

클로렐라 루테인의 산업화 연구

관철호

기능성천연물센터

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Recently, the needs for the pharmaceuticals preventing eye disease are growing because of worldwide growing elderly population, ozone depletion caused by environmental pollution, and the frequent use of electronic equipments which continued to stress for the eye. It was reported that cataract and age-related macular degeneration, two typical eye diseases, were caused by a reduction of xanthophyll (lutein and zeaxanthin). As the content of xanthophyll present in the macula was decreased with aging, many people must intake lutein or zeaxanthin as food for the health of eye. According to these demand, lutein market as pharmaceuticals is growing significantly.

Chlorella is a rich source of lutein and there are many reports related in the extraction of lutein from chlorella. Though chlorella has abundant lutein, it is considered that the extraction efficiency of lutein and their bioavailability is very low due to the thick cell wall of chlorella. In this reason, physical processing improving the lutein bioaccessibility from chlorella is important for industrialization. Therefore, this research aims to develop functional food suppressing macular degeneration through developing technology which enables to increase the lutein bioavailability from chlorella containing high levels of lutein.

Physical processing using pulsed electric field generator, high hydrostatic pressure, and microfluidizer was carried out to overcome the limitation of chlorella in nutrition absorption and to increase lutein bioavailability of chlorella. Microfluidization was most effective technique among three processing technology. In order to evaluate the effect of physical processing on the lutein bioavailability of chlorella, *in vitro* digestion system was established and applied to the microfluidized chlorella. The lutein micelles that are known to actually available to human body were more efficiently formed comparing with no treatment group. The result of Caco-2 cell transmembrane analysis shows that the cellular transport of lutein was approximately three times greater from microfluidized chlorella rather than untreated chlorella. Also, *in vivo* rat model was performed to assess the reliability of *in vitro* digestion system developed from this study. The level of lutein in the plasma, liver, and eye from rats administrated the microfluidized chlorella has the concentration-dependent manner, while no organs from rats injected general chlorella were analyzed to increase the lutein significantly. Through our research, the application of physical processing on the chlorella was effectively increased the lutein bioavailability from chlorella and we developed the novel functional food containing the high level of lutein.

천연물 신소재 발굴 및 실용화를 위한 산학연 심포지움

일 시 | 2011. 11. 4(금) 13:00 ~ 11. 5(토) 12:00

장 소 | 강릉 경포대 현대호텔 8층 에메랄드 홀

주 관 | 의료·바이오 신소재 융복합 연구사업단
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의료·바이오 신소재 융복합 연구사업단 한림대학교 사업팀에서는 한국과학기술연구원(KIST) 기능성천연물센터와 공동주최로 심포지움을 개최 하고자 합니다. 이번 심포지움은 창의적인 연구 활동의 일환으로 본 심포지움을 준비하였습니다. 바쁘시더라도 참석하셔서 "천연물 신소재 발굴 및 실용화를 위한 산학연 심포지움"에 관한 전문가들의 발표와 토론의 장에서 새로운 소재 개발을 위한 정보 교류의 시간을 가지시길 바랍니다.

본 심포지움에 관심 있으신 분들의 많은 참여와 협조를 바랍니다.

2011년 11월

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▶ 2011. 11. 4(금) ~ 11. 5(토) 경포대 현대호텔 8층 에메랄드 홀

시 간	프 로 그 램	비 고
11. 4(금) 13:00 ~ 15:00	KIST 기능성천연물센터 투어	
15:00 ~ 15:30	등록	
15:30 ~ 15:50	환영사 최수영 박사 (한림대학교 사업팀장) 노주원 박사 (KIST 기능성천연물센터장)	
	축사 이한수 박사 (강원대학교 사업단장)	
15:50 ~ 16:30	Development of Nutraceuticals Using Korean Wild Vegetables : 노주원 박사 (KIST 기능성천연물센터)	좌 장 : 최수영 박사
16:30 ~ 17:10	꽃나무 유래 기능성 소재의 개발 : 박상재 대표 (에이지아이(주))	
17:10 ~ 17:20	Coffee Break	
17:20 ~ 18:00	클로렐라 루테인의 산업화 연구 : 판철호 박사 (KIST 기능성천연물센터)	
18:00 ~ 20:00	저녁 만찬 및 기업체 대표자들과의 간담회	
11. 5(토) 09:00 ~ 09:15	Production of antibody with CpG-DNA-peptide-liposome complex without carriers : 김동범 (외과대학 미생물학교실)	
09:15 ~ 09:30	Constituents of xanthium strumarium and their biological activity of diabetes and its complication : 윤희나 (식품영양학과)	
09:30 ~ 09:45	Effect of licochalcone E feeding on solid tumor growth and lung metastasis in 4T1 murine mammary cancer model : 권수진 (식품영양학과)	
09:45 ~ 10:00	Inhibitory effects of dietary luteolin on transendothelial migration of monocytes and formation of lipid-laden macrophages : 김민수 (식품영양학과)	사 회 자 : 김대원 박사
10:00 ~ 10:15	Coffee Break	
10:15 ~ 10:30	Potential roles of D-serine and serine racemase in experimental temporal lobe epilepsy : 김지은 (의과대학 해부학교실)	장 소 : 4층 사피이어 홀
10:30 ~ 10:45	Licochalcone A attenuates IFN- γ -induced expression of MCP-1 via the induction of heme oxygenase-1 in the HeCaT cells. : 고아라 (바이오메디컬학과)	
10:45 ~ 11:00	Protective effects of transduced Tat-DJ-1 protein on Parkinson disease and ischemic insults : 정훈재 (바이오메디컬학과)	
11:00 ~ 11:15	Combinatorial control of human ABCG5/ABCG8 gene expression by transcription factors : 박수선 (바이오메디컬학과)	
11:15 ~ 11:30	천연물 유래 진통제 및 신경병증성 통증 치료제 개발 연구 : 김선미 (의과대학 약리학교실)	
11:30 ~ 12:00	종합토론	
12:00 ~	중식 및 이동	