Sesame (*Sesamumindicum*L.) A Hub of Nutrients: Strategies towards Mitigating the Climate Change and Introducing Climate Smart Agriculture by 2050

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Abstract:

By 2050 the world would be changing at a pace that is unclear. So to feed the number of people by then requires certain approaches. The developed countries has already reached their maximum limit but what persists as a problem is developing countries where the limits are not reached yet. To get the maximum yield environment must be kept in intact as various pest infestations, climatic conditions and environmental hazards makes it rather unsustainable. So the question arises that how we can solve this issue without using biofortified crops? Could there be any crop that qualifies with the changing environment? Moreover could there be any crop that provides enough nutrients even for Vegan's meal? Well the answer is simple"Sesame".

Introduction:

We all are hearing that by 2050 population will be doubled and reach to approximately 9.5 billion. Hence there is a dire need to increase the production in order to meet the demand of the ever growing population. To double the yield since we have to feed a large population. Mostly countries developing and the scenario over there is worse. Urbanization is increasing in these countries and less area is left for cropping, therefore per acre yield need to be increase. But according to the recent study by Penn State University the world wide accepted perception about food security is actually deceptive. As the goals are misleading. It states that the climate change, its impact and food production must be considered as one entity because the future projections for various crops are not based on data but rather on mere assumptions for future. The developing countries has already reached their maximum limit but what persists as a problem is developing countries where the limits are not reached yet. To get the maximum yield environment must be kept in intact as various pest infestations, climatic conditions and environmental hazards makes it rather unsustainable.

At present the scenario of agriculture is completely out of balance. With captivating goals to enhance food production but without taking in note of the environment. In order to get the goal by 2050 we need to work both quantitatively and qualitatively keeping in view both yield and environment. But the most interesting thing to note is that besides yield the major concern is nutrients requirement. A review of recent trends in agriculture's environmental impacts shows that they are increasing and must drop dramatically to maintain clean water and stabilize the climate, according to the researchers. Because without it deficiency among children of various developing countries is prevalent. Use of biofortified crops to tackle the deficiency of micronutrients requires a long term breeding procedure or the use of transgenics which becomes sometimes a concern as some countries don't prefer GMO's. So the question arises that how we can solve this issue without using biofortified crops? Could there be any crop that qualifies with the changing environment? Moreover could there be any crop that provides enough nutrients even for Vegan's meal? Well the answer is simple "Sesame".

Sesame (*Sesamumindicum* L.) is a well-known oilseed crop that has been cultivated since primitive times for its edible oil and seeds in the sub-continent (1). It is a drought tolerant crop. It is also well known as the queen of oilseeds due to the presence of high oil content (50% - 60%) in its seeds (2,3,4). It reduces the blood glucose level significantly and improves the conditions of type 2 diabetes (5) and has anti-inflammatory properties (6) and is widely used for medicinal purposes (7, 8)

Sesame is basically a short-day plant. Therefore, light intensity has a significant morphogenic effect influencing yield and oil content. The rate of net

total dry matter production per unit of ground area is related to the daily amount of photosynthetically active radiation (PAR) intercepted by the crop. It is considered to be drought resistant and capable of withstanding a high degree of water stress than many other cultivated plants. One of the important features of sesame oil is its stability which results from presence of powerful antioxidants namely sesamine, sesamolin and sesamol (9). Tahini, halvah, oil, flour and other products are made from sesame.

Nutritionally, whole seed and seed cake contain 22-25% and 22-35% protein; 43-50% and 9% oil; 11 and 23% carbohydrate; 3 and 4% mineral, respectively. Whole sesame seed contains total fiber 6.3gm; ash 5.3gm; iron 10.5µg, sodium 60µg; potassium 725µg; calcium 1,160µg and phosphorous 616µg; vitamin A 10µg/100gm, thiamine 0.98 µg/100gm; riboflavin 0.24µg/100g; niacin 5µg/100g. (Table 1) Amino Acid and Fatty Acid Composition. (Table 1) Amino Acid and Fatty Acid Composition.

Table 1. Amino Acid and Fatty Acid Composition.

Nutrients	Quantity
Amino acid (g/16g N)	
Threonine	3.1-3.7
Valine	3.9-4.6
Cysteine + methionine	2.8-4.8
Isoleucine	4.0-4.2
Phenylalanine + tyrosine	6.4-9.6
Histidine	2.7
Tryptophan	1.3-1.5
Lysine	2.6-2.7
Argenine	12.0
Fatty acid (%)	
Palmitic acid (16:0)	11.7
Stearic acid (18:0)	05.2
Oleic acid (18:1)	41.4
Linoleic acid (18:2)	39.4
Linolenic acid (18:3)	00.4
Arachidic acid (20:0)	00.4
Behenic acid (22:0)	00.2

Conclusion:

With the nutritional profile as dynamic as sesame and more $CO_{2\ accumulation}$percentage and highly drought tolerant makes this crop as an amazing alternative as compared to other crops. So more emphasis should be laid on increasing its yield to meet the demand. Benefits of sesame are given below.

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