

3.2.6. Comparison of activity of nano sulfated-titania with various catalysts for the synthesis of coumarin derivatives.

For the purpose of comparison, the performances of nano sulfated-titania and some other catalysts in the synthesis of 7-hydroxy-4-methyl-coumarin is also shown in Table 4. It can be seen that nano sulfated-titania demonstrates the superior performance towards synthesis of coumarin derivatives, and the promising features in terms of easy separation of the catalyst, reaction rate, product yield, low catalyst loading, and reaction temperature in comparison with the existing systems.

4. Conclusion

In conclusion, we have developed a simple and efficient method for the synthesis of substituted coumarins via Pechmann condensations using nano sulfated-TiO₂ catalyst under solvent-free conditions. Moreover, the low cost of the catalyst, solvent-free condition, low toxicity of the catalyst, simple experimental procedure, and recyclability of the catalyst and high yields of the products are the advantages. We believe our procedure will find important applications in the synthesis of coumarins and the method is environmentally benign.

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Table 4. Comparison of activity of nano sulfated-titania with some other catalysts in the synthesis of 7-hydroxy-4-methyl-coumarin under solvent-free condition.

Entry	Catalyst	Temp. (°C)	Time (min)	Isolated yield (%)	Ref.
1	Nano sulfated-titania	100	30	95	This work
2	[N ₁₁₂ OH][HSO ₄]	90	180	99	[23]
3	m-ZrP	160	240	94	[21]
4	Fe ₃ O ₄ @SiO ₂ @PrSO ₃ H	130	130	25	[35]
5	HClO ₄ SiO ₂	130	35	95	[36]
6	SBPDSA	80	10	90	[37]
7	SBSSA	80	15	87	[38]

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