The effect of additives on the production of secondary metabolites and antioxidant properties on gra

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ABSTRACT

Owing to the wild fruiting body is very rare and expensive, some researchers are developing artificial cultivation of Antrodia cinnamomea fruiting bodies using woodblocks of Cinnamomum kanehirae Hayata to meet the demands of tests for physiological function and markets. However, the supply of A. cinnamomea fruiting bodies is unable to meet the demand. The aim of this research is to explore the effect of different additive on the production of secondary metabolites and antioxidant properties of A. cinnamomea by grain solid-state culture. The cultures were under various conditions, and at a period of 30 or 45 days. Grains of Coix lacryma-jobi ,wheat, and pearl barley were used as basic medium respectively. The highest yield of polysaccharide and triterpenes produced by A. cinnamomea cultured on Coix medium were 23.01 mg/ml and 10.63 %, respectively. At 45 day, the highest yield of polysaccharide derived from A. cinnamomea cultured on pearl barley and wheat medium were 60.80 and 31.48 mg/ml, respectively. And thighest yield of triterpenes derived from A. cinnamomea cultured on pearl barley and wheat medium were 10.11 and 0.05 %, respectively. Culturing at 30 °C for 60 days, the highest yield of polysaccharide and triterpenes obtained on wheat and pearl barley media of A. cinnamomea were 64.12 mg/ml and 17.59 %, respectively. For different additives on culturing A. cinnamomea, the highest polysaccharide yield was 68.66 mg/ml when 0.5 % (w/w) $CaCl_2$ was added to pearl barley medium at 30 day of culture . And the highest triterpenes obtained was 16.65 %, which was produced at 60 day by A. cinnamomea when 0.5 % (w/w) chitosan was used as additive in pearl barley medium. When Chinese medicinal herbs were added to culture media, the highest polysaccharide yielded 70.90 mg/ml on wheat medium with 1 % (w/w) Magnolia officinalis at 15 day. And the highest triterpenes produced was 33.72 % on pearl barley medium supplemented with 1 % (w/w) Perilla frutescens at 30 day culture of A. cinnamomea. The highest scavenging ability on DPPH radical.of methanolic vi extract (10 mg/ml) was 95.47 % obtained from culturing A. cinnamomea on Coix medium added with 0.5% (w/w) Ocimum basilicum at 15 day. The highest chelating capability on ferrous ions of methanolic extract (20 mg/ml) was 95.75% derived from adding 0.5 % (w/w) chitosan on wheat medium for culturing A. cinnamomea 60 days. And the highest reducing powers of methanolic extract (10 mg/ml) was 2.957 yielded from A. cinnamomea when culturing on pearl barley medium added with 0.5% (w/w) Piper betle at 60 day.

Keywords : Antrodia cinnamomea, grain solid-state culture, polysaccharide, triterpenoid, antioxidant property

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