Tannin free lentils: A promising development for specialty use and increased value

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Abstract: Tannin free lentils have been developed and are now available for production over a wide area in North America. The trait is controlled by a single recessive gene that eliminates tannin precursors in the seeds thereby making it possible to prevent the development of darkened seeds. Lentil varieties that are tannin free represent a new type that may appeal to specialty markets. Varieties with the zero-tannin trait have been released in Canada ('CDC Gold') and the U.S. ('Shasta' and 'Cedar'). The red cotyledon Cedar variety could possibly be used in place of commonly decorticated and split red lentils. Acceptance on a wide scale is still to be determined.

Key words: lentil, tannins, testa color, specialty type

Seed size, shape and color are the basis of consumer preferences and overall lentil marketing strategies. Differences in taste and texture between red and yellow cotyledon types and between whole or decorticated lentils determine consumer preferences, marketing strategies and prices. Nearly all lentil varieties in use in the world at the present time have seed coats that will darken upon long term storage and also when cooked. In nearly all cases, tannin precursors in the seed coats of whole lentils will cause the cooking solution and the lentils themselves to become brown or dark brown upon being cooked. This situation is often avoided by the process of removing the seed coats (decortication) and splitting of the lentil seeds. Consequently, many users prefer lentils that have been decorticated thus removing the source of discoloration of not only the lentil seeds but the cooking liquid as well. Elimination of the tannin precursors in the seed coats would prevent darkening of the whole seeds and the cooking solution during preparation. An interesting recessive gene for zero tannin was found in accession P.I. 345635 of the U.S. Department of Agriculture world collection of lentil germplasm (1). Seeds of that accession were observed not to darken when kept in storage for extended periods of time or when cooked. The recessive gene designated as *tan* was shown to eliminate the content of tannin precursors responsible for darkening during the cooking process or darkening when kept in long term storage.

Commonly used lentil varieties have polyphenolic compounds (tannin precursors) that slowly oxidize when exposed to air and progressively turn brown. Cooking also has the effect of turning the seed coats brown and also to darken the cooking solution. In the case of P.I. 345635, these precursors are not present and consequently they do not darken during storage or cooking. The *tan* gene appears to be associated with a thin and somewhat opaque seed coat that causes difficulties at planting time through poor plant establishment due to increased pathogen attack and susceptibility to cold temperatures during germination. Effective breeding for thicker seed coats among zero-tannin selections and the judicious use of fungicides to prevent pre-emergence damping off should successfully overcome these problems.

The great promise of zero-tannin lentil lies in the unique nature of the trait and the visually desirable appearance of the seeds. With the lack of seed coat pigmentation, cotyledon color is visible through the slightly opaque seed coats. In addition, it has been suggested that varieties with the zero-tannin trait may not require decortication to improve cooking time and appearance before and after cooking. The direct use of zero-tannin varieties by consumers without the need for decortication would reduce processing costs as well as a certain percentage of processing loss.

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Progress has been made in breeding zero-tannin types in Canada and the U.S. with several varieties already available to producers. The first zero-tannin variety, 'CDC Gold', was released in Canada; while two varieties, 'Shasta' and 'Cedar', have been released in the U.S. Shasta has yellow cotyledons and Cedar has red cotyledons. Comparisons of seeds of Shasta and Cedar with a conventional red cotyledon variety 'Redberry' are shown below (Fig. 1). These varieties have comparable yields to conventional varieties provided seed treatment fungicides are applied to prevent seed rotting and ensure an adequate plant population.

Zero-tannin lentils are expected to be appealing to certain markets and uses. In the case of the red types, they could be used without decortication in the food preparations in South Asia and other places. They could be used effectively to avoid the processing losses inherent with the decortication process and possibly be more nutritious due to the presence of the relatively seed coat. However, the main advantage would be reduced costs to consumers. Another possible use of zero-tannin lentil would be in dry soup mixes. The zero-tannin lentil would impart a brighter appearance to the dry mix and when prepared would not turn the preparation dark brown typical of conventional lentils. ■

References

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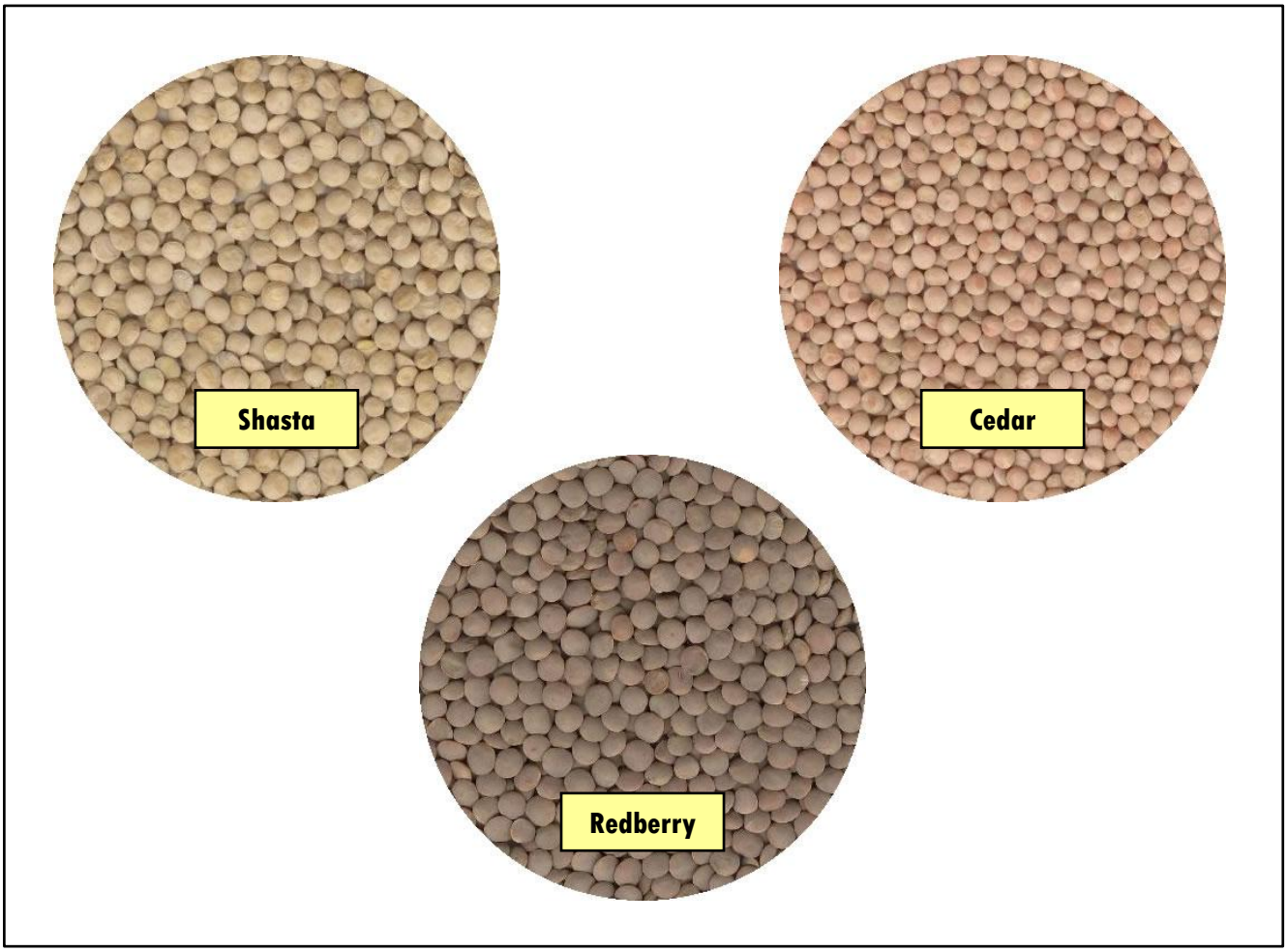

Figure 1. Comparisons of seeds of Shasta and Cedar with a conventional red cotyledon variety 'Redberry'