracea* exposed with NO₂ and no urea, protein reduced continuously, the maximum per cent reduction in protein was observed at 120 days while the same reduction was noted at 90 days for the rest of the treatments (Fig. 11). In *T. foenum-graecum* maximum protein content reduced at 120 days at all the levels of urea (Fig. 19). At all the treatments of urea, protein content in *T. foenum-graecum* affected more (Table 73) than in *S. oleracea*, suggesting the protein content in former spp. is more sensitive to NO₂. The reason of such differential behaviour of protein as far as the differential per cent reduction at different urea is concerned is not clear.

O₃: At zero urea, the maximum per cent reduction (similar to NO effect) was at 105 days while it was at 90 days at the remainder level of urea in *S. oleracea* exposed with O₃ (Fig. 11). As far
as protein in *T. foenum-graecum* is concerned, at 15 days it was found to be increased over control but at other periods, rate of decrease in protein content increases compared to control reaching maximum at 120 days at all the three levels of urea (Fig. 19). Reduction in our investigation was also supported by the findings of other workers (Mudd *et al.*, 1969; Ting and Mukerji, 1971; Cracker and Starbuck, 1972; Adedipe *et al.*, 1973; Neely *et al.*, 1977; Agrawal *et al.*, 1982; Flagler and Youngner, 1985). Reduction in protein by O₃ might be due to the destruction of existing protein or prevention of forming new one. In the present investigation, O₃ causes reduction in N content (Fig. 15, 23) in both the spp which also might be the reason of reduction in protein content in O₃-stressed leaf as N is the constituent of protein. It is also supported by the work of Thompson *et al.* (1976).

At 15 days increase in protein over control of *T. foenum-graecum* was observed (Fig. 19). It is in agreement with the findings of other workers (Cracker and Starbuck, 1972; Beckerson and Hofstra, 1979; Flagler and Youngner, 1985). This might be due to the increase in biosynthesis of amino acids and new proteins.

*S. oleracea* showed more per cent reduction (mean) in protein than that of *T. foenum-graecum* at all levels of urea (Table 73) indicating the more influence of O₃ on protein content of the former spp. than in the latter. In the present investigation, at
all levels of urea, protein reduced more at optimum and least at no urea while intermediate reduction observed at more than optimum urea in both the spp. It is in concurrence with the findings of Leone et al. (1966)

NO+NO$_2$+O$_3$: Protein content reduced continuously and maximum reduction occurred at 105 days with no urea when exposed with NO+NO$_2$+O$_3$ while the same occurred at 90 days at the other two levels of urea in case of S. oleracea (Fig. 11) (similar to NO and O$_3$ effect), while in T. foenum-graecum maximum reduction occurred at 120 days at any of the three levels of urea (Fig. 19).

Except at no urea (protein reduced more in T. foenum-graecum), protein (mean) content (Table 73) reduces more in S. oleracea compared to that of T. foenum-graecum. Differential behaviour at different urea is not clear. Secondly it also shows more influence of O$_3$ on protein under sequential exposure in S. oleracea.

The impact of NO+NO$_2$+O$_3$ on protein was less-than-additive compared to the sum of the effects of individual pollutants at all levels of urea in both the spp. Presence of NO$_x$ might have lowered the effect of O$_3$ on protein content in S. oleracea while in case of T. foenum-graecum presence of O$_3$ might have lowered the effect of NO$_x$ (Table 73).

In S. oleracea (Fig. 26), ambient air at Motinagar causes highest percent reduction (mean) in protein while NO$_2$ causes lowest one, at no urea. At optimum and more than optimum urea both, O$_3$ causes highest per cent reduction in protein while NO, the lowest one. In case of T. foenum-graecum at no urea protein reduction in terms of per centage (mean), was highest by O$_3$ effect and lowest by ambient air (Motinagar). At optimum urea, NO$_2$ reduced the
protein to highest level and O₃ reduced it to lowest level. At more than optimum urea NO caused reduction of protein to maximum level while O₃ caused to the minimum level (Fig. 27). The reason for such behaviour is not understood.

**Ambient air:** Maximum protein content reduced at 90 and 120 days in *S. oleracea* (Fig. 13) and *T. foenum-graecum* (Fig. 21) respectively by ambient air at Motinagar. The pattern of protein reduction is more or less similar to NO effect in *T. foenum-graecum* (maximum reduction occurred at 120 days in *T. foenum-graecum* at all levels of urea and pollutant treatments). Protein (Table 73) in *S. oleracea* reduced more compared to that of *T. foenum-graecum* (Fig. 28), at all levels of urea. Thus it behaves in a similar way as that of O₃ effect.

The impact of pollutant on protein at optimum urea was in the decreasing (Fig. 29) order of

- *S. oleracea*: O₃ > NO+NO₂+O₃ > ambient air(MN) > NO₂ > NO
- *T. foenum-graecum*: NO₂ > NO+NO₂+O₃ > ambient air(MN) > NO > O₃

The reason for such behaviour is not clear.

As RNA is the agent of protein synthesis, its reduction might have contributed towards less protein in treated plant. Nitrogen is one of the constituents of protein. Therefore reduction in N might be also the cause of less protein in fumigated plant compared to control in both the spp.

**RNA**

**NO** : At no urea, there was % increase over control (the reason for which is not understood) in RNA content of *S. oleracea* (Fig. 12) at the exposure of 15 days with NO treatment. But RNA
content reduced compared to control at all the other treatments of urea as well as after 15 days of exposure periods at no urea, per cent reduction upto 90 days was slow reaches to maximum abruptly at 105 days but the rate of reduction declines abruptly after that. In T. foenum-graecum, it reduced (Fig. 20) irrespective of the exposure period and urea treatment continuously upto 120 days. At no urea, RNA (mean) content (Table 73) reduced more in S. oleracea than that of T. foenum-graecum. At optimum urea mean RNA content reduced more in T. foenum-graecum than that of S. oleracea while at more than optimum urea, the RNA was reduced more in S. oleracea. The reason for differential reduction in RNA at different levels of urea in both the spp. is not clear.

NO₂ : RNA content increased at zero and more than optimum urea with NO₂ exposure at 15 days in S. oleracea after which it decreases, the rate of reduction reaches maximum (similar to NO effect) at 105 days of exposure (at all levels urea) but later on, it declines suddenly upto 120 days (Fig. 12) while in T. foenum-graecum per cent reduction (Fig. 20) occurred continuously (suddenly at 75 days) upto 120 days at any of the urea treatment. At all levels of urea, per cent reduction in RNA (mean) was more (Table 73) in T. foenum-graecum compared to S. oleracea. It suggests that RNA in T. foenum-graecum is more sensitive to NO₂ than that in S. oleracea.

O₃ : At initial period of exposure with O₃, no change in RNA (Beckerson and Hofstra, 1979; Adedipe, 1973; Tingey et al.,
1975) for *T. foenum-graecum* was found at all the levels of urea. Maximum per cent reduction occurred at 90 days at all levels of urea but later on the rate declined up to 120 days in *S. oleracea* (Fig. 12) while in *T. foenum-graecum* (Fig. 20), the rate of reduction was maximum at 120 days of O$_3$ exposure. Reduction in RNA content is supported with the findings of Cracker (1972), Cracker and Starbuck (1972).

NO+NO$_2$+O$_3$ : RNA content reduced continuously at all levels of urea in both the spp., reached maximum (similar to O$_3$ effect) per cent reduction stage at 90 days in *S. oleracea* (Fig. 12) and 120 days in *T. foenum-graecum* (Fig. 20) when fumigated with NO+NO$_2$+O$_3$. The RNA content in *S. oleracea* affected (at all levels of urea) more than that of *T. foenum-graecum* (Table 73). The effect of combination of gases was found to be less-than-additive in both the spp. at all levels of urea. Less-than-additive effect indicates the influence of O$_3$ on NO$_x$ effect on RNA. Presence of O$_3$ might have lowered the effect of NO$_x$ on RNA in *T. foenum-graecum* while the presence of NO$_x$ might have lessen the influence of O$_3$ in *S. oleracea*. In case of *S. oleracea* at no urea, O$_3$ had maximum while NO$_2$, the minimum effect on RNA content; at optimum urea O$_3$ had maximum effect while NO causes minimum effect, while at more than optimum urea, NO+NO$_2$+O$_3$ caused highest effect and NO$_2$ caused lowest one (Fig. 26). In case of *T. foenum-graecum* at no urea, NO$_2$ had maximum influence on RNA content, least being that of NO while in rest of the urea treatments, NO$_2$ had highest effect while as O$_3$ the lowest one (Fig. 27).
Ambient air: Ambient air (Motinagar) causes reduction in RNA, reaching maximum (similar to NO and NO₂ effect) reduction at 90 days in *S. oleracea* (Fig. 13) and at 120 days in *T. foenum-graecum* (Fig. 21) at all the three levels of urea. The pattern of reduction is more or less similar to NO effect. RNA (mean) content (Table 73) reduced more in *S. oleracea* than that of *T. foenum-graecum* (Fig. 28) at all levels of urea. This might be due to the fact that O₃ might have played dominant role (compared to NOₓ) in reducing the more RNA content of *S. oleracea* than that of *T. foenum-graecum*.

The effect of different (Fig. 29) pollutants on RNA at optimum urea was in the decreasing order

\[ O₃ > NO + NO₂ + O₃ > \text{ambient air (MN)} > NO₂ > NO (S. oleracea) \]
\[ NO₂ > NO + NO₂ + O₃ > \text{ambient air (MN)} > NO > O₃ (T. foenum-graecum) \]

The reason for such behaviour is not understood.

Chlorophyll

Chl content, an index of photosynthetic potential of plant is highly susceptible to pollutant action.

NO: Under NO stress condition, *S. oleracea* and *T. foenum-graecum* showed continuous increase in the rate of per cent reduction in Chl, reached maximum at 90 days (later declined upto 120 days) for *S. oleracea* (Fig. 14) but at 120 days for the latter spp. (Fig. 22), at all levels of urea. *T. foenum-graecum* showed
more reduction in Chl (mean) than the other spp. (Table 73) indicating Chl is more susceptible to NO than in S. oleracea. Chl a reduced more than Chl b. The reason is not understood.

\( \text{NO}_2 \): Chl reduces by \( \text{NO}_2 \) exposure (Nash, 1976; Irving et al., 1980; Prasad, 1980; Singh, 1980) ultimately reducing the photosynthesis (Carlson, 1983; Okano et al., 1985). In the present investigation also, Chl reduced by \( \text{NO}_2 \) fumigation. In S. oleracea (similar to NO effect, Chl reduction rate was faster since the beginning of exposure) the maximum reduction was at 60 days at all urea levels (Fig. 14) but later on it declined gradually. In case of T. foenum-graecum, the maximum reduction (Fig. 22) was at 120 days at no urea or optimum urea, whereas at more than optimum urea, it occurred at 90 days. The reason of such shift in maxima is beyond our understanding. At no urea, Chl (mean) content of S. oleracea affected more while at rest of the urea concentrations, T. foenum-graecum showed more reduction in Chl compared to S. oleracea (Table 73). The reason is not understood. Chl a decreased more compared to Chl b.

In the present investigation in control as well as polluted leaf, the activity of Chl increases during maturatation, reaches to maximum but later on it decreased during aging (Tables 29, 59) in both the spp. It is in concurrence with the findings of Reich (1983).
$O_3$: Chl reduces under artificial as well as field condition when exposed to $O_3$ (Mulchi et al., 1983). In present investigation, Chl content in S. oleracea (Fig. 14) showed continuous decline in $O_3$ stressed plant, declination rate reaching maximum at 75 days (after that rate declined to zero at no urea) at no urea as well as at more than optimum urea while at optimum urea, the rate of per cent reduction reached maximum at 60 days after that rate of reduction declined suddenly. The reason of such differential maxima at different level of urea is not understandable. In case of T. foenum-graecum, there was increase (Cooley and Manning, 1988) in total Chl at initial age (Fig. 22) but after that the declination per cent rate reached maximum at 120 days at all levels of urea. Thus it is proportional to the dose of $O_3$ exposure. The decrease in Chl in our investigation also coincides with the similar observation in literature (Miller et al., 1969; Barnes, 1972; Chang, 1974 a, b; Frick and Cherry, 1974; Ormrod et al., 1981; Agrawal et al., 1982; 1983; Singh and Rao, 1982; Boralkar and Shinde, 1983; Pratt et al., 1983; Yang et al., 1983; Mulchi et al., 1983; Reich et al., 1986; Forberg et al., 1987; Cooley and Manning, 1988). It has been suggested that $O_3$ by itself affect the Chl molecule or it impair the synthesis of new one (Adedipe, 1973; Knudson et al., 1977).

$O_3$ fails to affect Chl (Koukol and Dugger, 1967). It is in concurrence with the findings of the present study where at
no urea, in case of *S. oleracea* (Fig. 14) there was no change in Chl at initial as well as at the end of exposure period (at 15, 105 and 120 days).

Chl a and b decrease (Fletcher *et al.*, 1972; Knudson *et al.*, 1977; Beckerson and Hofstra, 1979) or the ratio of Chl a and b decreases (Noble, 1974; Verkroost, 1974; Knudson *et al.*, 1977; Beckerson and Hofstra, 1979; Agrawal *et al.*, 1982). In the present investigation Chl a reduced more compared to Chl b at all levels of urea by O₃ exposure (Table 30, 60) in both the spp.

Chl (total) reduced more in *S. oleracea* compared to *T. foenum-graecum* (Table 73) at all treatments urea indicating the more susceptibility of the former spp. as far as Chl is concerned.

NO+NO₂+O₃ : NO+NO₂+O₃ caused progressive per cent reduction over control, reaching maximum at 60 days (*S. oleracea*, Fig. 14, similar to NO₂ effect) or 120 days (*T. foenum-graecum*, Fig. 22). The per cent reduction (mean) in total Chl was more in *S. oleracea* compared to that of *T. foenum-graecum* (Table 73) at all levels of urea, informing us about more dominant role played by O₃ in sequential exposure study causing more damage to Chl in the former spp.

At any of the urea, the effect of NO+NO₂+O₃ in reducing the Chl was less-than-additive compared with the sum of the
effects of individual pollutants (Table 73). Presence of
NO$_x$ might have lowered the effect of O$_3$ on Chl in S. oleracea
but the presence of O$_3$ might have lowered the effect of NO$_x$
in T. foenum-graecum.

At no urea (S. oleracea), NO+NO$_2$+O$_3$ effect on Chl was
highest and that of NO was lowest. At optimum urea, O$_3$ impact
was highest while that of NO$_2$ was lowest. At more than optimum
urea, again sequential exposure shows highest impact and that
of O$_3$, the lowest one (Fig. 26). In case of T. foenum-graecum,
ambient air exposure showed highest effect at no urea or more
than optimum urea while at optimum urea the highest effect was
observed for NO$_2$. As far as lowest impact is concerned, it was
observed for O$_3$ at all levels of urea (Fig. 27).

Ambient air: Under field condition, ambient air at Motinagar
caused progressive per cent reduction in Chl compared to control
in both the spp. In S. oleracea (Fig. 17) it reached maximum
at 75 days (similar to O$_3$ effect) at no urea or more than opti-
mum urea while at optimum urea it reached at 60 days. After
this period, the rate of decrease in Chl declined upto 120 days.
In case of T. foenum-graecum (Fig. 25) rate of per cent reduc-
tion (after 90 days similar to that of O$_3$ effect) became maxi-
mum at 120 days. At zero and more than optimum urea, the per-
cent Chl (mean) of T. foenum-graecum (Table 73) reduced more
than that of S. oleracea while at optimum urea, Chl of S.
oleracea reduced more (Fig.). The reason of such behaviour of
Chl at different levels of urea is beyond our understanding.
Nitrogen is one of the constituents of Chl. Its reduction might be the cause of reduction in Chl.

The impact of optimum urea and pollutants was in the following order in two spp. (Fig 29)

S. oleracea, O\(_3\) > NO + NO\(_2\) + O\(_3\) > ambient air (MN) > NO > NO\(_2\)

T. foenum-graecum, NO\(_2\) > NO + NO\(_2\) + O\(_3\) > ambient air (MN) > NO > O\(_3\)

The reason for such behaviour is not understandable.

**Nitrogen**

**NO**\(_2\) : At 15 days N content increased by NO exposure in both the spp. at all levels of urea. In S. oleracea as the dose increases, there was more and more reduction after 15 days, rate of reduction being slow up to 90 days after which it declined rapidly reaching maximum at 105 days (Fig. 15) but later on it declines suddenly up to 120 days. But contrary to this in T. foenum-graecum, rate of reduction reaches maximum on 120 days (Fig. 23) at all urea treatments. At zero and more than optimum urea, N (the mean per cent) in S. oleracea affected more while at optimum urea, T. foenum-graecum showed more reduction (Table 73). The reason of such behaviour of N in two spp. is not clear.

**NO**\(_2\) : When both the spp. were exposed to NO\(_2\), the per cent nitrogen content increased at 15 days (similar to NO effect) in S. oleracea (Fig. 15) at all treatments of urea. It also supports the findings by other workers (Prasad, 1980; Elkley and Ormrod, 1981; Srivastava and Ormrod, 1986). Except at this exposure period, nitrogen content decreases, the rate reaching maximum (similar to NO effect) at 105 days and then
it further declined. In *T. foenum-graecum* (Fig. 23) rate of N reduction increased continuously in NO₂ exposed plants, maximum being at 120 days. Thus our findings also support investigation carried out by Srivastava and Ormrod, (1986) as far as reduction in N content is concerned. The N (mean) content decreases more in *T. foenum-graecum* than that of *S. oleracea* at all levels of urea (Table 73) indicating that nitrogen in former spp. is more susceptible to NO₂ stress.

Q₃ : O₃-stress caused continuous per cent reduction in N content of *S. oleracea*, the rate of reduction reaching (Fig. 15) maximum at 75 days at zero and more than optimum urea while the same was observed at 60 days at optimum urea. After that period, the rate declined upto 120 days. But in case of *T. foenum-graecum*, at initial exposure period, the per cent N content increased (Fig. 23) over control but later on, the degree of damage in terms of per cent reduction increased, reaching maximum at 120 days (curves are more or less similar to NO effect). The reduction in nitrogen content was also shown by several workers (Pippen et al., 1975; Thompson and Kats, 1976; Letchworth and Blum, 1977; Neely et al., 1977; Neary and Leonard, 1978; Luesewitz, 1981; Agrawal et al., 1982; Blum et al., 1982, 1983; Rebbeck and Brennan, 1984). The N (mean) content decreased more in *S. oleracea* (Table 73) than in *T. foenum-graecum* at all levels of urea proving that N is more susceptible to O₃ in *S. oleracea* compared to the later spp.
NO+NO₂+O₃: The degree of N reduction increases reaching maximum at 75 (Fig. 15) in *S. oleracea* (later on rate declined suddenly while at 120 days minor increase was seen at no urea) and at 120 days in *T. foenum-graecum* (Fig. 23) when fumigated with NO+NO₂+O₃. The (mean) per cent reduction in N content of both the spp (Table 73) at all the levels of urea exposed with combination of gases was always less-than-additive compared to sum of the effects of individual pollutants (NO, NO₂, O₃). At no and more than optimum supply of urea, N content of *S. oleracea* was more susceptible (Table 73) to NO+NO₂+O₃ than that of *T. foenum-graecum* while at optimum urea the case was exactly reverse, *T. foenum-graecum* showed more nitrogen reduction compared to that of *S. oleracea*. The reason for such behaviour is not understood.

In case of *S. oleracea*, there was no uniformity of the effect of pollutants (Fig. 26). The O₃ effect on nitrogen content was highest while NO₂ and NO effect was lowest at no urea and optimum urea respectively. At more than optimum urea, NO+NO₂+O₃ effect was highest while that of ambient air was lowest. In case of *T. foenum-graecum*, NO₂ showed highest impact and O₃ showed lowest at all levels of urea (Fig. 27).

**Ambient air**: When *S. oleracea* (similar to NO and NO₂ effect) and *T. foenum-graecum* exposed to ambient air (Hotinagar), the degree of N per cent reduction values over control increased after 15 days in both the spp. (at 15 days, the per cent increases over control at all urea in both the spp.) reaches maximum
at 105 days (Fig. 17) in *S. oleracea* (after that rate declined) while it reaches at 120 days in *T. foenum-graecum* (Fig. 25). The nitrogen (mean) per cent reduction (Table 73) at zero and more than optimum urea was more (Fig. 28) in *S. oleracea* compared to that of *T. foenum-graecum* while in *T. foenum-graecum* it was more compared that of *S. oleracea*, the reason for which we fail to understand.

Ambient NO\textsubscript{2} results in the increment of total N (Mulchi et al., 1986). In the present study ambient NO\textsubscript{2} at Hotinagar might have contributed towards the reduction in N content in the field fumigated spp. particularly in *T. foenum-graecum*.

When *Nicotiana rustica* was treated with ambient O\textsubscript{3} and N-fertiliser, the plants supplied with either no urea or excess of urea show less reduction in nitrogen content than that of supplied with moderate quantity of urea (Leone et al., 1966). Results of the present investigation are in coincidence with the same statement. In *S. oleracea* and *T. foenum-graecum*, the plants supplied with optimum quantity of urea show maximum reduction under the influence of O\textsubscript{3}. Secondly, the O\textsubscript{3} present in the ambient atmosphere at Hotinagar might have contributed towards the reduction in N content in field exposed spp. specially in *S. oleracea*.

The impact of optimum urea and pollutants was in the following order in two spp. (Fig. 29)

- *S. oleracea*, O\textsubscript{3} > NO+NO\textsubscript{2}+O\textsubscript{3} > ambient air(HN) > NO\textsubscript{2} > NO
- *T. foenum-graecum*, NO\textsubscript{2} > NO+NO\textsubscript{2}+O\textsubscript{3} > ambient air(HN) > NO > 0
The reason for such behaviour is not understood.
Phytomass

NO: When *S. oleracea* (Fig. 16) and *T. foenum-graecum* (Fig. 24) exposed to NO, at initial exposure period, total per cent phytomass increased compared to control, later on the degree of reduction progressively increased, becoming maximum at 105 days at all levels of urea (90 days in addition to 105 days at optimum urea) after that it declined gradually up to 120 days in *S. oleracea* while in *T. foenum-graecum*, the extent of damage to phytomass reached maximum at 120 days. Phytomass (mean per cent) reduced more in *T. foenum-graecum* (Table 73) compared to that of *S. oleracea* indicating the more influence of NO on phytomass of the former spp. than that of the latter.

NO\(_2\): Dry wt of *S. oleracea* (Fig. 16) increased at 15 days exposure period with NO\(_2\) when treated with optimum and more than optimum urea but at no urea, there was no change (Pande and Mansfield, 1975), the reason for such differential change is not understood. After 15 days the per cent decrease in NO\(_2\) exposed plant reached maximum at 90 days (pattern being similar to that of NO effect) for all the urea treatments. In case of *T. foenum-graecum*, the rate of per cent reduction increased progressively (Fig. 24) being maximum at 120 days. Phytomass of *T. foenum-graecum* reduced more compared (Table 73) to that of *S. oleracea* at all levels of urea, giving the signal of more susceptibility of phytomass of the former spp compared to latter when exposed with NO\(_2\).*
Findings of the present investigation i.e. reduction of plant dry wt by NO₂ exposure is in concurrence with that of other researchers (Taylor and Eaton, 1966; Spierings, 1971; Ashenden, 1979).

In the present investigation shoot dry wt of S. oleracea increased (Ashenden and Williams, 1980) at optimum urea at 15 days while there was no change in root dry wt (Ashenden and Williams, 1980; Srivastava and Ormrod, 1986) at all levels of urea of the same spp. (Table 39). Shoot dry wt affected more than that of root in both the spp. at all levels of urea. This might be due to the fact that, majority of the metabolites are more concentrated in leaf than stem and least being in root. They might have encountered with NO₂ directly causing more adverse effect.

O₃: Exposure with O₃ caused gradual per cent reduction of phytomass, rate of reduction reaching maximum (similar to NO and NO₂ effect) at 90 days for S. oleracea (Fig. 16) while at 120 days for T. foenum-graecum (Fig. 24) at all urea treatments. But in case of T. foenum-graecum, there was increase (Chapelka et al., 1988) of phytomass at 15 days at all levels of urea (but in case of no urea 15 as well as 30 days). Thus the pattern is more or less similar to NO effect. The cause of such increase in one spp. only is not known. Literature supports the finding of the present study (reduction in phytomass). Growth reduces (Tingey et al., 1969; Duchelle et al., 1982;
Evans, 1973, Howell, 1975; Tingey, 1975; Blum and Letchworth, 1976; Heagle et al., 1979a; Ashmore et al., 1980; Blum and Heck, 1980; Kress and Skelly, 1982; Reich, 1983; Temple et al., 1985; Irving, 1986; Marie and Ormrod, 1986; Prokipcap and Ormrod, 1986; Cooley et al., 1988; Chapelka et al., 1988). It reduces growth along with yield (Heagle et al., 1976b; Oshima et al., 1979; Blum et al., 1983; Kohut and Laurence, 1983; Kats et al., 1985; Kohut et al., 1986; Reich et al., 1986) while dry wt of plant reduces by O₃ (Constantindou and Kozlovaski, 1979, Singh and Rao, 1982; Agrwal et al., 1983; Blum et al., 1983; McLaughlin and McConthy, 1983; Rebbeck and Brennan, 1984; Prokipcap and Ormrod, 1986).

In the present investigation shoot dry wt (Amani et al., 1979; Constantindou and Kozlovaski, 1979; Blum et al., 1980, 1982; Montes et al., 1982; Amundson, 1986; Rajput and Ormrod, 1986) which also includes leaf dry wt (Frick and Cherry, 1974; Noble and Jensen, 1980) reduced in O₃ fumigated S. oleracea (Table 40) and T. foenum-graecum (Table 70). The possible cause of lower growth of two spp. due to O₃ in the present study may be due to decrease in Chl (photosynthesis), altered allocation and metabolic disturbances (Irving, 1986) in AA, protein etc.

No growth or yield response (Heggestad et al., 1980; Olszyk et al., 1986). But in the present study, growth reduced considerably in S. oleracea. This might be due to the fact that in the aforesaid study the spp. might be either less sensitive or tolerant to the O₃.
In the present investigation root dry wt (Amani et al., 1979; Amundson, 1980; Blum et al., 1980; 1982; Kochchar et al., 1980; Montes et al., 1982; Jonston et al., 1986) reduced in both the spp. at all levels of urea.

Above ground biomass is good indicator of O₃ (Kohut, 1986). It is true in case of present study particularly in S. oleracea, the shoot dry wt of which was more affected than root dry wt. (Table 40).

In the present investigation comparing the three controls i.e. at no urea, optimum and more than optimum urea, the dry wt at latter two treatments was more (Neary and Leonard, 1978; Sameni et al., 1980; Luesewitz, 1981) in both the spp.

Present study showed that, at no urea there was less (Fig. 16, 24) per cent reduction in phytomass while as the N-supply increased to moderate level there was highest reduction (Brewer et al., 1969; Ormrod et al., 1973) but on further increase of urea there was less reduction compared to moderate dose of urea (Heagle, 1979).

Phytomass of S. oleracea affected more than that of T. foenum-graecum at all urea (Table 73) under artificial exposure condition with O₃. It shows that phytomass of former spp. is more sensitive to O₃.

NO+NO₂+O₃: When both the spp. fumigated with NO+NO₂+O₃, after slow per cent reduction upto 30 days it reached to maximum rapidly at 105 days (similar to NO, NO₂ and O₃ effect) with no
urea while at 90 days with optimum or more than optimum urea for *S. oleracea* (Fig. 16). The reason of such differential behaviour at different urea as far as maxima is concerned is beyond our understanding. But in case of *T. foenum-graecum*, the rate of per cent reduction gradually reached to maximum at 120 days (Fig. 24) at all levels of urea. The pattern was more or less similar to NO\(_2\) effect. Such reduction in growth (De Termmerman, 1979; Kress *et al.*, 1982 a, b; Kress and Skelly, 1982) and plant dry wt (Lorenzini *et al.*, 1985) was also shown with NO\(_2\)+O\(_3\) fumigation. Phytomass of *T. foenum-graecum* reduced more (Table 73) than that of *S. oleracea* at all fertiliser levels indicating the more contribution of the impact of NO\(_x\) than O\(_3\) on the former spp. Effect of NO+NO\(_2\)+O\(_3\) on phytomass was less than sum of the effects of individual pollutants at all levels of fertiliser.

In case of *S. oleracea* (Fig. 26), O\(_3\) showed maximum impact on phytomass (mean) at all levels of urea. At no urea lowest impact was occurred by NO\(_2\) while at optimum and more than optimum urea, lowest effect was occurred by NO. In case of *T. foenum-graecum* NO\(_2\) had maximum effect on phytomass while minimum being by O\(_3\) at all levels of urea (Fig. 27).

Ambient air: When *S. oleracea* exposed to ambient air (Motinagar), at initial stage, there was no change at no
or more than optimum urea while at optimum nitrogen supply phytomass increased (Fig. 17) compared to control plant but at later ages rate of reduction increased suddenly after 30 days, maximum being at 90 days irrespectively of N-supply. After that the rate declined upto 120 days even if the dose increased. In case of T. foenum-graecum, rate of per cent reduction increased (Fig. 25) slowly reaching maximum at 120 days. (The pattern is more or less similar to NO$_2$ and NO+NO$_2$+O$_3$ effect). At no urea or more than optimum urea mean phytomass (Table 73) of S. oleracea reduced more than that of T. foenum-graecum (Fig. 28). While at optimum urea, the case was exactly opposite i.e. phytomass of T. foenum-graecum reduced more compared to the other spp. The explanation for such behaviour at different concentrations of urea is beyond our reach.

The effect of pollutants on phytomass at optimum urea was in the decreasing order in two spp (Fig. 29)

S. oleracea, O$_3$ > NO+NO$_2$+O$_3$ > ambient air (MN) > NO$_2$ > NO

T. foenum-graecum, NO$_2$ > NO+NO$_2$+O$_3$ > ambient air (MN) > NO > O$_3$

The reason for such behaviour is beyond our understanding.

Thus it is clear from the discussion that:

1. Reduction (with minor increase over control at early age) in all the parameters of both the spp. at optimum supply of urea (at which the plant growth is maximum) was more, followed by more than optimum and least in no supply, the reason for which is not
understood. Thus the biomonitoring of pollutant may be encouraged at optimum nitrogen supply.

2. The overall effect of NO and NO₂ each at optimum urea, shows that *T. foenum-graecum* affects more than *S. oleracea* while that of O₃, NO+NO₂+O₃ and ambient air (field) each shows the reverse trend i.e. *S. oleracea* affected more than *T. foenum-graecum*. It is obvious that *T. foenum-graecum* may be used as NOₓ indicator while *S. oleracea* may be used as O₃ indicator.

3. At optimum urea, in *S. oleracea* the trend of pollutant effect is in the decreasing order of O₃>NO+NO₂+O₃>ambient air (MN)>NO₂>NO while in *T. foenum-graecum* is NO₂>NO+NO₂+O₃>ambient air (MN)>NO>O₃.

4. In all the parameters irrespective of the spp., the effect of NO+NO₂+O₃ is less-than-additive compare to sum of the individual pollutant effects (Matsushima, 1971; Barnes, 1972 a, b; Kress, 1980).

5. As the age of plant increases the adverse effect of all pollutants become more and more up to 120 days in *T. foenum-graecum* but in case of *S. oleracea* up to certain period the rate of reduction enhanced, reaches to maximum and then started decreasing even if the exposure period increases (Irving, 1986) indicating the age effect.

6. Chl a reduced more than that of Chl b at all levels of urea irrespective of pollutants and plant spp.
7. The day at which maximum reduction in all the six parameters occur, vary with pollutant and urea treatment.

8. At optimum urea in NO+NO$_2$+O$_3$ exposed spp., S. oleracea shows more damage to AA than that of T. foenum-graecum (Table 73) indicating that the presence of O$_3$ might have helped to reduce the loss to AA in latter spp. by NO$_x$. AA in S. oleracea reduces less than in T. foenum-graecum when exposed to ambient air showing the dominant role of NO$_x$ in affecting the AA of the latter spp. The reason for such contradictory results at two fumigation conditions is not understood.

9. At optimum urea, the protein, RNA and Chl reduced more in S. oleracea than that of T. foenum-graecum when exposed to NO+NO$_2$+O$_3$ as well as ambient air (Table 73) indicating that the presence of O$_3$ might have lowered the effect of NO$_x$ on T. foenum-graecum. Similar behaviour of the three plant parameters in artificial and field exposure study show the confirmation of the field observations.

10. Contrary to AA behaviour (at optimum urea), the N content (Table 73) in T. foenum-graecum reduced more than that of S. oleracea when exposed to NO+NO$_2$+O$_3$ but when exposed to ambient air, it was the latter spp. which shows the more reduction in N content, the reason for which is beyond our reach to explain.

11. Contrary to protein, RNA and Chl behaviour, phytomass of T. foenum-graecum reduced (Table 73) more (at optimum urea)
than that of *S. oleracea* when exposed to either NO+NO$_2$+O$_3$ sequentially in artificial condition or to ambient air at Motinagar (thus confirming the field observation) indicating the presence of NO$_x$ might have lowered the O$_3$ effect on the phytomass of the latter spp.

12. The AA and phytomass of *T. foenum-graecum* reduced more than that of *S. oleracea* when exposed to ambient air at optimum (Table 73) urea. It indicates the more sensitivity of AA and phytomass of the former spp. exposed to more concentrations of NO and NO$_2$ than *S. oleracea* (concentrations of NO and NO$_2$ with which *T. foenum-graecum* was exposed were 42.42 and 77.69 $\mu$g/m$^3$ respectively while the same for *S. oleracea* were 31.01 and 73.38 $\mu$g/m$^3$ respectively). On the contrary, the protein, RNA, Chl and N reduced more in *S. oleracea* than the other spp. indicating the more influence of O$_3$ on the protein, RNA, Chl and N in *S. oleracea* (exposed to 64.57 $\mu$g O$_3$/m$^3$) than that of the *T. foenum-graecum* (exposed to 50.65 $\mu$g O$_3$/m$^3$).

13. At optimum urea, the parameters can be arranged in the decreasing order of the effects of all the pollutants for the two spp. (Fig. 29).

*S. oleracea*

NO, Chl > AA > RNA > protein > N > phytomass

NO$_2$, AA > Chl > RNA > protein > N > phytomass

O$_3$, AA > protein > Chl > RNA > phytomass > N
NO+NO2+O3, Chl > protein > AA > RNA > phytomass > N
Ambient air, protein > Chl > AA > RNA > phytomass > N (Motinagar)

T. foenum-graecum

NO, Chl > AA > protein > RNA > N > phytomass
NO2, Chl > RNA > phytomass > AA > protein > N
O3, Chl > protein > AA > RNA > N > phytomass
NO+NO2+O3, Chl > AA > protein > phytomass > RNA > N
Ambient air, Chl > AA > protein > RNA > phytomass > N (Motinagar)

14. Thus at optimum urea, AA was the most sensitive parameter to O3 while N was the least sensitive to the same pollutant in S. oleracea. But in case of T. foenum-graecum Chl was the most sensitive to NO and NO2 both while phytomass was least sensitive to NO and N was least sensitive to NO2.
Table 73 Comparison of various plant parameters of *S. oleracea* and *T. foenum-graecum* exposed under artificial (NO, NO₂, O₃, NO+NO₂+O₃) and field (ambient air) exposed condition (mean of 15-120 days, per cent reduction value ±1SD)

<table>
<thead>
<tr>
<th>Plant species</th>
<th>Parameter</th>
<th>Urea (g)</th>
<th>NO</th>
<th>NO₂</th>
<th>O₃</th>
<th>NO+NO₂+O₃</th>
<th>Ambient air (field)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>S. oleracea</em> AA</td>
<td>1.00</td>
<td>1.692±0.523</td>
<td>2.974±0.823</td>
<td>6.299±4.086</td>
<td>2.832±1.454</td>
<td>2.416±0.959</td>
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<tr>
<td></td>
<td>2.00</td>
<td>1.96±0.732</td>
<td>4.04±1.080</td>
<td>0.70±3.425</td>
<td>7.09±2.309</td>
<td>2.77±1.288</td>
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</tr>
<tr>
<td>Protein</td>
<td>0.00</td>
<td>0.721±0.840</td>
<td>0.59±0.562</td>
<td>0.70±0.527</td>
<td>0.75±0.673</td>
<td>1.23±1.387</td>
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<tr>
<td></td>
<td>1.44</td>
<td>2.05±1.432</td>
<td>3.60±3.136</td>
<td>28.06±6.248</td>
<td>19.53±2.755</td>
<td>17.71±2.527</td>
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<tr>
<td></td>
<td>2.00</td>
<td>1.72±1.250</td>
<td>3.26±3.274</td>
<td>14.21±1.214</td>
<td>14.05±1.530</td>
<td>8.24±0.930</td>
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</tr>
<tr>
<td>RNA</td>
<td>0.00</td>
<td>1.27±1.609</td>
<td>0.95±0.749</td>
<td>3.82±3.522</td>
<td>3.01±2.598</td>
<td>1.59±0.445</td>
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<td>1.69±1.304</td>
<td>7.39±5.928</td>
<td>8.26±7.639</td>
<td>8.24±0.737</td>
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<tr>
<td>Total Chl</td>
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<td>1.23±0.649</td>
<td>2.35±0.886</td>
<td>1.81±0.746</td>
<td>2.49±1.491</td>
<td>2.41±1.042</td>
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<td>1.44</td>
<td>6.68±4.191</td>
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<td>27.36±1.509</td>
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<td>6.01±4.948</td>
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<td>N</td>
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<td>0.30±0.587</td>
<td>0.07±0.029</td>
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<td>2.00</td>
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<td>2.86±1.402</td>
<td>2.39±1.062</td>
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<tr>
<td>Total phytomass</td>
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<td>0.204±0.085</td>
<td>5.19±2.664</td>
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<td>T. foenum- AA</td>
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</tr>
<tr>
<td></td>
<td>Protein</td>
<td>RNA</td>
<td>Total Chl</td>
<td>N</td>
<td>Total</td>
<td>phytomass</td>
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<tr>
<td>0.0</td>
<td>0.312±0.414</td>
<td>0.585±0.288</td>
<td>2.705±2.318</td>
<td>0.218±0.312</td>
<td>0.179±0.242</td>
<td>0.829±0.452</td>
<td>0.409±0.363</td>
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<tr>
<td>1.0</td>
<td>5.172±1.841</td>
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<td>6.879±5.557</td>
<td>1.205±0.522</td>
<td>5.961±3.779</td>
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<td>3.333±4.131</td>
<td>1.908±1.261</td>
<td>0.581±0.357</td>
<td>9.542±3.860</td>
<td>10.699±3.963</td>
<td>10.801±3.816</td>
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<td>1.481±0.861</td>
<td>0.922±0.630</td>
<td>1.289±2.073</td>
<td>0.124±0.088</td>
<td>1.053±0.292</td>
<td>0.524±0.418</td>
<td>0.102±0.336</td>
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<td>6.207±7.776</td>
<td>1.727±1.000</td>
<td>1.185±0.777</td>
<td>0.253±0.247</td>
<td>4.681±1.392</td>
<td>7.335±2.207</td>
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<td>5.803±8.640</td>
<td>0.630±0.279</td>
<td>4.144±3.406</td>
<td>0.554±0.669</td>
<td>2.034±0.528</td>
<td>3.533±0.414</td>
<td>2.417±0.353</td>
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</tbody>
</table>
Fig. 10. IMPACT OF UREA AND NO, NO₂, O₃, NO+NO₂+O₃ ON ASCORBIC ACID OF SOLERACEA
Fig. 11. IMPACT OF UREA AND NO, NO₂, O₃, NO+NO₂+O₃ ON PROTEIN OF _S. OLERACEA_
Fig 12. IMPACT OF UREA AND NO, NO₂, O₃, NO+NO₂+O₃ ON RNA OF S. OLERACEA
Fig. 13. IMPACT OF UREA AND AMBIENT AIR (MOTINAGAR) ON ASCORBIC ACID, PROTEIN, AND RNA OF S. OLERACEA
Fig 14. IMPACT OF UREA AND NO, NO\textsubscript{2}, O\textsubscript{3}, NO+NO\textsubscript{2}+O\textsubscript{3} ON CHLOROPHYL OF S. OLERACEA
Fig. 15. IMPACT OF UREA AND NO, NO₂, O₃, NO+NO₂+O₃ ON NITROGEN OF S. OLERACEA
Fig 16: IMPACT OF UREA AND NO, NO₂, O₃, NO⁺NO₂+O₃ ON PHYTOMASS OF S. OLERACEA
Fig. 17. IMPACT OF UREA AND AMBIENT AIR (MOTINAGAR) ON CHLOROPHYLL, NITROGEN AND PHYTOMASS OF S. OLERACEA.
Fig. 18. IMPACT OF UREA AND NO, NO₂, O₃, NO+NO₂+O₃ ON ASCORBIC ACID OF T. FOENUM-GRAVISSimum
Fig. 19. IMPACT OF UREA AND NO, NO₂, O₃, NO+NO₂+O₃ ON PROTEIN OF T. FOENUM-GRAECUM
Fig. 20. IMPACT OF UREA AND NO, NO$_2$, O$_3$, NO+NO$_2$+O$_3$ ON RNA OF T. FOENUM-GRAECUM
Fig21. IMPACT OF UREA AND AMBIENT AIR(MOTINAGAR) ON ASCORBIC ACID, PROTEIN, RNA OF *F. FOENUM-GRAECUM*
Fig. 22. IMPACT OF UREA AND NO, NO₂, O₃, NO+NO₂+O₃ ON CHLOROPHYLL OF F. FOENUM GRAECUM
Fig. 23. IMPACT OF UREA AND NO, NO₂, O₃, NO+NO₂+O₃ ON NITROGEN OF Foenrum-Graecum
Fig. 24. IMPACT OF UREA AND NO, NO₂, O₃, NO + NO₂ + O₃ ON PHYTOMASS OF T. FOENUM-GRAECUM
Fig. 25. IMPACT OF UREA AND AMBIENT AIR (MOTINAGAR) ON CHLOROPHYLL, NITROGEN, PHYTOMASS OF T. FOENUM-GRAECUM
Fig. 26. COMPARISON OF THE IMPACT OF UREA AND NO, NO$_2$, O$_3$, NO+NO$_2$, O$_3$ OF S. OLERACEA
Fig. 27. Comparison of the impact of urea and NO, NO₂, O₃, NO+NO₂+O₃ on T. FOENUM-GRACEUM.
Fig. 28. COMPARISON OF IMPACT OF UREA AND AMBIENT AIR (MOTINAGAR).
Fig. 29. COMPARISON OF THE IMPACT OF NO, NO\textsubscript{2}, O\textsubscript{3}, NO+NO\textsubscript{2}+O\textsubscript{3} AND AMBIENT AIR AT OPTIMUM UREA.