

**All India Co-ordinated Research Network on Potential Crops,
ICAR-NBPGR, New Delhi**

Proceedings of the Review Meeting/ Workshop on “Progress made towards quality improvement, finding upper maximum limits for anti-nutritional factors and fixing Benchmark Values in potential crops”, held on 6th November 2023 in Virtual Mode

Based on the recommendations of Kharif 2022 Workshop on AICRN-Potential Crops, earlier a meeting was held on 3rd June, 2022 in which Benchmarks were fixed for quality traits and anti-nutritional factors in five potential crops including Amaranth, buckwheat, chenopodium, faba bean and winged bean. In continuation of that, this meeting was convened, to review the quality parameters and fixing Benchmarks in remaining potential crops. The meeting was chaired by Dr. D.K. Yadava, ADG (Seeds), ICAR, New Delhi and Co-Chaired by Dr. G.P. Singh, Director, ICAR-NBPGR and Network Coordinator, AICRN-PC, New Delhi. Prof. (Dr.) M.L. Lodha, Ex-Head, Division of Biochemistry, IARI, New Delhi and Member of Advisory & Monitoring Committee of AICRN-Potential Crops was an expert for reviewing Benchmark values in potential crops. Dr. S.K. Yadav, Nodal Officer, AICRN-PC and Dr. Sandeep Kumar, PI, Quality Improvement and Value Addition convened the meeting/workshop. Scientists working on different potential crops at various AICRN-PC Centers including breeders, agronomists, biochemists and food nutrition, were also invited to attend the meeting.

Dr. G.P. Singh, Director, ICAR-NBPGR, New Delhi, welcomed all the invitees. In his inaugural remarks, Dr. D.K. Yadava emphasized on the need for fixing Benchmarks so that the varieties released in future would have a certain fixed amount of one or more quality traits. Dr. M.L. Lodha opined that the selection of quality traits and the plant material to be analysed should be purposeful. He highlighted the importance of fixing Benchmarks citing examples of other crops. Dr. Sandeep Kumar, PI, Quality Improvement and Value Addition, presented the progress made in quality analysis under AICRN-PC. He compared crop- wise, the trait-specific data generated under AICRN-PC trials with the literature values, and based on that proposed the Benchmark values. In addition, benchmark values proposed earlier in 1st Meeting held on 3rd June 2022 for five potential crops, were also relooked/reviewed.

In the meeting, all were of the opinion that Crop Improvement and Quality Analysis/Improvement program should go hand- in- hand, and not carried out in isolation. After a lengthy discussion, the following recommendations were made pertaining to 9 potential crops in all:

1. Trait-specific Benchmarks/ Cut-off values recommended for promotions of entries/ release of varieties of potential crops (for seed) are:

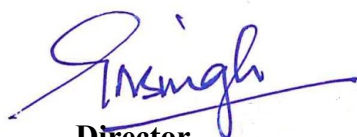
Crop	Protein (%)	Oil (%)	Lysine (g/16g N)	Diet. Fibre %	Anti-nutritional factors	Fe (mg/100g)	Zn (mg/100g)
Amaranth	13.5	-	5.5		-	5.0	
Buckwheat	12 (<i>F. esculentum</i>) /11 (<i>F. tataricum</i>)	-	5.0		-	-	
Winged bean	23.0	14.0	-		-	-	
Faba bean	24.0	-	-		Vicine-Convicine (%) -Approaching to 0.1% or less.	-	
Chenopodium	13.0	-	5.0		Saponin Content (%) -Approaching to 0.15% or less	5.0	
Kalingada	18.5	32				4.0	2.25
Job's tear	14.5	-		5		4.5	3

Perilla	18.5	39				-	
Adzuki bean	23.0	-			Phenol- less than 0.2 % ; Tannin-less than 0.55 %.	-	

2. The key point to be considered before undertaking any chemical/biochemical analysis for nutritional traits and anti-nutritional factors should be “Whatever chemical/biochemical analysis is being done that should have a purpose”. With this key point in mind, the benchmarks developed, be used.
3. So far as the application of the benchmarks as suggested for different nutritional traits in nine potential crops, is concerned, these should be applied from the very first stage of selecting purified/stable and genetically pure accessions or genetic materials.
4. Before undertaking any chemical analysis of the materials/entries coming from different ongoing trials (IVTs, AVTs), its usefulness may be ascertained as these entries have not been subjected to selection pressure for nutritional traits, from the beginning.
5. While adding more benchmarks for a nutritional trait in any crop, it should be kept in mind that not more than two benchmarks to be handled at a time for a particular crop, otherwise it would be most difficult to select simultaneously for more than two nutritional traits, and chances are there that one may not get any suitable entry for further use.
6. All the released/popular varieties should be analysed for complete nutritional composition –protein and important amino acids, oil and important fatty acids, micronutrients (Fe, Zn, Ca), fibre, and anti-nutritional factors (as the case may be).
7. Biofortification: If at all biofortification is required to be undertaken for a particular quality trait, it should be attempted in only those crops wherein gene sources/QTLs, are already available.
8. The basic purpose of fixing benchmarks for quality traits in a specific crop, is to develop a high yielding variety with improved nutritional quality.
9. It was emphasized that the value added products developed from potential crops should come to the market. To achieve this, there is need to develop value chain in these crops through establishing industrial linkages.
10. It was also suggested that to enhance quality w.r.t. other traits, there is need to standardize more crop specific breeding methods to initiate hybridization program.

In his concluding remarks, Dr. G.P. Singh, Director, ICAR-NBPGR and Network Coordinator emphasized on the need of reviewing the quality and value addition programme at regular intervals and setting the priorities as per needs. Dr. D.K. Yadava, ADG (Seeds), ICAR, New Delhi again raised the need for strengthening of Biochemistry laboratories, popularization of potential crops, commercialization of value added products etc.

The meeting ended with a vote of thanks proposed by Dr. S.K. Yadav, Nodal Officer, AICRN-PC.



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