

Association between body composition and body mass index in young Japanese women

Hiroyuki YAMAGISHI, Takao KITANO, Tsutomu KUCHIKI,
Hideki OKAZAKI, Shigeo SHIBATA

¹Laboratory of Nutritional Sciences, Musashigaoka College, Yoshimi-machi, Saitama 355-0154, Japan

²Department of Public Health, Kumamoto University School of Medicine, Honjo, Kumamoto 860-0811, Japan ³Wenness Promotion Planning Group, Meiji Life Foundation of Health and Welfare, Shinjuku-ku, Tokyo 160-0023, Japan

⁴laboratory of Clinical Nutrition, Graduate School of Kagawa Nutrition University, Sakado, Saitama 350-0288, Japan

Abstract

The National Nutrition Survey of Japan indicated a trend toward a decreasing body mass index (BMI; kg/m²) among young Japanese women. Current studies suggest that not-high BMI often does not correlate with not-high body fat percentage. Recently, the classification of BMI in adult Asians was proposed by the International Obesity Task Force. The addition of an “at risk of overweight” category, BMI as 23.0-24.9, was intended to prevent chronic diseases. We investigated the association between body fat percentage (BF%) and BMI to evaluate the screening performance of BMI focused on individual preventive medicine. The subjects consisted of 605 female college students. The subjects’ ages (y), heights (cm), body weights (kg), BMIs, and BF percents with underwater weighing expressed as the means±SD were 19.6±0.5, 158.7±5.6, 53.8±7.2, 21.3±2.4, and 24.9±4.9, respectively. We defined high BF% as ≥85 th percentile of BF% (29.8%). High-BF% individuals are often not classified into BMI ≥23.0 because their BMI readings are very broad (18.4-31.7). In comparison to the screening performances (specificity and sensitivity), BMI ≥23.0 (85.3% and 52.1%, respectively), rather than BMI ≥25.0 (96.7% and 29.8%, respectively), is recommended for the mass evaluation of fatness. For this reason, the BMI “at risk of over-weight” category is characterized as the threshold of increasing the appearance ratio of high-BF% individuals. In conclusion, the BMI ≥25.0 kg/m² category is determined as high BF%, regardless of body composition measurement for mass evaluation as a result of quite high specificity. Even so, body composition measurement is necessitated by the individual evaluation of fatness focused on preventive medicine because BMI performed a poor representation of body composition, especially BMI<25.0 kg/m² individuals.

J Nutr Sci Vitaminol. **48**, 201-206. 2002

The increased incidence rate of colorectal tumors due to the intake of a soluble dietary fiber in rat chemical carcinogenesis can be suppressed by substituting partially an insoluble dietary fiber for the soluble one.

Hideki OKAZAKI¹, Takahiro NISHIMUNE¹, Hiroshi MATSUZAKI², Tsutomu MIURA³, Shigeru MORITA⁴, Yukio YANAGIMOTO⁴, Hiroyuki YAMAGISHI¹, Kazuhiko YAMADA⁵ and Sachie IKEGAMI⁶

¹Laboratory of Food Hygiene, Musashigaoka College, Saitama, Japan ²Department of Nutrition, Junior College of Tokyo University of Agriculture, Tokyo, Japan ³Department of Food and Nutrition, Tomakomai Komazawa Junior College, Hokkaido, Japan ⁴Life Science Laboratory, Osaka, Japan ⁵Division of Applied Food Research, National Institute of Health and Nutrition, Tokyo, Japan ⁶Department of Domestic Science, Otsuma Women's University, Tokyo, Japan

Abstract

In epidemiologic studies on human colorectal tumors, results on the relative protective effect of soluble and insoluble fibers are not consistent. We studied in this work the effect in rats of feeding guar gum or guar gum together with cellulose on the incidence of colorectal tumors induced by 1,2-dimethylhydrazine. The results were as follows: (i) The enhancement of tumor formation by feeding solely guar gum (guar gum group) was suppressed completely when two-thirds of the guar gum was replaced with cellulose (cellulose-guar gum group). The odds ratio for tumor formation was 0.075 (95% CI 0.006-0.936, $p = 0.044$) for guar gum group vs. no fiber control and 0.833 (0.134-5.167, $p = 0.83$) for cellulose-guar gum group vs. the control. (ii) In both groups, serum cholesterol and triglyceride levels decreased significantly compared to the no fiber control group, and fecal excretion of total bile acids almost doubled. (iii) In guar gum group rats, the deconjugation activity (β -glucuronidase, β -glucosidase) was higher than the control or cellulose-guar gum group rats. (iv) The amount of cecal short-chain fatty acids was almost double in guar gum group rats compared to the cellulose-guar gum group or the control rats, and pH of the cecal content of the guar gum group rats had a tendency to be lower. (v) The concentration of fecal secondary bile acids was extremely low in the younger rats of the guar gum group. From these results, it seemed significant to study the cancer preventive effect of the mixed feeding to experimental animals of water-soluble and insoluble fibers instead of the singular feeding.

Int. J. Cancer. **100**: 388-394

Possible role of nitric oxide on adipocyte lipolysis in exercise-trained rats

Hitomi KAWANAMI, Sachiko NOMURA, Takuya SAKURAI,
Tomonobu SAKURAI, Hiroyuki YAMAGISHI**,
Takao KOMABAYASHI*, and Tetsuya IZAWA

Department of Kinesiology, Graduate School of Science, Tokyo Metropolitan University, Hachioji, 192-0397 Japan; and *Laboratory of Nutritional Sciences, Musashigaoka College, Yoshimi-machi, Hiki-gun, Saitama, 355-0154 Japan

Abstract

A possible role of nitric oxide (NO) on adipocyte lipolysis was studied in exercise-trained (9 weeks of running) rats. Lipolysis in adipose tissue tended to be greater in trained rats than in control rats. A treatment of adipose tissue with 5 mM N^o-nitro-L-arginine methyl ester (L-NAME) showed that basal and isoproterenol-stimulated lipolysis were both significantly greater in trained rats than in control rats. In contrast, in isolated adipocytes L-NAME had no effect on lipolysis in either group of rats, though the lipolysis of isolated adipocytes was significantly greater in trained rats than in control rats. Training significantly reduced nitrite/nitrate production in adipocytes, but not in tissue. On the other hand, training increased the protein expression of endothelial nitric oxide synthase (eNOS), but not that of inducible NOS (iNOS) in the extracts of tissue homogenates. In tissue homogenates, eNOS activity but not iNOS activity was significantly greater in trained rats than in control rats. In cellular extracts, training significantly reduced the activities of both NOS's, but the mRNA expressions of both NOS's were not different between groups. The NO donors, S-nitroso-N-acetyl-penicillamine (SNAP) and 1-propamine, 3-(2-hydroxy-2-nitroso-1-propyl-hydrazine) (PAPA-NONOate), significantly inhibited adipocyte lipolysis in response to isoproterenol in both groups. This inhibitory effect of SNAP, but not that of PAPA-NONOate, was greater in the adipocytes of trained rats than in those of the control rats. Thus it is possible that NO is involved in the regulation of lipolysis and that exercise training enhances the responsiveness of adipocytes to extracellular NO with the reduced production of nitrite/nitrate in adipocytes because of decreased activities of NOS's. On the other hand, it is also possible that exercise increases either the activity or the protein expression of eNOS in adipose tissue.

Jpn J Physiol. **52**: 343-352

北海道タマネギの品質と調理加工特性

Cooking and proceeding quality of onions (*Allium cepa*)
cultivated in Hokkaido

玉木 雅子*, 鵜飼 光子**,
村田 容常***, 本間 清一***

*武蔵丘短期大学, **北海道教育大学, ***お茶の水女子大学

Abstract

In Japan, onion is mainly produced in Hokkaido. The quality of onion has been improved by breeding or crossing, and the production is increasing. Although cooking and proceeding properties of the onion have been reported in a few papers, the cultivars used in these papers are often unclear. Therefore, we employed 13 cultivars of onion currently cultivated in Hokkaido, and studied on individual cooking and proceeding properties. The results obtained were summarized as follows ;

(1) All cultivar of onion bulb were levels of solid contents (9-11%) and reducing sugar (4-5%), showed suitability of processing to saute and powder.

(2) Brix percent of onion bulbs were 7-11%.

(3) Phenol contents were 150 mg/100 g in red type, and 70-100 mg/100 g in yellow type. The cultivars which contain high phenol were evaluated with that it is bitter when it was sauted. The correlation was established between phenol contents and color value (a^* and b^*) of onion bulb, the green and yellow degree was high for onion containing high phenol. But phenol contents did no affect to color of sauted onion.

(4) Pyruvate production was $5-9 \mu\text{mol/g}$, this was divided into medium pungency. There was the positive correlation between pyruvate production and pungency, and negative correlation between pyruvate production and sweetness. There was no correlation between sweetness and free sugar, Brix, solid content.

北海道タマネギ長期貯蔵中の品質変化

Effect of long-term storage on quality attributes of onions
(*Allium cepa*) grown in Hokkaido

玉木 雅子*, 鷓飼 光子**,
村田 容常***, 本間 清一***

*武蔵丘短期大学, **北海道教育大学, ***お茶の水女子大学

Abstract

Japanese onions has been mainly cultivated in Hokkaido and their important quality is high storability, being able to store a half of year or so. But the taste of all these onions was not good. The breeding of onion has been developed, and new cultivars which their taste is sweet and less bitter in raw and more sweet in cooking. Any papers have not been reported about new cultivars. Therefore, we conducted studies to find out the quality attributes of onions grown in Hokkaido and its changes during long-term storage. These results were summarized as follows;

- (1) During long-term storage, solid content, average whole weight and Brix changed in content without two cultivars; Rantarou and Sarari cultivars. Especially pyruvate development in these two cultivars were lower than others and keeps same level during 6 months. Superkitamomiji, major cultivar in Hokkaido, contents low pyruvate level just after 1 month, but high contents level after 3 months at refrigerator and then keeps this level.
- (2) In almost cultivars, solid contents and reducing sugar contents keep during long-term storage, and these contents are suitable to saute and powder.
- (3) Color and composition of free sugars in all cultivars changed during long-term storage.

長時間炒めたタマネギの味、香り、遊離糖、色の変化

**Changes in the taste, flavor, free sugar, and browning of onion
(*Allium cepa*) during long-term frying**

玉木 雅子*, 鵜飼 光子**

*武蔵丘短期大学, **北海道教育大学

Abstract

Onion was fried in 10% its weight of oil for a long time until brown. Onion soup was then prepared from the fried onion. The relationship between the frying time and color, taste, smell and texture was examined for both the fried onion and onion soup. During the process of frying, the characteristic stimulus of the onion disappeared, and the taste and smell changed in order to sweet, aromatic, sour, bitter, and crispy. The glucose and total free sugar contents both decreased. The onion soup and fried onion required a different taste and smell, and it was necessary to obtain the best soup flavor by frying the onion for longer than is required of fried onion as food. The onion in the soup become softened after being fried until crisp. The strength of the sweetness of the fried onion did not agree with the sugar content.

日本家政学会誌 54巻 69-76 2003