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Absorption of nutrient on mustard plants with fertilizers levels in agroforestry systems based on *Gmelina arborea* and *Dalbergia sissoo*

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Abstract
During Rabi period, a field experiment was conducted at a research farm under Department of Forestry JNKVV, Jabalpur season 2021-22 to know the nutrient absorption of the mustard crop with different fertilizer rates under agroforestry systems based on *Gmelina arborea* and *Dalbergia sissoo*. The experiment was structured factorial randomized block designs (FRBD) with 4 replicates and 2 factor treatments and 3 fertilizers passed F_1 (75% NPK at 45:30:30 kg ha^{-1}), F_2 (100% NPK at 60:40:40 kg ha^{-1}) and F_3 (125% NPK at 75:50:50 kg ha^{-1}) Nutrient absorption through mustard cultivation with different fertilizers. The result augmented that there were different variations in nutrients utilization by mustard. The highest nutrient content (N: P: K) by mustard seed was found in F_3 (2.93:0.30:3.53) and minimum was in F_1 (2.48:0.17:2.11) moreover nutrient absorption by straw was observed in highest F_3 (0.28:0.008:7.58) and minimum was in F_1 (0.23:0.007:4.56). The mustard seed nutrient content on factor *Gmelina arborea* (2.69:0.29:2.90) was higher than *Dalbergia Sissoo* (2.39:0.16:2.71). Nutrient uptake (N:P:K @ Kg ha^{-1}) in mustard seed estimated that F_3 (14.42:1.522:17.35) was highest and minimum in F_1 (7.00:0.559:6.42) whereas under fertilizer level was different in mustard straw F_3 (9.36:0.281:45.60) and minimum was in F_1 (5.94:0.186:35.02) moreover mustard grain on factor *Gmelina arborea* (11.82:1.285:12.92) was estimated maximum and minimum was estimated in *Dalbergia sissoo* (7:95:0.564:9.27).

Keywords: Nutrient content, *Dalbergia sissoo*, *Gmelina arborea,* fertility levels

Introduction
Nutrient uptake a natural phenomenal activity in the plant by growth and development. Optimum nutrition is required for gave the higher seed yield and good quality of the grain. The nutrients (NPK) is play important role for production of oil seed crops. The nutrient value direct influx. The *Gmelina arborea* and *Dalbergia sissoo* wood is used for pulp, particle plywood, board, carpentry, matches and packing. It's also used for construction of Lumber, Timber and furniture industry in India. Some small hold farmer and big farmer have to cultivated tree crops in the field and agricultural crop are integrate. This trees crops gives a micro environment for growing agriculture crops in farm of organic matter, litter material, nitrogen nutrient through fixing of atmospheric nitrogen and other micro nutrient in form of Humus. Rapeseed or Mustard (Indian mustard) belong in Brassicaceae family. Mustard is second largest oil seed consumption after groundnut. This Mustard oil accounts for almost 40% of the total edible oil output in the country. Mustard is produced all over northern India and substantial acreage is under it in Rajasthan (29 lakh ton), Haryana, MP and Gujarat (20 lakh ton together), UP (8.8 lakh ton) and Punjab (FICCI Report 2023). In this investigation reflected that agroforestry important role play in production for mustard crop through appropriate nutrient application.

Materials and Methods
The field experiment was conducted during the winter (Rabi) season 2021-22 at College of Agriculture, Jabalpur, J.N.K.V.V., (MP) The soil consisted of sandy loam with slightly acidic character to determine the productivity of mustard plants in agroforestry systems. The experiment was Factorial Randomized Complete Block Design (RCBD) with 4 repetitions and 3 fertilizer levels with 2-factor treatments (systems). The consisted F_1 (75% NPK @ 45:30:30 kg ha^{-1}), F_2 (100% NPK @ 60:40:40 kg ha^{-1}), and F_3 (125% NPK @ 75:50:50 kg ha^{-1}).

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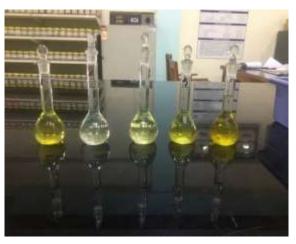JNKVV, Jabalpur, Madhya
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Mustard variety (Pusa Tarak) was sown on 06 to 15th Nov, 2021-22 at row spacing of 30 cm by using 5 kg ha^{-1} seed rate. All the quantity of NPK was applied at the time of provide as basal application. Plant protection done for controlling of Aphid (saw fly) in the mustard crop, lethal gold (Bifenthrin 3% + Chlorophyriphos 30% EC) at 2 ml per liter of water was sprayed during flowering period.

Estimation of N, P and K uptake by mustard plants

To estimate N, P and K uptake, samples were taken from the mustard harvest. The samples were dried in an oven at a temperature of 650 °C. The nitrogen uptake of the mustard plant was determined by digesting the plant samples with a suitable acid mixture of concentrated sulfuric acid. Phosphorus content was estimated using the Vanadomolybdate method in a diacid mixture. The intensity of the developed color was measured in a spectrophotometer using a blue filter. The potassium content was estimated from the diacid digested material using a flame photometer and expressed as percent K. Nutrient content and weight were used to calculate total nutrient intake (NPK) according to the following formula.

$$\text{Nutrient uptake (kg ha}^{-1}) = \frac{\text{Nutrient content (\%) X Dry weight (kg ha}^{-1})}{100}$$

Methodology for estimation of Phosphorus content percentage in seed and straw

Methodology for estimation for nitrogen content percentage in seed and straw

Results and Discussion
N, P, K content (%) in grain and straw

The perusal of data regarding N, P, K content in grain and straw of wheat as influenced by different treatments are presented in different table during both the year.

N content (%) in grain and straws

Table 1 shows that the grain N content (%) due to fertilizer dose ranges from 2.28 to 2.92, while all treatments are significant with each other, but the maximum N content was found using F_3 and the minimum value F_1 fertilizer dose was estimated. The average N content of *Gmelina arborea* and *Dalbergia sissoo* is between 2.39 and 2.69, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo* with a significance level of 5%. The interaction effect of *Gmelina arborea* and *Dalbergia sissoo* on F_1 is constant, the mean varies between 2.13 and 2.43, however *Gmelina arborea* was significantly higher than *Dalbergia sissoo* and F_2 is constant, the mean is 2.28 to 2.52. while *Gmelina arborea* was clearly superior to *Dalbergia sissoo.* At constant F_3, the means varied between 2.74 and 3.11, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo,* so the interaction effect at the fertilizer level was significant for all treatment trends with *Dalbergia sissoo* on *Gmelina arborea.* While it is constant for *Gmelina arborea,* this means that the N content varies between 2.14 and 2.43, while all treatments were significant. However, F_3 was found maximum and minimum in F_2, followed by F_1, increasing the fertilizer dose and N content in *Gmelina arborea.* While the content of *Dalbergia sissoo* N varies between 1.91 and 2.15 However, all treatments were significant, but F_3 was found to be maximum and minimum in F_2, followed by F_1, which increased the N content of fertilizer dose. The N content (%) in the straw determined based on the fertilizer dose varies between 0.23 and 0.28, with all treatments being significant among each other. However, the maximum N content was determined at F_3 and the minimum N content was estimated at the fertilizer dose F_1. The average N content of *Gmelina arborea* and *Dalbergia sissoo* is in the range of 0.23 to 0.28, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo.* The interaction effect of *Gmelina arborea* and *Dalbergia sissoo* on F_1 is a constant mean ranging from 0.21 to 0.24; However, *Gmelina arborea* was significantly superior to *Dalbergia sissoo* and F_2 is a constant mean of 0.22 to 0.29, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo.* At constant F_3, the means varied between 0.25 and 0.30, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo,* so the interaction effect at the fertilizer level was significant for all treatment trends with *Dalbergia sissoo* on *Gmelina arborea.* While it is constant for *Gmelina arborea,* this means that the N content varies between 0.24 and 0.30, while all treatments were significant. However, F_3 was found maximum and minimum in F_2, followed by F_1, so fertilizer dose and N content increase in *Gmelina arborea.* While the content of *Dalbergia sissoo* N varies between 0.21 and 0. However, all treatments were significant, however, F3 was found to be maximum and minimum in F_2, followed by F_1, which increased the N content of the fertilizer dose. The similar result found the nitrogen content estimated by Stojanović *et al.* (2023) [8].

P content (%) in grain and straw
data on P content (%) presented in Table 1 reflects that the P

content (%) of the grain varies between 0.17 and 0.30 due to the fertilizer dose, while all treatments are significant among themselves and the fertilizer dose is 5% of the significant is However, the maximum P content was determined with F3 and the minimum P content was estimated with the fertilizer dose F_1. The average P content of *Gmelina arborea* and *Dalbergia sissoo* is between 0.16 and 0.29 while *Gmelina arborea* was significantly higher than *Dalbergia sissoo* with a significance level of 5%. The interaction effect of *Gmelina arborea* and *Dalbergia sissoo* in F_1 is constant, the mean varies between 0.12 and 0.23; However, *Gmelina arborea* was significantly higher than *Dalbergia sissoo* and F_2 is constant, the mean is 0.13 to 0.20, while *Gmelina arborea* was clearly superior to *Dalbergia sissoo*. At constant F_3, the means varied between 0.22 and 0.38, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo,* so the interaction effect at the fertilizer level was significant for all treatment trends with *Dalbergia sissoo* on *Gmelina arborea.* While it is constant for *Gmelina arborea,* this means that the P content varies around 0.23 to 0.38 while all treatments were significant, however, F_3 was found maximum and minimum in F_2 followed by $F_1,$ which increased the fertilizer dose and P content in *Gmelina arborea.* Although the P content of *Dalbergia sissoo* ranges from 0.12 to 0.22, all treatments were significant; However, it was found that F_3 is maximum and minimum in F_2, followed by F_1, so the fertilizer dose is increased. The P content (%) in the straw determined based on the fertilizer dose is between 0.0071 and 0.0083, while all treatments are significant among themselves, the fertilizer dose is 5% of the significant level; However, the maximum P content was found in F_3 and the minimum P content was estimated in F_1. Fertilizer dose The average P content of *Gmelina arborea* and *Dalbergia sissoo* is between 0.0069 and 0.0085, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo* with a significance level of 5%. The interaction effect of *Gmelina arborea* and *Dalbergia sissoo* in F_1 is constant, the mean varies between 0.0066 and 0.0076; However, *Gmelina arborea* was significantly higher than *Dalbergia sissoo* and F_2 is constant, the mean is 0.0067 to 0.0088, while *Gmelina arborea* was clearly superior to *Dalbergia sissoo*. At constant F_3, the means ranged from 0.0074 to 0.0091, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo*, so the interaction effect at the fertilizer level was significant for all Dalbergia treatment trends. sissoo on *Gmelina arborea*. While it is constant for *Gmelina arborea,* this means that the P content varies around 0.0076 to 0.0091, while all treatments were significant, however, F_3 was found to be maximum and minimum in F_2, followed by F_1, which increased fertilizer dose and P content in *Gmelina arborea.* Although the P content of *Dalbergia sissoo* varies between 0.0066 and 0.0074, all treatments were significant. However, F_3 was found to be maximum and minimum in F_2, followed by F_1, which increased the P content of the fertilizer dose. also findings noted by Neha *et al.,* 2014 [5], and Shah *et al.,* 2022 [4].

K content (%) in grain and straw
The K content (%) data included in Table 1 showed that the grain K content (%) varies between 0.021 and 0.035 due to fertilizer dose, while all treatments are significant from each other for fertilizer dose; However, the maximum K content was determined with F_3. and the minimum was estimated using the F_1 fertilizer dose. The average K content of *Gmelina*

arborea and *Dalbergia sissoo* is between 0.027 and 0.029, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo* with a significance level of 5%. The interaction effect of *Gmelina arborea* and *Dalbergia sissoo* on F_1 is constant, the mean is between 0.021 and 0.021, however *Gmelina arborea* was significantly higher than *Dalbergia sissoo* and F_2 is constant, the mean is between 0.026 and 0.030, while *Gmelina arborea* was clearly superior to *Dalbergia sissoo*. With constant F_3, the means were between 0.035 and 0.036, with *Gmelina arborea* clearly superior to *Dalbergia sissoo,* so the interaction effect at the fertilizer level was significant for all treatment trends with *Dalbergia sissoo* versus *Gmelina arborea.* While it is constant for *Gmelina arborea,* this means that the K content varies from 0.021 to 0.036, while all treatments were significant, however, F_3 was found to be highest and lowest in F_2, followed by F_1, which increased fertilizer dose and K content in *Gmelina arborea.* Although the K content of *Dalbergia sissoo* ranges from 0.021 to 0.035, all treatments were significant; However, it was found that F_3 is maximum and minimum in F_2, followed by F_1, so the fertilizer dose is increased. The K content (%) in the straw is between 0.0456 and 0.0758 due to the fertilizer dose, with all treatments being significant among each other. However, the maximum K content was found to be F_3 and the minimum was estimated at the fertilizer dose F_1. The average K content of *Gmelina arborea* and *Dalbergia sissoo* is between 0.0571 and 0.0617, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo* with a significance level of 5%. The interaction effect of *Gmelina arborea* and *Dalbergia sissoo* on F_1 is a constant mean ranging from 0.0437 to 0.0474; However, *Gmelina arborea* was significantly higher than *Dalbergia sissoo* and F_2 is a constant mean from 0.0547 to 0.0591, while *Gmelina arborea* was clearly superior to *Dalbergia sissoo.* At constant F_3, the means ranged from 0.0729 to 0.0787, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo,* so the interaction effect at the fertilizer level was significant for all Dalbergia treatment trends. *Dalbergia sissoo* on *Gmelina arborea.* While it is constant for *Gmelina arborea*, this means that the K content varies from 0.0474 to 0.0787, while all treatments were significant, however, F_3 was found to be maximum and minimum in F_2, followed by F_1, which increased fertilizer dose and K content in *Gmelina arborea.* While the K content of *Dalbergia sissoo* varies between 0.0437 and 0.0729, all treatments were significant, however, F_3 was found to be highest and lowest in F_2, followed by F_1, thereby increasing the K content of fertilizer dose increased. These findings are in line with those noted by Parmar *et al*. (2011) [6], Rajput (2017) [7] and Shah *et al* 2022 [4].

Nitrogen uptake by Mustard grain and straw (kg ha^{-1})
The Table 2 Present that the Grain N uptake (%) due to fertilizer dose ranges from 7.00 to 12.42, while F_3 was significant for F_1 and F_2; However, F_1 was on par with the fertilizer amount F_2. However, the maximum N uptake was found to be at F_3 and the minimum was estimated at the fertilizer dose F_1. The average N uptake of *Gmelina arborea* and *Dalbergia sissoo* is in the range of 7.95 to 11.82, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo* with a significance level of 5%. The interaction effect of *Gmelina arborea* and *Dalbergia sissoo* on F_1 is constant, the mean is between 5.32 and 8.67, but *Dalbergia sissoo* was

on par with *Gmelina arborea* and F_2 is constant, the mean is 6.10 to 10.38, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo*. At constant F_3, the means varied between 12.42 and 16.42, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo*, so the interaction effect at the fertilizer level was significant for all treatment trends with *Dalbergia sissoo* on *Gmelina arborea*. While constant for *Gmelina arborea*, this means that N uptake varies between 8.67 and 16.42, while all treatments were significant. However, F_3 was found to be maximum and minimum in F_2, followed by F_1, which increases fertilizer dose and N absorption in *Gmelina arborea*. While the N uptake of *Dalbergia sissoo* varies between 5.32 and 12.42 However, all treatments were significant, but F_3 was found to be maximum and minimum in F_2, followed by F_1, which increased fertilizer dose with N uptake. Straw N uptake (%) determined due to fertilizer dose ranges from 5.94 to 9.36, while F_3 and F_2 were significant for F_1 but F_2 was same with fertilizer dose. F3 fertilizer at 5% of significant level; however, the maximum uptake of N. was determined with F_3 and the minimum was estimated with the fertilizer dose F_1. The average N uptake of *Gmelina arborea* and *Dalbergia sissoo* is between 5.43 and 9.99, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo* with a significance level of 5%. The interaction effect of *Gmelina arborea* and *Dalbergia sissoo* on F_1 is constant, the mean varies between 3.84 and 8.04, however *Gmelina arborea* was significantly higher than *Dalbergia sissoo* and F_2 is constant, the mean is 5.73 to 9.95, while *Gmelina arborea* was clearly superior to *Dalbergia sissoo*. At constant F_3, the means varied between 6.72 and 11.99, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo*, so the interaction effect at the fertilizer level all treatment trends with *Dalbergia sissoo* on *Gmelina arborea* was significant. In *Gmelina arborea*, however, it is constant, which means that N absorption varies 8.04 to 11.99, while all treatments were equivalent, however, F_3 was found to be maximum and minimum in F_2, followed by F_1, which increased fertilizer dose and N uptake in *Gmelina arborea*. While the N uptake of *Dalbergia sissoo* varies between 3.84 and 6.72, all treatments were equivalent, but F_3 was found to be maximum and minimum in F_2, followed by F_1, increasing the fertilizer dose. N uptake similar studies shown by Keerthi *et al*. (2017) [3], Shah *et al*., (2022) [4],

Phosphorous uptake by Mustard grain and straw (kg ha⁻¹)
The Table 2 shows that the The P uptake (%) in grain determined based on fertilizer dose varies between 0.559 and 1.522, while F_3 was significant for F_1 and F_2; However, F_1 was on par with the fertilizer dose F_2 at the 5% significant level; However, the maximum P uptake was found to be at F_3 and the minimum dose was estimated at the fertilizer dose F_1. The average P intake of *Gmelina arborea* and *Dalbergia sissoo* is between 0.564 and 1.285, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo* with a significance level of 5%. The interaction effect of *Gmelina arborea* and *Dalbergia sissoo* on F_1 is constant, the mean is between 0.287 and 0.831, however, *Gmelina arborea* was significantly higher than *Dalbergia sissoo* and F_2 is constant, the mean is between 0.390 and 0.994, while *Gmelina arborea* was clearly superior to *Dalbergia sissoo*. At constant F_3, the means varied between 1.015 and 2.030, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo*, so the interaction effect at the fertilizer level was significant for all

treatment trends in *Dalbergia sissoo* versus *Gmelina arborea*. For *Gmelina arborea*, however, it is constant, meaning that the P absorption varies from 0.831 to 2,030, while F_3 was significant for F_1 and F_2, but F_1 was equal to F_2, increasing fertilizer dose and P uptake in *Gmelina arborea*. While the P uptake of *Dalbergia sissoo* varies between 0.287 and 1.015, F_3 was significant for F_1 and F_2, but F_1 was on par with F_2, so F_3 had the maximum and minimum in F_2, followed by F_1, giving the P Uptake increased from the fertilizer dose. The uptake of P (%) in the straw determined based on the fertilizer dose varies from 0.186 to 0.281, while F_3 and F_2 were significant for F_1; However, F_2 was on par with fertilizer dose F_3 at the 5% significant level; However, the maximum N absorption was found in F_3 and the minimum was estimated in the fertilizer dose F_1. The mean P uptake of *Gmelina arborea* and *Dalbergia sissoo* is between 0.163 and 0.305, while *Gmelina arborea* was significantly higher than that of *Dalbergia sissoo* with a significance level of 5%.The interaction effect of *Gmelina arborea* and *Dalbergia sissoo* on F_1 is constant, the mean is between 0.119 and 0.253, but *Gmelina arborea* was significantly higher than *Dalbergia sissoo* and F_2 is constant, the mean is between 0.175 and 0.296, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo* clearly superior.At constant F_3, the means varied between 0.196 and 0.367, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo*, therefore the interaction effect is at different fertilizer contents, while for *Gmelina arborea* constant, the absorption of P is in the range of 0.253 to 0.367, while F_3 for F_1 and F_2 were significant. F_1 was on par with F_2, so F_3 had a maximum and minimum in F_2, followed by F_1, which increased the amount of fertilizer and P uptake in *Gmelina arborea*. While the P uptake of *Dalbergia sissoo* ranges from 0.163 to 0.196, F_3 was significant for F_1 and on par with F_2, but F_1 was on par with F_2, so F_3 was highest in F_2, followed by F_1 augmented finding observed by Neha *et al*. 2014 [5], and Shah *et al* 2022 [4].

Potassium uptake by Mustard Grain and straw (kg ha⁻¹)
The Table 2 revealed that the P uptake (%) The grain K uptake (%) determined based on the fertilizer dose is between 6.42 and 17.35, while F_3 was significant for F_1 and F_2; However, F_1 was on par with the fertilizer dose F_2 at the 5% significant level; However, the maximum K uptake was determined as F_3 and the minimum dose was estimated using the F_1 fertilizer dose. The average K intake of *Gmelina arborea* and *Dalbergia sissoo* is between 9.27 and 12.95, while *Gmelina arborea* was significantly higher than *Dalbergia sissoo*. The interaction effect of *Gmelina arborea* and *Dalbergia sissoo* on F_1 is constant, the mean varies between 5.19 and 7.65, but *Dalbergia sissoo* was on par with *Gmelina arborea* and F_2 is constant, the mean is 6.94 to 12.20, while *Gmelina arborea* was clearly superior to *Dalbergia sissoo*. At constant F_3, the mean values varied between 15.69 and 19.00, while *Dalbergia sissoo* was on par with *Gmelina arborea*, while the K absorption for *Gmelina arborea* varied between 7.65 and 19.00, while all treatments were significant among each other, F_3 was therefore found to be the estimated maximum and the minimum at F_2, followed by F_1, which increased the fertilizer dose and K uptake in *Gmelina arborea*. While the K uptake of *Dalbergia sissoo* varies between 5.19 and 15.69, F_3 was significant for F_1 and F_2, but F_1 was on par with F_2, so F_3 was found to be maximum and minimum in F_2, followed by F1, i.e the absorption of K

from the fertilizer dose increases. The absorption of K (%) in the straw, determined based on the fertilizer dose, varies between 35.02 and 45.60 While F3 and F2 were significant for F_1, however, F_2 was on par with fertilizer dose F3 at a significant level of 5%; However, the maximum K absorption was found in F3 and the minimum was estimated in the fertilizer dose F_1. The mean K uptake of *Gmelina arborea* and *Dalbergia sissoo* ranges from 32.17 to 48.87, while *Gmelina arborea* was significantly higher than that of *Dalbergia sissoo*. The interaction effect of *Gmelina arborea* and *Dalbergia sissoo* in F_1 is constant and the mean between 24.71 to 45.33, however, *Gmelina arborea* was significantly higher than *Dalbergia sissoo* and F_2 is constant at the mean of 35.54 to 46.34, while *Dalbergia sissoo* was at par with

Gmelina arborea. With constant F3, the average values fluctuated around 36.25 to 54.95 whereas the *Gmelina arborea* was significant superior *Dalbergia sissoo* thus interaction effect at different fertilizer level While for the *Gmelina arborea* is constant means K uptake varies 45.33 to 54.95 whereas all treatments were non-significant however F3 was found maximum and minimum on F_2 followed by F_1 thus increase the fertilizer dose the K uptake into *Gmelina arborea*. While *Dalbergia sissoo* K uptake varies from 24.71 to 36.25 All treatments were not significant, so F3 was found as maximum and minimum in F_2, followed by F_1, so K absorption from fertilizer dose increased Parmar *et al.* (2011) [6] Rajput (2017) [7] and Shah *et al* (2022) [4].

Table 1: N, P, K content (%) in grain and straw as influenced by different fertilizer doses on mustard under agroforestry system (2021-22)

	GRAIN									STRAW								
	N content (%)			P content (%)			K content (%)			N content (%)			P content (%)			K content(%)		
	G	D	Mean	G	D	Mean	G	D	Mean	G	D	Mean	G	D	Mean	G	D	Mean
F1	2.43	2.13	2.28	0.23	0.12	0.17	2.15	2.08	2.11	0.24	0.21	0.23	0.0076	0.0066	0.0071	4.74	4.37	4.56
F2	2.52	2.28	2.40	0.25	0.15	0.20	2.97	2.60	2.78	0.29	0.22	0.26	0.0088	0.0067	0.0078	5.91	5.47	5.69
F3	3.11	2.74	2.92	0.38	0.22	0.30	3.59	3.46	3.53	0.30	0.25	0.28	0.0091	0.0074	0.0083	7.87	7.29	7.58
Mean	2.69	2.39		0.29	0.16		2.90	2.71	0.00	0.28	0.23		0.0085	0.0069		6.17	5.71	0.00
Treatment	Factor A	Factor B	A X B	Factor A	Factor B	A X B	Factor A	Factor B	A X B	Factor A	Factor B	A X B	Factor A	Factor B	A X B	Factor A	Factor B	A X B
SEm±	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
CD (5%)	0.02	0.02	0.03	0.00	0.00	0.00	0.02	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.03

Note: *G = *Gmelina arborea* Arborea and D= *Dalbergia sissoo* Sissoo

Table 2: N, P, K Nutrient Uptake (Kg ha^{-1}) in grain and straw as influenced by different fertilizer doses on mustard under agroforestry system (2021-22)

	GRAIN Nutrient Uptake (Kg ha^{-1})									STRAW Nutrient Uptake (Kg ha^{-1})								
	Nitrogen (N)			Phosphorus (P)			Potassium (K)			Nitrogen (N)			Phosphorus (P)			Potassium (K)		
	G	D	Mean	G	D	Mean	G	D	Mean	G	D	Mean	G	D	Mean	G	D	Mean
F1	8.67	5.32	7.00	0.831	0.287	0.559	7.65	5.19	6.42	8.04	3.84	5.94	0.253	0.119	0.186	45.33	24.71	35.02
F2	10.38	6.10	8.24	0.994	0.390	0.692	12.20	6.94	9.57	9.95	5.73	7.84	0.296	0.175	0.236	46.34	35.54	40.94
F3	16.42	12.42	14.42	2.030	1.015	1.522	19.00	15.69	17.35	11.99	6.72	9.36	0.367	0.196	0.281	54.95	36.25	45.60
Mean	11.82	7.95		1.285	0.564		12.95	9.27		9.99	5.43		0.305	0.163		48.87	32.17	
Treatment	Factor A	Factor B	A X B	Factor A	Factor B	A X B	Factor A	Factor B	A X B	Factor A	Factor B	A X B	Factor A	Factor B	A X B	Factor A	Factor B	A X B
SEm±	0.70	0.86	1.21	0.058	0.071	0.101	0.86	1.05	1.49	0.42	0.52	0.73	0.013	0.015	0.022	2.38	2.91	4.11
CD(5%)	2.11	2.58	3.65	0.175	0.214	0.303	2.59	3.18	4.49	1.28	1.57	2.21	0.038	0.047	0.066	7.16	8.77	12.40

Note: *G = *Gmelina arborea* Arborea and D= *Dalbergia sissoo* Sissoo

Conclusion
Nutrient absorption from fertilizers treatment has different capacity and appears to be higher with F3 fertilizers in both systems. Furthermore, the Gmelina-based agroforestry system provided a higher percentage of nutrient content and estimated intake than the Dalbergia-based agroforestry system. In both agroforestry systems, nutrient uptake was estimated to be higher for N and P (kg ha^{-1}) in grain followed by straw, but for K (kg ha^{-1}) in straw followed by grain.

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