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NOTE

Optimization of Parameters for the Production of Ergot-Alkaloids by *Claviceps purpurea* PC-5

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The optimum culture conditions i.e., pH, temperature and incubation period have been studied for *Claviceps purpurea* PC-5. It has been found that activity of *Claviceps purpurea* PC-5 is maximum when 30% sucrose solution is allowed to ferment for 12 days at 24°C temperature by maintaining the pH value of the medium at 5.2.

The optimization of different parameters for ergot-alkaloids culture has been studied by several workers.[1–5] Arcamone *et al.*[6] studied the effect of temperature on alkaloid fermentation and found 23°C to be optimum. The pH value for the optimum growth of *Claviceps* Sp. has been reported to be between 5.0 and 6.0 by Abe[7] or 3.0 and 5.0 by Windisch and Bronn[8]. Spalla[9] reported 14 days of incubation period for the production of ergot-alkaloids using strain 275 FI of *Claviceps purpurea*. However, from the above brief review it is evident that there is no definite opinion regarding the effect of pH, temperature and incubation period on ergot-alkaloids production by different strains of *C. purpurea*. Keeping this in view, the present investigation has been carried out to optimize the different parameters for the production of argot-alkaloids by *Claviceps purpurea* PC-5.

54 Conical flasks each containing 100 mL of production medium[9] were plugged with non-absorbent cotton and were sterilized at 15 lb steam pressure for 30 min and were cooled at room temperature. The total flasks were divided into 3 sets each comprising 18 flasks. The 1st to 3rd set of 18 flasks each were again divided into 6 subsets each comprising 3 flasks and were employed to study the effect of different pH, temperature and incubation period respectively. Each flask was inoculated with 10 mL of the inoculum from 2nd vegetative stage. They were kept on rotatory shaker operating at 230 rpm. Colorimetric[10] analysis was carried out for the estimation of ergot-alkaloids produced under different parameters.

The data recorded in Table-1 shows that *C. purpurea* PC-5 attains its best activity when the pH of the medium is at 5.2. In acidic medium, it failed to give

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higher yield of ergot-alkaloids. However, at higher pH values of the experiment there is again decrease in the yield of ergot-alkaloids. It is obvious from the results that *C. purpurea* PC-5 shows its best activity at the temperature of 24°C. Lower temperature of the experiment (20 to 22°C) caused poor yield of ergot-alkaloids. However, higher temperature of the experiment also disfavoured the alkaloids producing activity of *C. purpurea* PC-5.

TABLE-1
EFFECT OF DIFFERENT pH, TEMPERATURE AND INCUBATION PERIOD ON PRODUCTION OF ERGOT-ALKALOIDS BY *C. purpurea* PC-5.

% of sucrose in g	pH	Temperature (°C)	Incubation period in days	Corresponding yield of ergot-alkaloids* in mg/ litre		
				1	2	3
30	5.0	20	8	800	400	490
"	5.2	22	10	890	680	675
"	5.4	24	12	615	889	891
"	5.6	26	14	500	775	620
"	5.8	28	16	360	425	190
"	6.0	30	18	300	400	160

t* Each value represents mean of three observations.

Production medium:[9] Sucrose 300 g; citric acid 15 g; Yeast extract 0.10 g; KH_2PO_4 0.05 g; $MgSO_4 \cdot 7H_2O$ 0.5 g; KCl 12 g; $FeSO_4 \cdot 7H_2O$ 0.007 g; $ZnSO_4 \cdot 7H_2O$ 0.015 g; pH 5.2 (adjusted by NH_4OH). Distilled water to make up 1000 mL. 100 mL of the production medium was employed for the fermentative production of ergot-alkaloids in each flask.

It is also evident from the results that an incubation period of 12 days is most favourable for the ergot-alkaloids production by *C. purpurea* PC-5. No increase in the yield of ergot-alkaloids has been observed even after the incubation period of 14, 16 and 18 days.

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