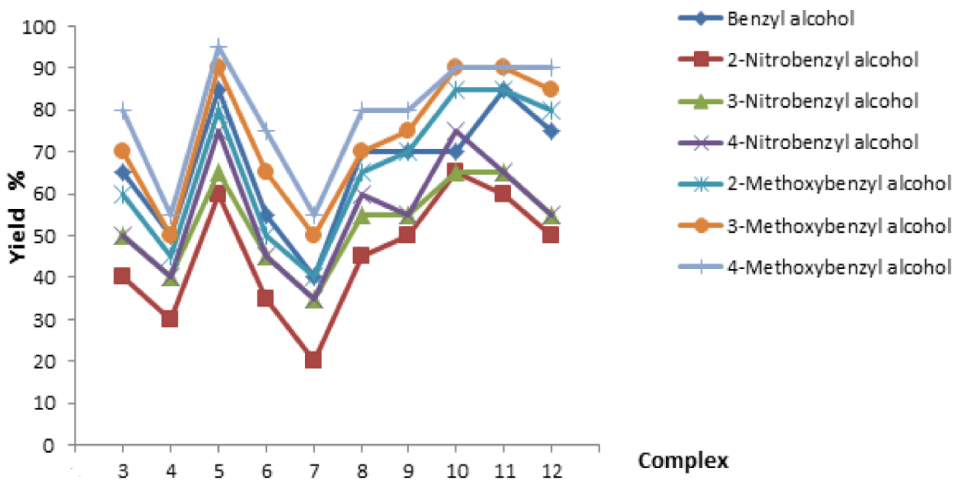


Fig. 4. Oxidation yield presentation of complexes 3-12 for different benzyl alcohols.

decomposition either at the elevated temperature or in the presence of the catalysts. The oxygen released in the decomposition reaction plays no role in the oxidation of alcohols. No oxidation occurred under similar conditions by using oxygen as oxidant.

To assess the scope of the reaction, the oxidation of other benzylic alcohols was then examined using the optimized reaction conditions (catalyst, 0.03 mmol, benzyl alcohol, 1 mmol, oxidant, 3.0 mmol, in CH_3CN, 3 ml, 80 minutes, 355 K, Table 6). Among the catalysts used in this study, $[Co(ABTSC)_2(OAc)_2]$ (5) has generated the best results which are presented in Fig. 4.

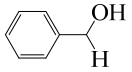
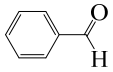
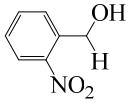
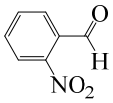
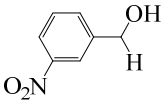
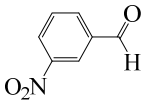
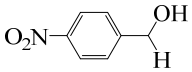
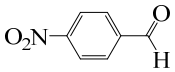
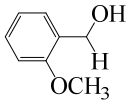
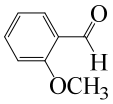
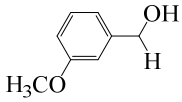
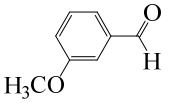
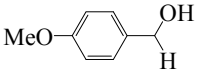
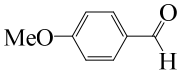
4. Conclusions

In summary the catalytic activity of thiosemicarbazide Schiff base complexes are eco-friendly and efficient heterogeneous catalyst for the selective oxidation of benzylic alcohols is explored. The catalysts exhibit high activities in all runs without any appreciable loss in activity, which is an environmentally friendly

Table 5. The Optimization of Benzyl Alcohol with compound 5.

Entry	Catalyst (mmol)	Oxidant (mmol)	Temp. (°C)	Solvent	Yield (%)
1	0.0	1.0	25	Ethyl acetate	15
2	0.0	2.0	25	Ethyl acetate	20
3	0.0	3.0	25	Ethyl acetate	20
4	0.0	2.0	25	Chloroform	20
5	0.0	3.0	25	Chloroform	25
6	0.0	2.0	25	Hexane	25
7	0.0	3.0	25	Hexane	25
8	0.0	3.0	25	Acetonitrile	25
9	0.01	3.0	25	Acetonitrile	50
10	0.01	3.0	40	Acetonitrile	55
11	0.02	3.0	50	Acetonitrile	60
12	0.03	3.0	50	Acetonitrile	60
13	0.03	3.0	60	Acetonitrile	65
14	0.03	3.0	70	Acetonitrile	70
15	0.03	3.0	82	Acetonitrile	85
16	0.03	4.0	82	Acetonitrile	85
17	0.1	3.0	82	Acetonitrile	85

Table 6. Oxidation benzyl alcohol derivatives for complex $[Co(ABTSC)_2(OAc)_2]$[a].

Compound	substrate	Product	Selectivity (%)	Yield (%)
1			100	85
2			97	65
3			97	65
4			100	75
5			100	85
6			100	90
7			100	95

[a] Reaction conditions: catalyst (0.03 mmol), benzyl alcohol (1 mmol), oxidant (3.0 mmol), in CH_3CN (3 ml), 80 minutes, 355 K.

oxidation system. In the catalytic process, many factors including the reaction temperature, the type of solvent, the amount of catalyst and the oxidant have an evident influence on the catalytic oxidation activity and selectivity. A 95 % conversion of 4-Methoxybenzyl alcohol with 100 % benzaldehyde selectivity was achieved under the following optimum conditions: reaction temperature of 355 K, reaction time of 80 min, with 3 ml of CH_3CN and 3/1 mmol ratio of oxidant to catalyst, making these catalysts and their conditions very economically feasible to be used for alcohol oxidation.

Acknowledgment

Analytical facilities and financial support provided by Islamic Azad University, Shahreza Branch is greatly appreciated.

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