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- 143-150** **BREAD CONTAINING TYPE 3 RESISTANT STARCH REDUCED GLYCEMIC INDEX AND GLYCEMIC RESPONSE IN HEALTHY YOUNG ADULTS**
Meng-Hsueh Amanda Lin, Chih-Rong Shyr, and Jenshinn
- 151-164** **EFFECTS OF DIETARY ROYAL JELLY ON EPIDERMAL GENERATION OF CERAMIDES FROM ACIDIC SPHINGOMYELIN AND GLUCOSYLCERAMIDES IN UV-IRRADIATED HAIRLESS MICE**
Juyoung Kim, Yunju Lee and Yunhi Cho
- 165-172** **BLACK RICE ANTHOCYANINS AMELIORATE RETINAL PHOTOCHEMICAL DAMAGE IN RAT VIA ANTI-OXIDATION AND ANTI-APOPTOSIS**
Wei Chen, Hao Jia, Xiaoping Yu, Xiuhua Wu, Mantian Mi, Longjian Liu, Shuai Li, Hong Liu, Jiru Liao, Min Yang, and Weihua Liu
- 173-178** **ANTI-AGING EFFECT OF SESAMIN AND ITS MECHANISM OF ACTION**
Lei Hong, Cai Liangliang, Wang Yi, Han Juncheng, Wang Qin, and Zhang Xiaoxiang
- 179-186** **LOW GLYCEMIC INDEX SWEET POTATO STARCH IMPROVES THE POSTPRANDIAL GLYCEMIC RESPONSE OF STZ/NICOTINAMIDE-INDUCED HYPERGLYCEMIC RATS BY UPREGULATING THE PROTEINS INVOLVED IN INSULIN SIGNALING**
Ya-Yen Chen, Ming-Hoang Lai, Tai-Chen Yu, and Jen-Fang Liu
- 187-192** **EFFECT OF VITAMIN C ON GLUCOSE METABOLIZING ENZYMES IN CYCLOPHOSPHAMIDE, METHOTREXATE AND 5-FLUOROURACIL TREATED FIBROSARCOMA BEARING RATS**
Govidan Muralikrishnan, Sarjeel Kaleem and Faiyaz Shakeel
- 193-200** **SAGE EXTRACT ENTRAPPED IN NANOSTRUCTURED LIPID CARRIERS FOR APPLICATION INTO THE MOUTH CAVITY FOR ORAL HYGIENE**
Melike Üner and Rainer H. Müller
- 201-205** **INSTRUCTION TO AUTHORS**

Current Topics in Nutraceutical Research 10 (3/4): 143-150

- 143-150 **BREAD CONTAINING TYPE 3 RESISTANT STARCH REDUCED GLYCEMIC INDEX AND GLYCEMIC RESPONSE IN HEALTHY YOUNG ADULTS**
Meng-Hsueh Amanda Lin, Chih-Rong Shyr, and Jenshinn

ABSTRACT: *The study evaluated the influence of resistant starch (RS) in bread formulation to postprandial glycemic response in healthy subjects and glycemic index (GI) of bread. Ten healthy subjects (five male and five female) aged between 20-30 years old were recruited. Type 3 resistant starch was used to substitute 10, 30 and 60% of white wheat flour in bread. The study method complied with an internationally recognized methodology (the Australian Standard for GI testing and WHO/FAO recognized method) for GI testing. The results showed bread made with 60 % of RS produced the lowest postprandial blood glucose at 0.5 h and at 1 h after ingestion and had the lowest GI in comparison to standard white bread and those made with 30%, and 10% RS substitutions. The 60 % and 30% RS breads had a 28.7% and 28.1% reduction in GI compared to the standard white bread. The glycemic indices were 51, 68 and 70 for 60%, 30% and 10% RS replaced bread respectively. We concluded that the bread with RS reduced glycemic index and elicited lower postprandial glucose response in adults. Thus, RS may have protective effects against hyperglycemia by decreasing postprandial glycemic response.*

Current Topics in Nutraceutical Research 10 (3/4): 151-164

- 151-164 **EFFECTS OF DIETARY ROYAL JELLY ON EPIDERMAL GENERATION OF CERAMIDES FROM ACIDIC SPHINGOMYELIN AND GLUCOSYLCERAMIDES IN UV-IRRADIATED HAIRLESS MICE**
Juyoung Kim, Yunju Lee and Yunhi Cho

ABSTRACT: *Ultraviolet (UV) irradiation induces skin dryness, mainly via disruption of the epidermal barrier. In an effort to identify dietary agents capable of preventing skin dryness, we investigated the effects of royal jelly on epidermal levels of ceramides (Cer), the major lipid responsible for maintaining the epidermal barrier. Albino hairless mice were fed either a control diet (UV groups) or diets containing 1% royal jelly (RJ) harvested from Cheolwon (group RJ1) or Pocheon (group RJ2) in Korea or imported from China (group RJ3) for 6 wks in parallel with UV irradiation. In groups RJ1 and RJ2, the levels of epidermal Cers 1, 2, 5 and 7 as well as glucosylceramide (GlcCer) 2 were higher than those in the UV- and UV+ groups. Furthermore, protein abundance of acidic sphingomyelinase (A-SMase) and β -glucocerebrosidase (GlcCerase), which are enzymes responsible for generating ceramides, were higher in the RJ1 group than in the UV+ group. Our results demonstrate that the RJ used for the RJ1 group may beneficially alter factors influencing skin dryness, including natural moisturizing factors.*

Current Topics in Nutraceutical Research 10 (3/4): 165-172

- 165-172 **BLACK RICE ANTHOCYANINS AMELIORATE RETINAL PHOTOCHEMICAL DAMAGE IN RAT VIA ANTI-OXIDATION AND ANTI-APOPTOSIS**
Wei Chen, Hao Jia, Xiaoping Yu, Xiuhua Wu, Mantian Mi, Longjian Liu, Shuai Li, Hong Liu, Jiru Liao, Min Yang, and Weihua Liu

ABSTRACT: *It was established that black rice anthocyanins (BRACs) provided potent anti-oxidative and anti-apoptotic effects wherever in vitro or in vivo. In this study, the protective effects of BRACs against retinal photochemical damage and the mechanisms that might be associated were investigated in*

Sprague-Dawley rats. Sixty rats were assigned randomly to two groups, which were treated with (n=30) or without BRACs (n=30) by intragastric administration for 15d respectively. Then both groups were exposed to 3000 ± 200 lux fluorescent light for 0~24h. After treatments, the cytoprotective role and antioxidant effects of BRACs were assessed in retinas. Our result showed that the light exposure resulted in severely functional and structural damage in retinas. And supplementary of BRACs effectively prevented injury as previously stated and maintained its normal function and structure. Furthermore, supplementary BRACs markedly reduced the photoreceptor cells apoptosis induced by light stress (P<0.05), and also decreased malondialdehyde level (P<0.05) and elevated the activities of superoxide dismutase (SOD), glutathione S-transferase (GST) and glutathione peroxidase (GSH-PX) in retinas (P<0.05). In conclusion, these results suggested that supplementation with BRACs can effectively protect the retina against photochemical damage in rats, which may be due in mostly to its potent antioxidant and anti-apoptotic capacity.

Current Topics in Nutraceutical Research 10 (3/4): 173-178

173-178 **ANTI-AGING EFFECT OF SESAMIN AND ITS MECHANISM OF ACTION**
Lei Hong, Cai Liangliang, Wang Yi, Han Juncheng, Wang Qin, and Zhang Xiaoxiang

ABSTRACT: *Sesamin (SES), as one of the most abundant lignans in sesame seed and oil, exhibits multiple functions. The anti-aging effect of sesamin on D-galactose (D-gal)-induced senescent mice model and its mechanism of action were evaluated. The effects of sesamin (50 or 100 mg kg⁻¹) on senescent mice were investigated by observing the changes of body weight, motor and memory ability, liver superoxide dismutase (SOD), glutathione peroxidase (GSHpx), reduced glutathione (GSH) and malondialdehyde (MDA). Moreover, the proliferative response and IL-2 production of splenocytes induced by ConA, the levels of macrophage proliferative response and IL-1, NO production by macrophage were observed. Results showed that age-related alternations of both motor and memory activity were ameliorated in the treatment group. Treatment with sesamin significantly increased the body weight, hepatic SOD and GSHpx activities, GSH content, the proliferative response and IL-2 production of splenocytes induced by ConA. Treatment with sesamin significantly decreased hepatic MDA content, the levels of macrophage proliferative response and IL-1 and NO production. In conclusion, sesamin has anti-aging effect on D-gal induced senescent mice, which might be related to its improvement of brain function, antioxidative activity and immunomodulatory effects.*

Current Topics in Nutraceutical Research 10 (3/4): 179-186

179-186 **LOW GLYCEMIC INDEX SWEET POTATO STARCH IMPROVES THE POSTPRANDIAL GLYCEMIC RESPONSE OF STZ/NICOTINAMIDE-INDUCED HYPERGLYCEMIC RATS BY UPREGULATING THE PROTEINS INVOLVED IN INSULIN SIGNALING**
Ya-Yen Chen, Ming-Hoang Lai, Tai-Chen Yu, and Jen-Fang Liu

ABSTRACT: *This study was to evaluate the effects of lower-GI starch on the insulin signaling in STZ/nicotinamide-induced hyperglycemic rats. We divided 13 hyperglycemic rats and 6 normal rats randomly into two groups respectively and fed a diet containing 575 g/kg as either low-GI sweet potato starch (designed as "S") or high-GI potato starch (designed as "P"). We labeled these four groups as HG-P, HG-S (hyperglycemic rats), N-P and N-S (normal rats). After consuming the diets for 4 weeks, the skeletal muscle was collected to measure the protein expression of the insulin receptor (IR), IR substrate (IRS)-1, and glucose transporter (GLUT)4. Two intraperitoneal glucose tolerance tests (IPGTTs) were also performed at 0th and 4th week to evaluate the postprandial glycemic response. The results showed that the area under the curve (AUC) for blood glucose at 4th week was significantly lower than that at 0th week in the HG-S group. The protein expression of IRS-1 and GLUT4 in the skeletal muscle was*

significantly upregulated in the HG-S group compared to the HG-P group. We concluded that starch with lower-GI improved the postprandial glycemic response of hyperglycemic rats and may associate with the upregulating the proteins involved in insulin signaling.

Current Topics in Nutraceutical Research 10 (3/4): 187-192

187-192 EFFECT OF VITAMIN C ON GLUCOSE METABOLIZING ENZYMES IN CYCLOPHOSPHAMIDE, METHOTREXATE AND 5-FLUOROURACIL TREATED FIBROSARCOMA BEARING RATS

Govidan Muralikrishnan, Sarjeel Kaleem and Faiyaz Shakeel

ABSTRACT: *The effect of vitamin C on carbohydrate metabolizing enzymes in cyclophosphamide, methotrexate and 5-fluorouracil treated fibrosarcoma bearing rats was evaluated in the present study, since the effect of vitamin C are beneficial on the abnormalities induced by cyclophosphamide, methotrexate and 5-fluorouracil. The fibrosarcoma cell lines induced rats were treated with cyclophosphamide, methotrexate and 5-fluorouracil and vitamin C (cyclophosphamide 10mg/kg, methotrexate 1mg/kg, 5-fluorouracil 10mg/kg and vitamin C 200mg/kg body weight) individually and in combination for 120 days. Since some definite correlation exists between tumor progression and the activities of glycolytic and gluconeogenic enzymes, assessment of alterations in the activity was considered as successful markers of diagnosis. The untreated as well as cyclophosphamide, methotrexate and 5-fluorouracil treated fibrosarcoma bearing rats showed significantly decrease in the activity of glycolytic enzymes and increasing gluconeogenic enzyme activities were found to be normalized by co-administration of vitamin C. These results suggested that the abnormalities of cyclophosphamide, methotrexate and 5-fluorouracil were corrected by co-administration of vitamin C in tumor stress condition.*

Current Topics in Nutraceutical Research 10 (3/4): 193-200

193-200 SAGE EXTRACT ENTRAPPED IN NANOSTRUCTURED LIPID CARRIERS FOR APPLICATION INTO THE MOUTH CAVITY FOR ORAL HYGIENE
Melike Üner and Rainer H. Müller

ABSTRACT: *Sage extract from *Salvia officinalis* L. (Lamiaceae) has a wide variety of biological activities to be used in mouthwashes and gargles in disorders of the mouth cavity, throat and respiratory system. Sage extract was purposed to be incorporated into nanostructured lipid carriers for hygiene and freshness of oral cavity in daily use, and for reducing oral flora and pH to assist in the re-epithelialization of the mucosa especially for surgical patients under nursing care. Nanostructured lipid carriers which combine various benefits including high payload of actives and controlled drug delivery, were produced by high pressure homogenization technique. Dexpanthenol and chlorhexidine digluconate were also added to the formulations. Nanoemulsions were also produced by the same technique for comparison. Photon correlation spectroscopy and laser diffraction were used for particle size measurements of nanoparticles and nanoemulsions. Nanostructured lipid carriers were obtained in the nanometer size range lower than 260 nm. Formulations containing dexpanthenol and chlorhexidine digluconate were tested in the descriptive type of subjective test on volunteers by spraying into their mouth cavity. Nanostructured lipid carriers containing the highest amounts of sage extract and lipid displayed the longest effect according to the descriptive type of subjective test indicating sustained sage extract delivery ($p < 0.05$).*