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**Bockshornsamen + Mikronährstoffe:  
Wirksamkeit eines Nahrungsergänzungsmittels gegen Haarausfall**

## Fenugreek + micronutrients: Efficacy of a food supplement against hair loss

Christiane Schulz, Stephan Bielfeldt, Dr. Jürgen Reimann

### Schlüsselwörter

Haarausfall, Haarwachstum, Bockshornklee, Bockshorn+Mikronährstoff Haarkapseln Arcon-Tisane® plus, Phototrichogramm, klinische Studie, Nagelgesundheit

### Key Words

hair loss, hair growth, fenugreek, Bockshorn+Mikronährstoff Haarkapseln Arcon-Tisane® plus, phototrichogram, clinical study, nail health

### Zusammenfassung

Haarverlust, dünner werdendes Haar, schlecht wachsende Haare und kraftlose oder stumpfe Haare sind bekannte Beschwerden in der klinischen Dermatologie. Daher gibt es einen Bedarf an Produkten zur Unterstützung des Haarwachstums oder die regulierend in den Haarzyklus eingreifen. Im Rahmen einer randomisierten, Placebo-kontrollierten klinischen Studie wurde die Wirksamkeit eines, auf Bockshornklee basierenden Nahrungsergänzungsmittels gegen Haarausfall überprüft. Die Ergebnisse zeigen eine erfolgreiche Behandlung bei leichtem bis mäßigem Haarausfall bei Frauen und Männern. Weiterhin zeigt das Präparat positive Effekte auf das Haarwachstum.

### Summary

Hair loss, hair thinning, poorly growing hair and powerless or dull hair are common complaints in clinical dermatology. There is a need for products, which support the hair growing process and control some of the disturbances in the hair cycle dynamics. In context of a randomised, placebo-controlled clinical trial efficacy of a fenugreek seeds containing food supplement against hair loss is evaluated. The results indicate a successful treatment of low to moderate hair loss in women and men. Additionally, positive effects on hair growth were demonstrated.



Fig. 1: Fenugreek  
(*Trigonella foenum-graceum* L.).

### Introduction

Hair growth depends on a complex and precisely controlled process, which is not fully understood. It is a cyclical process, involving synthesis, elongation and finally shedding of the hair shaft. Three phases are recognized in this cycle, namely the anagen (growth), catagen (regression) and telogen (rest) phases. Shedding of the hair shaft occurs at a time called telogenesis. After telogenesis, a latency period may be present before a

new hair shaft emerges at the skin surface. In normal states it is estimated that 85–90 % of scalp hairs are in anagen, with the majority of the remainder in telogen state [4, 6, 11]. If this balance in hair growth cycle is impaired effluvium occurs [5]. This can be caused due to complex interactions which may involve molecular mechanisms, angiogenesis, micro-inflammation, neuroendocrine influences as well as environmental impact, microorganisms and nutritional supply [11].

Hair loss, hair thinning, poorly growing hair and powerless or dull hair are common complaints in clinical dermatology. Therefore it is desirable to have products, which support the hair growing process and control some of the disturbances in the hair cycle dynamics. The aim of the study was to investigate the efficacy of a fenugreek seeds extract containing food supplement\* against hair loss. The efficacy was evaluated over time and in comparison to placebo.

## Fenugreek extract

The verum preparation used in this study is a fenugreek seeds extract containing food supplement, which additionally contains micronutrients like hair active B-vitamins, antioxidants and trace elements. Fenugreek (*Trigonella foenum-graceum* L.) (fig. 1) is an annual herb of leguminosea. Fenugreek is native to Southern Europe, the Mediterranean region and Western Asia. Seeds of fenugreek contain a wide range of active ingredients like saponins, especially derivatives of diosgenin, yamogenin and gitogenin, alkaloids (trigonelline), flavonoids, vitamins and fiber galactomannan etc [10]. Its seeds have a strong aroma and somewhat bitter in taste. It has a long history as both a culinary and medicinal herb in the ancient world. Beneficial properties of fenugreek seeds have attracted wide attention in the recent past due to their therapeutic potential, including its use as hypoglycemic, antiulcerogenic, hypocholesterolemic and antihypertensive agent [1, 3, 13]. Beyond, it is used in Ayurvedic medicine [18]. Up to now, all active ingredients responsible for the possible observed effects are not identified yet. In monography of fenugreek a dosage of 6 g / day is quoted for oral use and 50 g powdered drug in 1/4 l water for external use.

Positive effects of fenugreek on hair growth are known, however, the mechanism is not characterized. It is discussed that fenugreek interacts in a physiologic way by stimulating blood circulation to hair follicles and steroid saponins are expected to interact with DHT (dihydrotestosterone) metabolism. One reason for male and female pattern hair loss is thought to be due to the effects of DHT on genetically predisposed hair follicles. Binding of DHT to the hair follicle results in gradual miniaturization of the hair and eventual hair loss. A fenugreek containing product is already successfully on the market since 1987. Now the formulation shall be further improved with additional micronutrients: vitamins and trace element compounds. In the following clinical study its efficacy against hair loss shall be scientifically proven.

## Study design

The study was conducted as a mono-centric, randomised, double-blind, placebo controlled clinical study. Prior study start, the study design was approved by an independent ethics committee. Volunteers were screened for their eligibility to take part in the clinical trial according to in- and exclusion criteria and enrolled after informed consent. 60 volunteers (30 men and 30 women) with mild to moderate hair loss ingested the test preparations (2 capsules daily) over a period of 6 months. Additionally 6 volunteers were enrolled two months after start of clinical trial because of drop outs due to private reasons. In total, 53 volunteers successfully finished the clinical trial. Every two months there was a dermatological assessment of hair loss, a questionnaire and the assessment of hair parameters via phototrichogram picture analysis (fig. 2). Additionally after 6 months of treatment a retrospective questionnaire was performed. Methods used include both subjective and objective parameters, reliable methods to assess hair loss and hair growth parameters to monitor response of therapy [4, 8, 11, 16].

## Study group

Volunteers were randomly assigned to placebo (1/3 of volunteers of each sex) or verum\* group (2/3 of volunteers of each sex). Demographic data were assessed with a questionnaire. Regarding age, volunteers between 30 and 67 years participated in the trial. Women were significantly younger compared to men ( $p=0,0389$ ) with  $48,5 \pm$

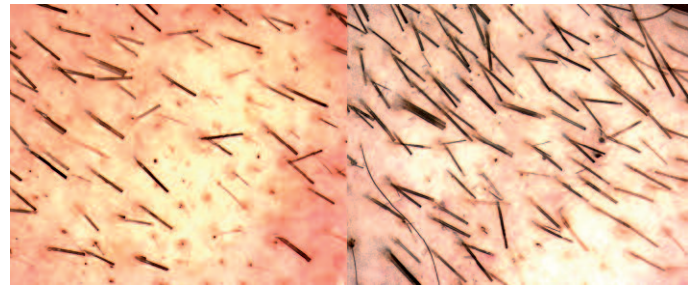


Fig. 2: Picture analysis prior (left) and post treatment (right) with Bockshorn + Mikronährstoff Haarkapseln Arcon-Tisane® plus over a period of 6 months.

11,0 years and  $54,4 \pm 11,0$  years, respectively. However, the subgroups regarding gender and preparation showed no significant difference in age ( $p = 0,1304$ ). BMI was distributed quite homogeneously between study groups. Noticeable is the high fraction (31,5 %) of subjects with BMI  $> 30$  kg/m<sup>2</sup>, termed as overweight. However, looking at outcome parameters, these volunteers did not show outstanding differences to other volunteers. In total, volunteers build a representative group for examination of intended objectives.

## Compliance and compatibility

Compliance visits took place every month. Compliance of intake of test preparations was very good. Tolerance was very high. Only a few volunteers disliked the strong smell of fenugreek which reminds to lovage. To mimic the smell in placebo capsules a fenugreek aroma was added. In both groups only a very few volunteers reported an unpleasant smell / belch / feeling after intake of study preparations. This especially occurred, if preparations were taken after over night fast without breakfast. Volunteers in the trial were asked to take the preparations in the morning together with breakfast. No other side effects were reported in relation to the intake of study preparations.

Satisfaction of preparations was quite high, 72 % and 86 % of volunteers in placebo and verum group, respectively, would recommend product to others and most of them (85 % and 90 %, respectively) would take the product further on.

## Hair loss / hair growth parameters

Volunteers with slight to moderate hair loss were enclosed to the trial. Hair loss was assessed according to a scale of 0–4 (0: none, 1: very slight, 2: slight, 3: moderate, 4: strong); placebo: 2,06; verum: 2,31 (baseline values). After 6 months of intake of test preparations, hair loss was significantly improved  $p < 0,0001$  in both groups; placebo: 0,39; verum: 0,37 (dermatologist assessment). Data are confirmed by volunteer assessment. With both study preparations improvement in hair loss was observed over treatment phase. The trial was performed as double-blind study design to control for psychological influence. However, the placebo effect is high and intensively developed for some parameters. Anyhow, clear conclusions can be stated from the clinical trial. The placebo effect is reflected in other placebo controlled trials [2]. To mimic the intense smell of fenugreek in placebo capsules, a fenugreek aroma was added. However, it was not possible to get an aroma completely free of saponins. Therefore it cannot be ruled out, whether small amounts of saponins could have contributed to the positive effects.

Sex specific differences in baseline values were obvious especially for the ratio counts anagen/telogen counts. Men: 1,63 (placebo

equivalent to 62 % anagen hairs) and 2,03 (verum equivalent to 67 % anagen hairs); women 4,69 (placebo equivalent to 82 % anagen hairs) and 5,43 (verum equivalent to 84 % anagen hairs). However, changes over time depending on treatment were comparable between gender groups. For evaluation of statistical significance, parameters of picture analysis and dermatologist/volunteer assessment were evaluated for preparations but not in gender subgroup, because of small falling number. Hair density parameter from image analysis (fig. 2) was significantly improved ( $p < 0,045$ ; baseline versus all treated assessment times) over time in comparison to baseline data after intake of verum preparation. Maximum hair density was observed after intake of capsules for four months. Both, hair density and thickness anagen hair showed diminishing values after 6 months compared to 4 months. Here the seasonal shedding of hairs could have interfered with the study design.

The parameter hair density was also evaluated via subjective volunteer assessment which confirmed the results of picture analysis. The results clearly show superiority of the verum preparation over the placebo preparation for the parameter hair density. With the placebo preparation no significant improvement could be documented over total treatment phase. Verum preparation showed significant influence ( $p < 0,001$ ) on the growth rate of anagen hairs with lowest levels prior treatment. The ratio of anagen/telogen hair counts resulted in improvement for the benefit of anagen hairs after intake of verum preparation. However, differences over time were not statistically significant.

### Final questionnaire

After intake of study preparations over a period of 6 months, volunteers were asked to evaluate retrospective subjective changes of parameters according to a scale of -4 up to +4 (1: slight, 2: moderate, 3: medium, 4: strong). Negative numbers referred to worsening, positive numbers to improvement of parameters. Besides hair growth parameters, nail parameters were evaluated with this retrospective subjective questionnaire. Statistical evaluation was performed gender specifically as the subjective assessment of parameters showed that between genders different problem areas are defined and evaluated differently between gender groups.

### Hair growth

After intake of verum preparation, 82,9 % of volunteers reported an improvement for the parameter hair volume and hair thickness. 74,3 % reported an improvement of resistance of hairs. Significant preparation differences (placebo versus verum) were found for hair dressing in women (fig. 3) and hair thickness, hair density at parting region (fig. 4) and hair growth at receding brow in men for the benefit of verum preparation. Evaluating all observed hair parameters with clustering in worsening and no change (scale: -4 to 0) versus improvement (scale: 1 to 4) resulted in significant ( $p < 0,05$ ) differences between placebo and verum preparation.

### Nail health

In respect of nail health, volunteers mentioned changes especially in nail growth and robustness of nails (fig. 5). The parameter robustness was significantly improved after intake of verum preparation compared to placebo ( $p < 0,003$  for total group). The results indicate, that intake of a supplement containing fenugreek and micronutrients could come along with positive changes with related tissues like nails and skin.

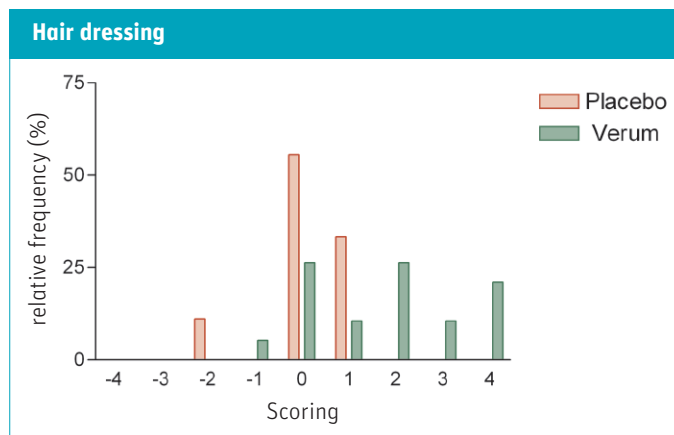


Fig. 3: Retrospective assessment of changes in hair dressing of women on a scale of -4 to +4; depicted are relative frequencies.  $p < 0,017$ .

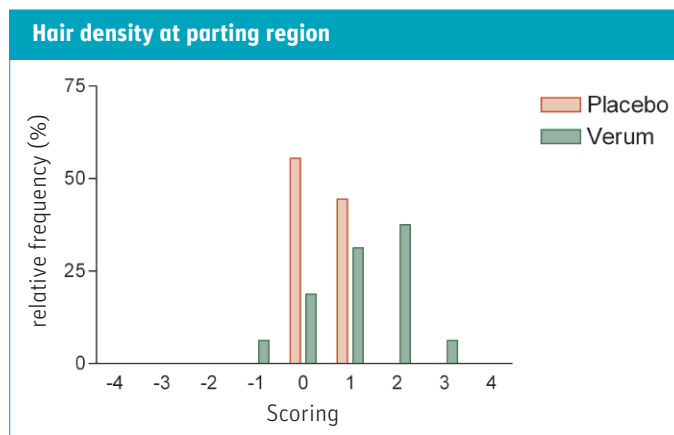


Fig. 4: Retrospective assessment of hair density at parting region of men on a scale of -4 to +4; depicted are relative frequencies.  $p < 0,047$ .

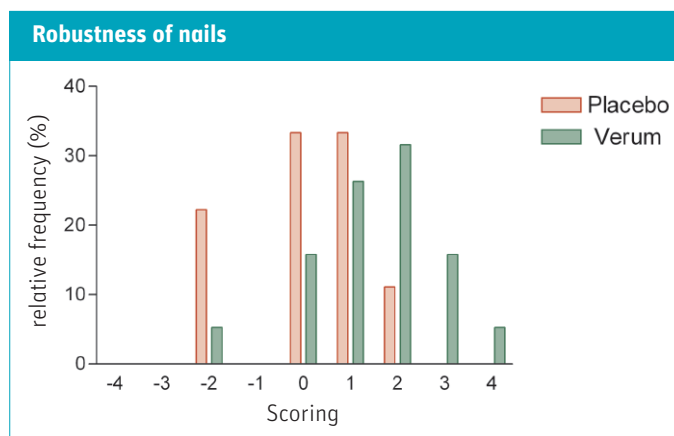


Fig. 5: Retrospective assessment of robustness of nails in women on a scale of -4 to +4; depicted are relative frequencies.  $p < 0,022$ .

### Context of literature

Commercially different therapeutics on the field of medical and supplemental area are available. These preparations are used as topical or oral applications. In the field of pharmaceutical products, Finasterid and Minoxidil are the best known preparations [7, 9, 15, 17]. Finasterid, a competitive inhibitor of type 2 5-alpha reductase inhibits the transformation of testosterone to dihydrotestosterone

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(DHT). Androgen-dependent process in hair loss are predominantly due to the binding of DHT to the androgen receptor. The hormone-receptor complex activates the genes responsible for the gradual change of large terminal follicles to miniaturized follicles [12, 14]. Minoxidil an adenosine triphosphate sensitive potassium channel opener has been reported to stimulate the production of vascular endothelial growth factor in cultured dermal papilla cells.

Since the clinical success rate of treatment of hair loss with modulators of androgen metabolism or hair growth promoters is limited, further possible cofactors are discussed. One approach is a sustained microscopic follicular inflammation considered as a possible cofactor in the complex aetiology of androgenetic alopecia [14]. The approach of dietary supplements with focus to support hair growth with different plant extracts, vitamins, trace elements, have shown comparable positive effects compared to drugs with the advantage of no side effects. This outlines good alternatives for persons with slight to moderate hair loss.

## Conclusion

The data support, that treatment with fenugreek containing food supplement\* results in favourable effects on hair loss that contribute to improvements in hair growth observed in treated volunteers. Fenugreek is used in a physiologic dosage of 300 mg extract, equivalent to 1200 mg fenugreek seeds. Therewith, efficacy of Bocks-horn+Mikronährstoff Haarkapseln Arcon-Tisane® plus, a fenugreek seeds extract containing food supplement, could be documented in women and men with low to moderate hair loss.

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