# EFFECT OF MEDIUM AND CULTURAL CONDITION ON BIOMASS, PROXIMATE COMPOSITION AND WATER-SOLUBLE INTRACELLULAR POLYSACCHARIDE

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**ABSTRACT**

CORDYCEPS SINENSIS IS AN INTERNATIONALLY POPULAR VALUABLE MEDICINAL INGREDIENT USED IN CHINESE TRADITIONAL MEDICINE. PHARMACOLOGY STUDIES HAVE PROVEN THAT ITS ACTIVE INGREDIENTS POSSESS ANTI-TUMOR, ANTI-NEPHRITIS, AGING RETARDANT AND IMMUNITY ENHANCING PROPERTIES. BASICALLY, IT IS AN ANTOMOGENOUS FUNGS. MEDICINAL FUNGUS. MYCELIA IS CULTURED THROUGH FERMENTATION AND USED IN HEALTH FOOD PRODUCTS TO DEVELOP PRODUCT INTO COMMERCIAL QUANTITIES. ALTHOUGH THE DIFFERENT MYCELIA FORMED THROUGH DIFFERENT FERMENTATION PROCESSES CONTAIN SIMILAR BASIC INGREDIENTS, THE ATOMIC METABOLITS PRODUCED FROM THE PROCESSES DIFFER. THE STUDY SELECT FOUR TYPES OF NATURAL AGRICULTURAL PRODUCTS TO COMPOSE COMPLEX MEDIUM, WE FIRST HYDROLYZED THE ACID AND ENZYME OF THE PRODUCTS TO PREPARE THE FERMENTATION CULTURE MEDIUM; FERMENTATION CULTURE USING THE CHEMICALLY DEFINED MEDIA CULTURE FOLLOWED. THE PROCESS NOT ONLY PREVENTED INTERFERENCE DURING THE EFFECTIVE INGREDIENT EXTRACTION, BUT ALSO FURTHER CONTROLLED THE CORDYCEPS SINENSIS GROWTH WITHIN THE CONDITION REQUIRED FOR THE EFFECTIVE INGREDIENTS. THEN CHEMICALLY DEFINED MEDIA WAS ADDED TO CORDYCEPS SINENSIS AND CULTURED IN 25 ° C CONTROLLED TEMPERATURE OSCILLATOR TO EVALUATE THE EFFECTS OF THE INITIAL PH, DIFFERENT CARBON-NITROGEN RATIO, GLUCOSE CONCENTRATION AND TRACE ELEMENTS SOLUTION CONCENTRATION OF THE CULTURE MEDIUM ON THE MYCELIUM BIOMASS, REDUCING SUGAR IN SUPERNATANT AND THE MYCELIUM WATER-SOLUBLE INTRACELLULAR POLYSACCHARIDE COMPOSITION; AS WELL AS TO DELVE INTO THE OPTIMIZED HYDROLYZE CONDITIONS OF THE NATURAL AGRICULTURAL PRODUCTS ACID AND ENZYMES. A COMPARATIVE STUDY OF THE FOUR AGRICULTURAL PRODUCTS WITH THEIR ACID HYDROLYZATES AND ENZYME HYDROLYZATES WAS CONDUCTED FOR CULTURE MEDIUM. THEIR PH CHANGES, MYCELIUM BIOMASS, AS WELL AS THEIR REDUCING SUGAR IN SUPERNATANT AND PRODUCTION PROCESS CHANGES IN THE FERMENTATION. MOREOVER, WE ANALYZED THE CRUDE PROTEIN, CRUDE FAT, TOTAL SUGAR, CRUDE FIBER, ASH AND WATER CONTENT OF THE MYCELIA. FINDINGS SHOWED THAT INITIAL PH WAS 5.0; CARBON-NITROGEN RATIO WAS 5:1; GLUCOSE CONCENTRATION WAS 4.0% AND THAT MYCELIUM BIOMASS CONTENT OF THE 2.5% TRACE ELEMENTS SOLUTION CONCENTRATION FERMENTED CULTURE MYCELIUM BIOMASS WAS HIGHER. EXCEPT FOR THE 3.0% TRACE ELEMENTS SOLUTION CONCENTRATION WHERE WATER-SOLUBLE INTRACELLULAR POLYSACCHARIDE COMPOSITION WAS THE HIGHEST, FINDINGS FROM THE OTHER GROUPS SHOWED THAT A POSITIVE RELATION WITH MYCELIUM BIOMASS. THE ACID OPTIMIZED HYDROLYZE CONDITIONS OF THE FOUR NATURAL AGRICULTURAL PRODUCTS AT HC1 1.5% UNDER REACTION TEMPERATURE 90 ° C 1N HC1 HAD THE HIGHEST REDUCING SUGAR PERCENTAGE. THE ENZYME OPTIMIZED HYDROLYZE REACTION TIME OF THE CORN STEEP POWDER, BROWN RICE POWDER, GERMS POWDER AND YEAST POWDER WERE 64, 62, 58, AND 63 HOURS, RESPECTIVELY. THE FOUR NATURAL AGRICULTURAL PRODUCTS UNDER THE CULTURE MEDIUM CULTURE CONDITIONS ACHIEVED THE HIGHEST MYCELIUM BIOMASS IN THE YEAST POWDER. THE ACID AND ENZYME HYDROLYZATE CULTURE MEDIUM OF THE NATURAL AGRICULTURAL PRODUCTS HAS THE HIGHEST MYCELIUM BIOMASS IN THE BROWN RICE POWDER. THE EFFECTS OF THE VARIOUS HYDROLYZE MEDIUM ON THE FUNGUS GROWTH RESULTS SHOWED THAT MYCELIUM BIOMASS OF ENZYME HYDROLYZATE MEDIUM IS HIGHER THAN THAT OF THE ACID HYDROLYZATE MEDIUM. A SIGNIFICANT DIFFERENCE WAS NOTED IN THE PROXIMATE CHEMICAL COMPOSITION RATIO OF THE CHEMICALLY DEFINED MEDIA AND NATURAL AGRICULTURAL PRODUCTS CULTURE MEDIUM. IF A FERMENTATION COMPOSITION SIMILAR TO THAT OF NATURAL INGREDIENTS IS TO BE OBTAINED FROM THE CHEMICALLY DEFINED MEDIA, THEN TOTAL SUGAR CONTENT SHOULD REACH 35.64%. A 5L FERMENTATION TANK WAS USED TO STUDY THE PHYSICOCHEMICAL FACTOR

INCLUDING THE ACID-ALKALI ENVIRONMENT, DIFFERENT STIRRING SPEED AND INOCULATION DOSAGE, CHANGES OF THE MYCELIUM BIOMASS, REDUCING SUGAR IN SUPERNATANT AND PH UNDER A 96-HOUR FERMENTATION PROCESS. FINDINGS SHOWED THAT MAXIMUM MYCELIUM BIOMASS WAS ACHIEVED UNDER A 5.0 PH, 250RPM STIRRING SPEED, AND 10% INOCULATION DOSAGE.

Keywords : CORDYCEPS SINENSIS, MYCELIA, CHEMICALLY DEFINED MEDIUM, ACID HYDROLYZATES, ENZYME HYDROLYZATES, PROXIMATE CHEMICAL ANALYSIS, WATER-SOLUBLE INTRACELLULAR POLYSACCHARIDE

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