Synthesis of (*E*)-1,2-bis-arylselanyl Alkenes Using *Saccharomyces cerevisiae*

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INTRODUCTION

Arylselanyl alkenes are important in organic synthesis, due to their use as a synthetic intermediate, they can be converted to different olefins with retention of configuration of the double bond.[1] Baker's yeast, *Saccharomyces cerevisiae*, is being used as a tool for the synthesis of several compounds. Reactions catalyzed by microorganisms were more popular due to the high selectivity that provide. *S. cerevisiae* is one of the most common biocatalysts by presenting easy availability, low cost, easy handling, not pathogenic, efficiency compared to conventional catalysts and could work at room temperature.[2,3]

We report here in the selective preparation of *E*-1,2-bis-arylselanyl alkenes using baker's yeast, *S. cerevisiae*, where it is believed to act in the reduction of diphenyl diselenide (Scheme 1).

RESULTS AND DISCUSSION

Initially we chose phenylacetylene **1a** (0.5 mmol) and diphenyl diselenide **2** (0.5 mmol) to establish the best reaction conditions. The influence of concentration of yeast and stoichiometry of the reagents was evaluated. The best result was obtained when the reaction was performed at room temperature using 10% dry yeast aqueous solution (4 mL) and excess of **1a** (1.0 mmol), Scheme 1. After 24 hours of reaction, the product **3a** was obtained in 96% yield with *E*:*Z* configuration ratio of 90:10. The reaction showed little efficiency using fewer of *S. cerevisiae* (5% solution of the dry yeast) at room temperature, **3a** was obtained only in 34% yield. The best established conditions was extended to other aromatic alkynes (Table 1). However, we noticed that the method is limited for the use of propargyl alcohol and aliphatic alkynes. In all the studied cases, with different aromatic alkynes **1a-d**, the desired products **3a-d** were obtained in good to excellent yields by using optimized conditions described above.

Scheme 1. Synthesis of *E*-1,2-bis-arylselanyl alkenes.

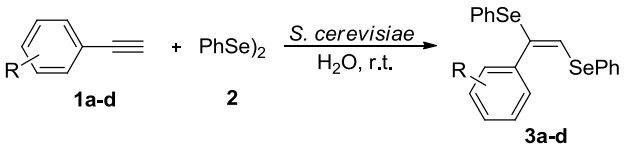
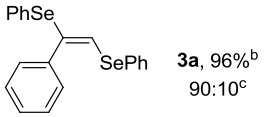
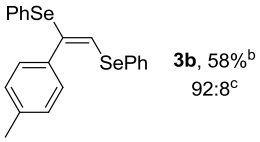
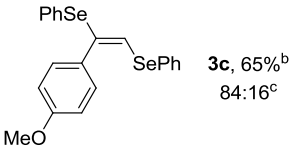
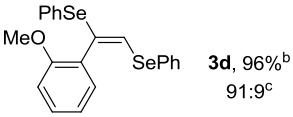


Table 1. Scope of the synthesis of *E*-1,2-bis-arylselanyl alkenes.[a]

 **3a**, 96%[b] 90:10[c]	 **3b**, 58%[b] 92:8[c]
 **3c**, 65%[b] 84:16[c]	 **3d**, 96%[b] 91:9[c]

[a]Reactions performed using **1a-d** (1.0 mmol), **2** (0.5 mmol) and 10% dry yeast aqueous solution (4 mL) at room temperature for 24 h. [b] Yields of isolated products. [c] Ratio of isomers *E*:*Z* determined by GC.

CONCLUSION

In conclusion, it was possible to develop a simple, efficient and less aggressive synthetic methodology for preparation of *E*-1,2-bis-arylselanyl alkenes in good to excellent yields. Using *Saccharomyces cerevisiae* as biocatalyst in water at room temperature.

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