Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 7, Issue, 07, pp.18591-18595, July, 2015

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

RESEARCH ARTICLE

THE EFFECT OF SOY MILK WITH VARYING DOSES AGAINST ACNE VULGARIS

***,[1]Puguh Riyanto, [1]Prasetyowati Subchan and [2]Rosa Lelyana**

[1]Departement of Dermatology and Venereology, Faculty of Medicine Diponegoro University, Hospital Kariadi, Semarang, Indonesia
[2]Departement of Nutrition, Faculty of Medicine Diponegoro University, Hospital Kariadi, Semarang, Indonesia

ARTICLE INFO

Article History:
Received 26th April, 2015
Received in revised form
18th May, 2015
Accepted 08th June, 2015
Published online 31st July, 2015

Key words:

Acne vulgaris,
Soy milk.

ABSTRACT

Background: Acne vulgaris (AV) is a skin disorder that is most common, with a multifactorial pathogenesis, but some studies have shown that dihydrotestosterone (DHT) is an androgen that is most instrumental in ductal hyperproliferation pilosebaseus and hypersecretion of the sebaceous glands. Soy milk are phytoestrogens which proved an antiandrogen and anti-inflammatory. The purpose of this study demonstrate the effect of soy milk on AV lesions in female patients.
Methods: This study is a clinical study design with randomized pretest-posttest control group design, with 25 samples were randomized into 5 groups: soy milk 200 ml, 400 ml, 600 ml, 800 ml, and placebo, for 4 weeks, conducted a double-blind manner .
Results: The study found differences in the mean total AV lesions before treatment among the five groups ($p : 0.259$) or not significant ($p>0.05$), whereas after treatment ($p : 0.001$) or significant ($p<0.05$). Differences decrease in the mean total AV lesion before and after the inter-group obtained soy milk 800 ml group ($p < 0.05$), while the placebo, 200 ml, 400 ml, 600 ml not significant ($p>0.05$), and the difference in total lesion delta AV ($p:0.001$) or significant ($p<0.05$).
Conclusion: This study of soy milk supplementation 800 ml/day can lower total AV lesion.

Citation: PuguhRiyanto, PrasetyowatiSubchan and Rosa Lelyana, 2015. "The effect of soy milk with varying doses against acne Vulgaris", *International Journal of Current Research*, 7, (7), 18591-18595.

INTRODUCTION

Acne vulgaris (AV) is a skin disorder that is most often found, nearly 80% of adolescents and young adults have suffered AV (Zanglein *et al*., 2012; Collier *et al*., 2008; Azimi *et al*., 2012). Acne vulgaris pathogenesis is not clear, but several studies have shown that dihydrotestosterone (DHT) is an androgen most responsible and DHT correlation with the number of AV lesions, especially in women (Thiboutot and Chen, 2003; Junkins-Hopkins, 2010). The active component of soy milk are isoflavones (Mackinnon and Rao, 2012; Barbara and McCauley, 2011; Basaria, 2009; Dilingham *et al*., 2010; Legg *et al*., 2011). Consumption of soy isoflavones in Asian countries four times more than in the western countries, the average daily consumption in Asian countries 24-45 mg (Legg *et al*., 2011; Pilsakova *et al*., 2010; Setchell and Clerici C. Equol, 2010). Role of soy isoflavones on androgen metabolism, by inhibiting the enzyme 3ß-hydroxysteroid dehydrogenase (3ß-HSD), 17ß-hydroxysteroid dehydrogenase (17ß-HSD) and 5α-reductase (Steinberg *et al*., 2011). The relationship between the consumption of soy milk with AV is still unknown, so do research on the effect of soy milk on the number of AV lesions, and obtained the formulation of the problem whether drink supplementation of soy milk affect the number of lesions in women with AV ? The purpose of this study is to prove that drink supplementation of soy milk affect the decrease in the number of AV lesions. This research could usefully contribute to science and technology, and improving the quality of health services, as well as contributions of science for the benefit of society. Major hypothesis of research is drink supplementation of soy milk affect AV, while the minor hypothesis is varied dosing for 4 weeks will lead to differences in the number of AV lesions.

***Corresponding author: Puguh Riyanto**
Department of Dermatology and Venereology, Faculty of Medicine Diponegoro University, Hospital Kariadi, Semarang, Indonesia.

MATERIALS AND METHODS

The study design is a true experimental research with randomized pretest-posttest control group design. This study used a variation of soy milk dose is 200 ml, 400 ml, 600 ml, 800 ml for 4 weeks, with a sample of 25 people, were randomized into 5 groups and to address the drop out to monitor the schedule of assessment visite guidelines. The sample was female patient who was treated in skin clinic, Ungaran city, Central Java, Indonesia. The selection of subjects of research conducted by consecutive sampling and the double-blind treatment.

Standard drug used was 0.025 % tretinoin cream and sunscreen SPF 15, while soy milk used in this study is manufactured and standardized by PT Ultrajaya Milk industry & trading Company tbk Indonesia. Inclusion criteria were women with mild to severe AV according to Lehmann and not on medication, do not suffer from hyperandrogenism, and willing to sign informed consent. Exclusion criteria were allergy soy milk. The independent variable is the soy milk 200 ml /day, 400 ml/day, 600 ml/day, and 800 ml/day. The dependent variable is the total number of AV lesions, examined by two dermatologist, then calculated interclass correlation coefficient and the coefficient alpha. Controlled confounding variables were age, body mass index, the average consumption of isoflavones from soy foods, stress status was measured by a score inventory beck depression (Henkel *et al*., 2002), hyperandrogenisme clinically assessed that there is amenorrhea, sound like men and hirsutism were assessed by Ferriman and Gallwey scale (Ehrmann *et al*., 2006). uncontrolled confounding variables is genetic, racial, environmental pollutants and chemicals. Analysis of the data displayed minor hypothesis test to prove the difference in the mean total lesion AV before and after the study, confounding factors controlled the randomization process. Limit the degree of significance will be determined is $p<0.05$ with 95 % confidence intervals. This study was approved by the Ethics Committee of the Faculty of Medicine/Hospital Kariadi Semarang city, Indonesia.

RESULTS

During the period of study found 50 women with AV, after the selection obtained in 25 patients met the inclusion criteria and 24 patients were excluded from the study, due to the 11 patients refused to have blood drawn and 5 people undergoing acne treatment on the other beauty clinics. 25 samples of the study were randomized into 5 groups, namely the group of soy milk 200 ml, 400 ml, 600 ml, 800 ml, and placebo groups, the treatment is not obtained until the end of the sample who dropped out in all groups. Characteristic average age of the entire sample in this study was 24.3 ± 5.71 years with a range youngest is 17 years old and the oldest was 34 years old. The level of education in junior school graduates by 1 (4.0%) samples, high school graduates were 23 (92.0%) samples, and university graduates by 1 (4.0%) samples, and found no primary school graduates. This type of work earned as many as 15 (60.0%) laborers samples, civil servants in 2 (8.0%) samples, and students 6 (24.0%) samples, self-employed and do not work as much as 1 (4.0%) samples. The entire sample in this study, the mean body mass index (BMI) was 20.8 ± 1.39 with a range of 17.3 and the lowest score is the highest score was 23.6. The mean BMI in the placebo group was 21.2 ± 0.43, soy milk 200 ml was 20.7 ± 0.79, soy milk 400 ml was 21.1 ± 2.08, soy milk 600 ml was 20.6 ± 2, 24, soy milk 800 ml was 20.5 ± 1.39. (Table 1)

Table 1. Characteristic data age, education, and employment variable

Variable	group					P
	Placebo	Soy milk 200 ml	Soy milk 400 ml	Soy milk 600 ml	Soy milk 800 ml	
	n= 5	n=5	n=5	n=5	n=5	
age (rmean±SD, year)	20,2 ± 2,28	22,2 ± 6,73	25,6 ± 6,73	26,0 ± 5,96	27,4 ± 6,66	0,307[a]
graduated (n,%)						
junior school	0 (0)	1(20)	0(0)	0(0)	0(0)	0,408[b]
high school	5(100)	4(80)	4(80)	5(100)	5(100)	
university	0(0)	0(0)	1(20)	0(0)	0(0)	
employment (n,%)						
did not work	0(0)	0(0)	1(20)	0(0)	0(0)	0,559[b]
student	2(40)	2(40)	0(0)	1(20)	1(20)	
labour	3(60)	3(60)	3(60)	2(40)	4(80)	
self-employed	0(0)	0(0)	0(0)	1(20)	0(0)	
civil servants	0(0)	0(0)	1(20)	1(20)	0(0)	
body mass index	32,1±0,43	20,68±0,79	21,1±2,08	20,59±2,24	25,9±4,33	0,911[b]

Description:, [a] Kruskal-Wallis [b]Chi square, [b] One way ANOVA

Table 2. Marital status, pregnancy, family planning, menarche and long menstruation variable

Variable	group					p
	Placebo	Soy milk 200 ml	Soy milk 400 ml	Soy milk 600 ml	Soy milk 800 ml	
	n= 5	n=5	n=5	n=5	n=5	
Married						
Yes	0(0)	0(10)	2(40)	2(40)	2(40)	0.261*
No	5(100)	5(100)	3(60)	3(60)	3(60)	
Pregnancy						
Yes	0(0)	0(0)	0(0)	0(0)	0(0)	
No	5(100)	5(100)	5(100)	5(100)	5(100)	
Family planning						
Yes	0(0)	0(0)	0(0)	0(0)	0(0)	
No	5(100)	5(100)	5(100)	5(100)	5(100)	
Menarche						
<12 year	1(20)	1(20)	1(20)	0(0)	0(0)	0.790*
>/= 12 year	4(80)	4(80)	4(80)	5(100)	5(100)	
Long menstrual						0.439*
4 days	2(40)	0(0)	1(20)	0(0)	1(20)	
5 days	3(60)	3(60)	3(60)	5(100)	3(60)	
6 days	0(0)	2(40)	1(20)	0(0)	1(20)	

Description: * Chi square

Overall marital status obtained 19 (74.0 %) samples were not married and 6 (24.0 %) samples were already married, not obtained a sample that is experiencing pregnancy and not being a participant family planning last 1 month. Age of menarche in this study all samples were from age 11 to 14 years, with details of the experience of menarche from the age of 11 years obtained 3 (12.0 %) samples, obtained 17 to 12 years of age (68.0 %) samples, aged 13 years obtained 4 (16.0 %) samples, and obtained the age of 14 years 1 (4.0%) samples. All samples among 5 groups have regular menstrual cycle period for 28 days, while having a long menstrual 4 days obtained 4 (16.0 %) samples, whereas the 5-day long menstrual obtained 17 (68.0 %) samples, and 6 days obtained 4 (16.0 %) samples. (Table 2)

There were no samples with clinical symptoms of hyperandrogenism such as hirsutism signs and sounds like a man, and the entire sample was not obtained extensive skin infections, lumps in the breast, obstetric diseases among 5 groups. AV sufferers do not experience stress that 21 (84%) and patient samples that mild stress that is 4 (16%) samples. The whole group is not found. AV mild severity, but moderate degrees obtained in the placebo group 3 samples, soy milk 200 ml group and 400 ml each sample obtained 4, 5 samples, 600 ml and 800 ml each 1 sample. Severity of acne vulgaris in the placebo group obtained two samples, 200 ml group and 400 ml group respectively obtained one sample, and 800 ml group are as much as 4 samples, whereas 600 ml group found no severe degree.

The mean total AV lesions before treatment showed different test unpaired One way ANOVA was not significant (p>0.05), whereas the mean total lesion after treatment results of different test unpaired Kruskal-Wallis found significant differences (p< 0.05). (Table 3)

Acne Vulgaris mean difference in total lesion before and after treatment in the group with 800 ml soy milk with Paired t-test found a significant difference (p <0.05), whereas the placebo group, soy milk 400 ml, and soy milk 600 ml results Paired t-test did not differ significantly (p> 0.05) and soy milk 200 ml with Wilcoxon Signed Ranks test, did not differ significantly (p> 0.05). (Table 4)

Results of Kruskal-Wallis test of difference between the delta lesions AV values obtained 5 groups (p: 0.013) or a significant difference (p <0.05) (Table 5) and differences between groups Mann Whitney test result mean delta value soy milk 800 ml group (p: 0.009) or significantly different (p <0.05) to placebo, soy milk 200 ml group, 400 ml group, and 600 ml group, whereas among other groups was not significant (p> 0.05). (Table 6)

DISCUSSION

This study using varying doses of soy milk, with the aim to see a dose response and determine the most effective dose of soy milk that affect the amount of total AV lesions, the dose used in the study were 0 ml/day, 200 ml/day, 400 ml/day, 600 ml/day and 800 ml/day for 4 weeks, it is adapted to regenerate skin will range from 28 days early clinically visible changes of the lesion AV (Gopal and Farahan, 2001).

Table 3. The mean difference of total AV lesions before and after treatment

Total AV Lesions	placebo	Soy milk 200 ml	Soy milk 400 ml	Soy milk 600 ml	Soy milk 800 ml	p
Before treatment	112.4 ± 64.47	65.4 ± 58,70	94.6 ± 24.07	88.0 ± 19,65	140.0 ± 70,.2	0.259[a]
After treatment	109.8 ± 59.92	64.4 ± 60,24	93.2 ± 26.08	82.4 ± 22,20	44.8 ± 32.24	0.001[b]

Description: [a]One way anova, [b]Kruskal Wallis, p<0.05 = significant

Table 4. The mean difference of total AV lesions in all groups

Group	Mean±SD total lesions before treatment	Mean±SD total lesions after treatment	P
Placebo	112.4 ± 64,47	109.8 ± 59,92	0.480[1]
Soy milk 200 ml	65.4 ± 58,70	64.4 ± 60,24	0.715[2]
Soy milk 400 ml	94.6 ± 24,07	93.2 ± 26,08	0.624[1]
Soy milk 600 ml	88.0 ± 19,65	82.4 ± 22,20	0.098[1]
Soy milk 800 ml	140.0 ± 70,92	44.8 ± 32,24	0.007[1]*

Description :[1] Paired t Test, [2] Wilcoxon Signed Ranks Test * p<0.05

Table 5. Kruskal-Wallis test of differences in delta AV lesions delta between the placebo, soy milk 200 ml, 400 ml, 600 ml, and 800 ml group

Groups	Mean±SD delta AV lesions	P
Placebo	-2.6 ± 7.470	0.013*
Soy milk 200 ml	-1.0 ± 6.325	
Soy milk 400 ml	-1.4 ± 5.899	
Soy milk 600 ml	-5.6 ± 5.814	
Soy milk 800 ml	-95.2 ± 42.287	

Description: **Kruskal Wallis,* p<0,05 or significantly different

Table 6. Mann Whitney test of difference between the delta lesions AV placebo, soy milk 200 ml, 400 ml, 600 ml, and 800 ml group

Variable	Soy milk 200 ml	Soy milk 400 ml	Soy milk 600 ml	Soy milk 800 ml
Placebo	0.753	0.917	0.402	0.009*
Soy milk 200 ml	-	0.465	0.295	0.009*
Soy milk 400 ml		-	0.251	0.009*
Soy milk 600 ml			-	0.009*

Description: * Value of different test unpaired Mann Whitney to delta AV lesion soy milk 800 ml group (p : 0.009) or significant (p< 0.05)

The mean difference in total AV lesions before the second treatment groups was not significant ($p>0.05$), whereas after treatment was significantly different ($p<0.05$). Differences decrease in the mean total lesion before and after treatment in the placebo group, soy milk 200 ml, 400 ml did not differ significantly ($p>0.05$), while the soy milk 800 ml group found significant differences ($p<0.05$). Differences delta AV lesions after 4 weeks of the study was significantly different between groups ($p <0.05$), and soy milk 800 ml effect of reducing the total AV lesions were significantly ($p <0.05$), compared to placebo, 200 ml, 400 ml, 600 ml, so the hypothesis is proved to be minor.

Study the effect of soy milk on AV lesions has not previously been done, but some studies have shown that soy isoflavones affect androgen (Dilingham *et al*., 2010), and the role of androgen hormones the AV especially in women, there is a correlation between the number of lesions AV DHT in women (Thiboutot and Chen, 2003; Junkins-Hopkins, 2010), whereas studies as anti-inflammatory effects of isoflavones can be found in several studies that prove that isoflavones may reduce cytokine pro-inflammatory (Throrpe *et al*., 2003). Effect of soy milk on AV lesions, due to decreased levels of DHT which will improve the condition of the duct pilosebaseus, decrease the secretion of sebaceous glands, fixing duct keratinization infundulum pilosebaseus, cohesion and prevent the formation of corneocytes mikrokomedo, resulting in a drop closed comedones or blackheads open, and will lead to a decrease in AV lesion counts (Thiboutot and Chen, 2003; Cappel *et al*., 2005). Effect of soy milk in inhibiting inflammation in AV, causing a reduction in papules, pustules, and nodules, it will also reduce the total number of lesions.

Role of soy milk in the androgen metabolism is inhibit 3ß-hydroxysteroid dehydrogenase enzyme (3ß-HSD), 17ß-hydroxysteroid dehydrogenase (17ß-HSD) and 5α-reductase (Steinberg *et al*., 2011). Several studies have shown that soy isoflavones affect androgen (Dilingham *et al*., 2010) The role of androgens against AV, especially in women, compared to men[4]. Levels of DHT There is a correlation with the number of lesions in women with AV (Cappel *et al*., 2005).

Isoflavones also have anti-inflammatory, several studies in postmenopausal women demonstrate the effect of isoflavones on the decline in pro-inflammatory cytokines. Soy milk 800 ml contains to 160 mg of isoflavones. Other studies using soy isoflavones to lower the AV lesion has never been done, however, some studies have shown the benefits of isoflavones dose of 160 mg for 12 weeks in postmenopausal women, a decrease in the expression of inflammatory mediators (Throrpe *et al*., 2003). The hormone DHT is the result of metabolism of testosterone through the activity of the enzyme 5α-reductase type 1. Dihydrotestosterone affects sebosit cells and keratinocytes in the infundibulum pilosebaceous duct, causing a cellular differentiation, proliferation, lipogenesis and Comedogenesis (Basaria, 2009). Effect of isoflavones on androgen hormones by inhibiting enzymes involved in androgen metabolism. Many diagnostic studies in experimental animals and in humans showed an effect of isoflavones on hormone androgen (Mackinnon and Rao, 2012).

Conclusion

Soy milk supplementation 800 ml/day for 4 weeks in women with AV would lead to a significant reduction in the number of lesions AV.

REFERENCES

Azimi H, Fallah, Khakshur AA, and Abdollahi M. A review of phytotheraphy of acne vulgaris: perspective of new pharmacological treatments. *Fitoterapia.,* 2012:1-5.

Barbara DA and McCauley. Breast cancer, estrogen, soy genistein, and other dietary factors: Towards an understanding of their mechanistic interactions. *Nutrition & Food Science,* 2011; 35 – 42.

Basaria S. Effect of high-dose isoflavones on cognition, quality of life, androgens, and lipoprotein in post-menopausal women. *J. Endocrinology Investigation* 2009;32(2):150-5.

Cappel M, Mauger D and Thiboutot D. Correlation between serum levels of insulin-like growth factor I, dehydroepiandrosterone sulfate, and dihydrotestosterone and acne lesion counts in adult women. *Arch Dermatology,* 2005;141:333-8.

Collier CN, Harper JC, Cantrell WC, Wang W, Foster KW. The prevalence of acne in adults 20 years and older. *J Am. Acad. Dermatol.,* 2008;58:56-9.

Dilingham BL, Brianne L, McVeigh, Johanna W and Lampe. Soy protein isolate of varying isoflavone content exert minor effects on serum reproductive hormones in healthy young men. *J. Nutrition,* 2010;584-91.

Ehrmann DA. Hirsutism and virilization. In : Jameson, J.L. editor. Harrison's endocrinology. New York : McGraw Hill Inc; 2006. P. 235

Gopal, MG and Farahan B, Effectiveness of herbal medications in the treatment of acne vulgaris – A pilot study. *The Indian Practitioner*, 2001:54(10): 723

Henkel V, Moeller HJ, Ring J and Warret. Screening for depression in adult acne vulgaris patients. Tools for dermatologist. *Journal of Cosmetic Dermatology*, 2002; 1: 7.

Junkins-Hopkins JM. Hormone therapy for acne. *J Am. Acad. Dermatol.,* 2010;62:486-8.

Legg RL, Tolman JR, Lovinger CT, Lephart ED, Setchell KD and Christensen MJ. Diet high in selenium and isoflavones decrease androgen-regulated gene expression in healthy rat dorsolateral prostate. *Reproductive Biology and Endocriology,* 2011;6: 57.

Mackinnon ES and Rao LG. Soyabean as a special functional food formula for improving women's health. In : Shi J., Ho CT, Shahidi F editors. Functional Food of the East. USA: CRC Press; 2012. P. 280-91.

Pilsakova L, Riecansky I and Jagla F. The physiological action of isoflavone phytoestrogens. *Physiol Res.,* 2010;59: 651-64.

Setchell KD and Clerici C. Equol : pharmakinetics and biological actions. *J. Nutrition*, 2010;140(70):1363s-62s.

Steinberg FM, Murray MJ, Lewis RD, Cramer MA, Amato Pand Young L. Clinical outcomes of a 2-y soy isoflavone supplementation in menopausal women. *American Journal Clinic Nutrition,* 2011;93: 356-67.

Thiboutot D, and Chen WC. Update and future of hormonal therapy in acne. In: Zouboulis CC, Herane MI, Thiboutot

D, editors. Acne symposium at the world congress of dermatology. Basel: S Karger medical and scientific publishers; 2003. P. 57-67.

Throrpe DG, Hagen CO, I. Young and Lewis LS. Dietary supplements of soya flour lower serum testosterone concentrations and improve markers of oxidative stress in men. *European Journal of Clinic Nutrition,* 2003:57: 100-6.

Zanglein AL, Graber AM, Thiboutot DM, Strauss JS. Acne vulgaris and acneiform eruptions. In : Freedberg IM, Eisen AZ, Wolff K, editors. Fitzpatrick's dermatology in general medicine. 8th edn. New York : McGraw Hill Inc; 2012. P. 897-917.

****