

Research Article

IDENTIFICATION OF MORPHOLOGICALLY CLOSE SPECIES OF OCIMUM L. ON THE BASIS OF SEED CHARACTERS

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ABSTRACT

Five species of *Ocimum* L. viz. *O. tenuiflorum* L. (syn. *O. sanctum* L.), *O. americanum* L. (Syn. *O. canum* Sims), *O. basilicum* L., *O. gratissimum* L. and *O. x citriodorum* Vis. were identified using their seed characteristics.

Keywords: *Ocimum*, Seed, Hybrid, Essential Oil, Medicinal Plants

INTRODUCTION

Ocimum L. member of family Lamiaceae, comprises approximately 65 species (Paton *et al.*, 2005). Many of these species are highly aromatic and economically important. The most heavily used species are *O. basilicum* L., *O. americanum* L. and their hybrid *O. x citriodorum* Vis. which are used for essential oil production and as pot herbs (Paton *et al.*, 2005). *Ocimum basilicum* L. is also used for culinary purpose. Some species of *Ocimum* have been shown to have insecticidal and antioxidant activity as well (Deshpande and Tipnis, 1977; Stein *et al.*, 1988; Juliani and Simon, 2002; Lee *et al.*, 2005).

Medicinal plant species may wittingly or unwittingly be substituted by other species containing toxic substances (Kite *et al.*, 2002). Therefore, it becomes important for users to have the correct identity of the medicinal plants.

Although some species of this genus can be identified readily as *O. gratissimum* L., and *O. tenuiflorum* L. using leaf morphology. But others particularly *O. americanum* var. *americanum*, the white flowered variety of *O. basilicum* and *O. x citriodorum* sometimes pose problem for identification. These species are difficult to distinguish on the basis of just their leaf morphology, as wide range of leaf shapes and sizes occurs within most species due to hybridization among species and selection by humans (Simon *et al.*, 1999).

Table 1: Nutlets size and shape of different *Ocimum* species

S. No.	Name of species	Size	Shape	Colour	Texture
1.	<i>O. basilicum</i>	2.0 mm long	Ellipsoid	Black	Pitted
2.	<i>O. gratissimum</i>	1.5 mm diam	Subglobose	Brown	Rugose
3.	<i>O. americanum</i>	1.2 mm long	Ellipsoid	Black	Pitted
4.	<i>O. tenuiflorum</i>	1.2 mm long	Broadly Ellipsoid	Yellow with small black markings	Nearly smooth
5.	<i>O. x citriodorum</i>	1.9 mm long	Ellipsoid	Black	Pitted

MATERIALS AND METHODS

Place of Study: Dr. H. S. Gour University Sagar (Central University), M. P., India.

Considering the importance of different *Ocimum* species, it becomes necessary to have their correct identity. Therefore, flower characters are used for their proper identification. However, floral characters too have a marginal difference in some of the species, which further complicates the problem. In absence of flowers it is quite difficult to distinguish between closely related species. As no literature was found on comparative account of seed morphology of different *Ocimum* species, therefore the present study was

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carried out to make an account of seed characteristics of different *Ocimum* species occurring in Central India. While surveying different areas of Sagar (M. P., India) and its environ, five species of *Ocimum* L. viz. *O. tenuiflorum* L. (syn. *O. sanctum* L.), *O. americanum* L. (Syn. *O. canum* Sims), *O. basilicum* L., *O. gratissimum* L. and *O. x citriodorum* Vis. were identified using standard floras (Hooker, 1984; Roy et al., 1992). Seeds were collected and studied for size, shape and morphological characters under stereomicroscope with a micrometer (Table 1, Figure 1).

RESULTS AND DISCUSSION

Largest seeds were found to be that of *O. basilicum* while smallest were of *O. tenuiflorum*. Seeds of *O. x citriodorum* were somewhat similar to that of *O. basilicum* but when they were analyzed by student t-test, significant differences were found in both length and breadth (Table 2) taking 30 seeds of each species.

Table 2: Comparison of nutlets size of *O. basilicum* and *Ocimum x citriodorum*

S.No.	Nutlet's character	Name of plant species		
		<i>O. basilicum</i>	<i>O x citriodo.</i>	t-test
1.	Length(mm)	2.1±0.09	1.9±0.025	9.06*
2.	Breadth(mm)	1.3±0.036	1.0±0.023	14.89*

*Significant at $p < 0.001$ at df 58

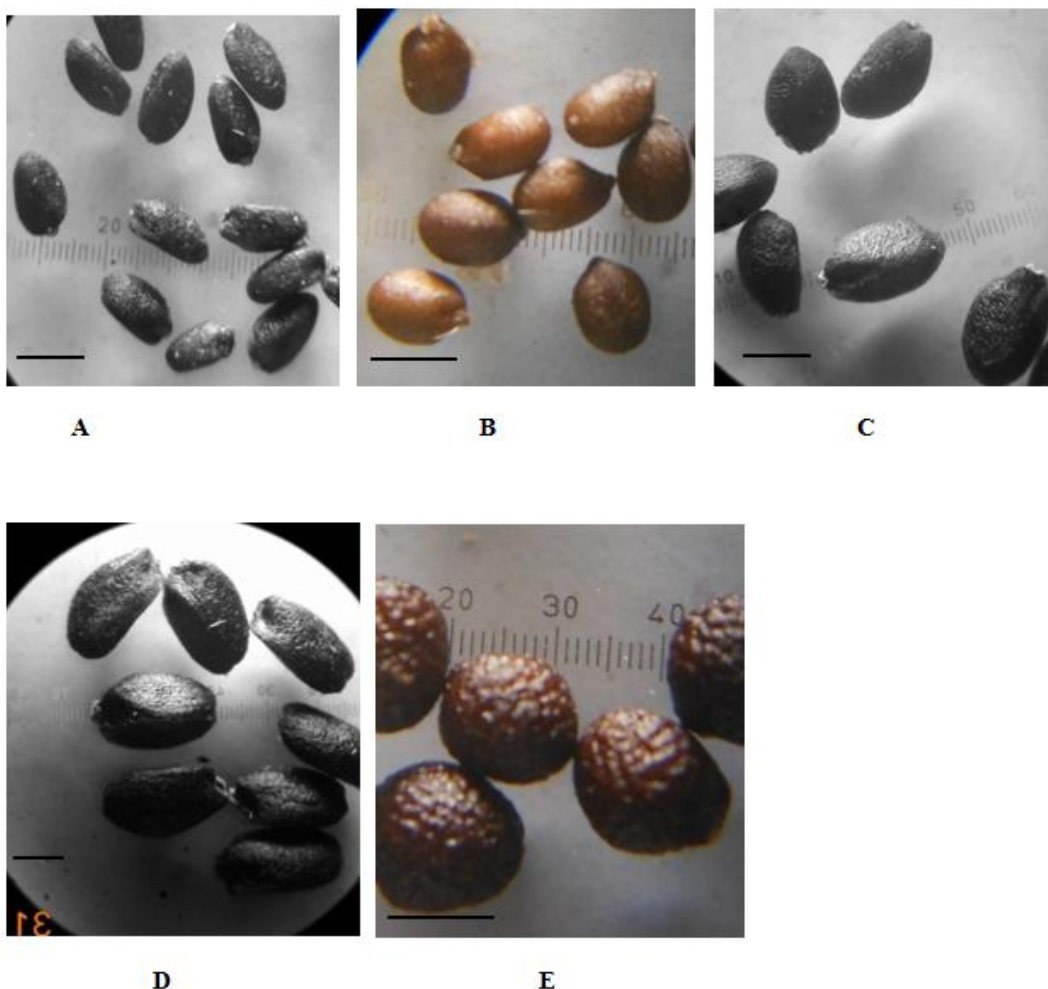


Figure 1: Nutlets of (A) *O. americanum* (B) *O. tenuiflorum* (C) *O. x citriodorum* (D) *O. basilicum* and (E) *O. gratissimum*. (Scale: bar in each figure = 1mm)

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A key as an aid for identification on the basis of seed characteristics is being proposed as under:

- 1a. Seed shape ellipsoid, colour black
- 2a. Shape lenticular, mean seed size 1.3 x 0.7mm, punctate *O. americanum*
- 2b. Shape oval, mean seed size 1.95 x 1.06mm, pitted *O. x citriodorum*
- 2c. Shape oval, mean seed size 2.1 x 1.4mm, pitted *O. basilicum*
- 1b. Seed shape subglobose to broadly ellipsoid, colour yellow to brown
- 2a. Shape broadly ellipsoid, colour yellow with small black markings *O. tenuiflorum*
- 2b. Shape subglobose, colour brown. *O. gratissimum*

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