PROFESSIONAL INFORMATION FOR MEDICINES
FOR HUMAN USE

Bio-Strath®
TABLETS

COMPLEMENTARY MEDICINE
Western Herbal Medicine
This unregistered medicine has not been evaluated by the SAHPRA for its quality, safety or intended use.

SCHEDULING STATUS
S0

1 NAME OF THE MEDICINE
BIO-STRATH® TABLETS

2 QUALITATIVE AND QUANTITATIVE COMPOSITION
Each tablet contains:
Strath Plasmolysed Herbal Yeast ..... 445,0 mg

Sugar free

For full list of excipients, see section 6.1.

3 PHARMACEUTICAL FORM
Light to dark beige, brown-speckled, round, biconvex tablets, engraved on both sides "B-S" with a yeast-like odour.

4 CLINICAL PARTICULARS
4.1 Therapeutic indications
BIO-STRATH®, a plasmolysed herbal yeast providing nutritional support to:
- Contribute to normal mental performance.
- Memory and concentration.
- Assist with focus and attention.
- Reduce fatigue and stress.
- Strengthen the immune system.
- Help restore and maintain natural energy.
- Increase vitality.
- Vitality during and after pregnancy.
- Recover from illness (convalescence).
- Recover from exercise.
- Support and contribute to the healthy metabolism of nutrients.
- Maintain good health.

*Nutritional Breakdown:
The individual nutrients are in a biological balance and natural form which supports absorption. For a full breakdown of nutrients visit www.bio-strath.co.za

BIO-STRATH® contains natural ingredients and is free from synthetic substances such as colouring agents, preservatives or flavouring agents.

4.2 Posology and method of administration
Posology
Adults and children over 12 years:
For times of increased demand:
Take 2 tablets three times daily.
For sustained good health and vitality:
Take 2 tablets once daily.

Special populations
Elderly population:
No dosage adjustment is required for this population.

Renal impairment:
No dosage adjustment is required for this population.

Hepatic impairment:
No dosage adjustment is required for this population.

Paediatric population
Children 4 - 12 years:
For times of increased demand:
Take 1 tablet up to three times daily.
For sustained good health and vitality:
Take 1 tablet once daily.

Method of administration
For oral use only.
Take with water before meals.

4.3 Contraindications
Do not use in cases of known hypersensitivity to *Saccharomyces cerevisiae* MEYEN (Fam Saccharomyceteceae), Strath Plasmolysed Herbal Yeast or to any of the excipients listed in section 6.1.

4.4 Special warnings and precautions for use
- None known
- BIO-STRATH®'s Strath Plasmolysed Herbal Yeast has NO relation to the parasitic strain of yeast known as *Candida albicans* which is linked to a number of health problems.

4.5 Interaction with other medicines and other forms of interaction
None known.

4.6 Fertility, pregnancy and lactation
Women of childbearing potential/Contraception in males and females
No information available.

Pregnancy
No precautions in pregnancy advised.

Breastfeeding
No precautions in breastfeeding advised.

Fertility
No effect on fertility expected.

4.7 Effects on ability to drive and use machines
BIO-STRATH® TABLETS have no or negligible effect on mental and/or physical abilities to perform or execute tasks or activities requiring mental alertness, judgement and/or sound coordination and vision.

4.8 Undesirable effects
If symptoms of hypersensitivity occur e.g. rash, urticaria or angioedema of the skin, discontinue use of product, and contact your healthcare professional immediately.

Reporting of suspected adverse reactions
Reporting suspected adverse reactions after authorisation of the medicine is important. It allows continued monitoring of the benefit/risk balance of the medicine. Healthcare providers are asked to report any suspected adverse reactions to SAHPRA via the "**6.04 Adverse Drug Reaction Reporting Form**", found online under SAHPRA's publications: https://www.sahpra.org.za/Publications/Index/8

4.9 Overdose
None known.
Treatment of overdose should be symptomatic and supportive.

5 PHARMACOLOGICAL PROPERTIES
5.1 Pharmacodynamic properties
D33.6 Western Herbal Medicine.
Pharmaceutical group and ATC code: A13A Tonics

5.1.1 Preclinical data
Metabolism of nutrients
Bagshaw and Leslie (1974) divided 40 male Sprague-Dawley rats into 4 groups of 10 animals fed with a standardised diet. Three groups received additionally either 1,7 ml/kg/day of BIO-STRATH®, chocolate mint flavoured vitamin enriched biscuit, or a multivitamin preparation for 210 days. Weight and amount of food pellets consumed were recorded every 7 days until day 210. The growth curves of the groups having received BIO-STRATH® or no supplement did not differ significantly. However, the animals on BIO-STRATH® had ingested only 70 % of the calories compared to control animals, and yet had achieved a slightly higher total body weight at the end of the experiment. Animals, which had received the standard diet alone, and those which had taken in BIO-STRATH®, had much lower levels of vitamin A in their livers than the other 2 groups, which had received multivitamins with vitamin A. Blood parameters and liver weights were not significantly different between the groups without supplement and those with BIO-STRATH®. Consumption of just a multivitamin preparation demonstrated the lowest growth rate, even though the caloric intake had been considerably high. Also, the animals had significantly lower corpuscular haemoglobin concentrations. Animals fed with vitamin-enriched biscuits had a very low leucocyte count.
In summary, consumption of BIO-STRATH® for 210 days was well tolerated by rats and had the benefit of making more use of the provided food, without gaining weight compared to control animals, because less food was consumed (Bagshaw and Leslie, 1974).

Immune modulation
Joller *et al.* (2000), used lymphocytes from two healthy, randomly selected blood donors. The lymphocytes were cultured both with and without 10 mg/ml concanavalin A (ConA) as a mitogen. BIO-STRATH® was added to the culture medium at final concentrations of 0, 0,5, 1,0, and 2,0 µL/mL, which corresponds to concentrations attainable in human blood with a regular daily dose of BIO-STRATH®. Cell proliferation, soluble IL-2 receptor in the culture supernatant, lymphocyte surface activation markers, such as CD25 (IL-2R), CD69 and HLA-Dr, were the measured endpoints. Untreated donor lymphocyte reactions under microgravity were compared to the same cells treated with BIO-STRATH®. Without concanavalin A (ConA), the natural rate of lymphocyte division was not affected by the addition of BIO-STRATH®. In contrast, the CD25 (IL-2 receptors) at the lymphocyte surface membrane were upregulated with increasing BIO-STRATH®. The negative effect of microgravity was compensated. The lymphocyte activation markers CD69 and HLA-DR also exhibited the same augmenting pattern with increasing BIO-STRATH® concentrations.
The rate of lymphocyte divisions induced by ConA decreased at higher BIO-STRATH® concentrations under both normal and microgravity. The measured quantities of soluble IL-2 receptors in cell culture medium progressed in a very similar fashion to the results for proliferation. The deviation from homoeostasis in the immune system at

rest, resulting from the addition of ConA, is corrected by BIO-STRATH®. This would be a desirable modulation since excessive, non-physiological cell proliferation over a certain period of time will damage the system (Joller *et al.*, 2000).

Schwarzenberg *et al.* (2000) measured the mitotic index by 3H-thymidine incorporation into DNA, expression of the activation markers CD25, CD69, and HLA-DR on the cell surface was determined with cytofluorometry, and the secretion of the IL-2R by an enzyme immunoassay. BIO-STRATH® was able to modulate T-lymphocyte function. The addition of BIO-STRATH® increased the expression of activation markers in activated and non-activated cells. Cultivation under low-gravity reduced the expression of the activation markers, but this expression was partly restored, or even increased upon addition of BIO-STRATH®. On the other hand, cell proliferation and secretion of soluble IL-2 receptor was reduced after addition of BIO-STRATH® in all samples. Low-gravity is an environmental stressor of the lymphocytes and has a negative influence on the activation and proliferation of these cells responsible for the immune reaction. The improvement by BIO-STRATH® of the expression of activation markers under low-gravity is in agreement with the hypothesis regarding the homeostasis-maintaining action of BIO-STRATH® on lymphocytes. Most prominent is the counterbalancing effect of BIO-STRATH® to low-gravity stress (Schwarzenberg *et al.*, 2000).

Various rodent studies have been carried out to assess the prophylactic effect of BIO-STRATH® against bacterial infections as summarised below:

Farrow and Leslie 1978	Mice	Superior prophylactic effect against bacterial infections *(Pseudomonas aeruginosa, Proteus vulgaris, Staphylococcus aureus)* compared to negative control ($p<0,05$) and multivitamin preparation.
Boden *et al.* 1985	Mice	Superior, dose dependent prophylactic effect against infection with *E. coli* (prevention of leukopenia) compared to control ($p<0,01$ and $p<0,001$).
Joller 1988	Mice	Significant prophylactic effect against *S. aureus* ($p<0,0005$).
Leslie & Frasdilla 1988	Mice	Superior prophylactic effect against *Staphylococcus aureus* compared to control and prolonged lifespan compared to control mice.
Joller & Aeppli 1989	Mice	Superior prophylactic effect against *Staphylococcus aureus* compared to positive and negative controls ($p<0,001$) and high spleen lymphocyte values, increase in helper T-Lymphocytes and antibody producing B-lymphocytes.
Leslie 1989	Mice	Superior prophylactic effect against *Staphylococcus aureus* compared to negative control, with large quantities of helper/inducer T-lymphocytes and natural killer cells as well as B-lymphocytes mobilised when needed.

Other

Monici *et al.* (2011) investigated the influence of BIO-STRATH® on the development of osteoblasts *in-vitro*. The addition of BIO-STRATH® promoted maturation of cells that build up bone mass (osteoblasts). The formation of undesirable osteoclasts (bone breakdown) decreased, and osteoblastic differentiation, triggered by a cocktail of dexamethasone, vitamin C and glycerol phosphate, was improved in combination with BIO-STRATH® (Monici *et al.*, 2011).

5.1.2 Clinical data

5.1.2.1 Normal mental performance, memory, concentration, focus and attention

Children

König and Joller (2006) conducted an open-label study with 18 children with attention deficit disorders (ADD/ADHD) in a paediatric practice. The subjects, who served as their own control, took BIO-STRATH® 5 ml three times daily for 10 weeks. In addition to subjective assessments by the doctor, parents and teachers, a computer program was used to objectively record the visual and auditory performance, and to compare performances at different times. 12 of the 18 subjects improved significantly, with statistically significant improvements in one or more parameters. When all the test subjects were analysed with reference to the subgroups of the 'Response Control Quotient', the most marked progress with BIO-STRATH® was seen in the following order: auditory parameters, visual parameters, and motor regulation. In particular, control of auditory impulsiveness and visual compliance with response times were clearly improved. In the 'attention quotient' it was observed that vigilance with auditory stimuli and processing of visual stimuli showed the most marked positive change under the influence of BIO-STRATH® Food Supplement. No adverse effects were recorded (König and Joller, 2006).

Joller (2005) conducted an open-label study with 83 children (4 – 18 yrs.) and adolescents with special needs who received BIO-STRATH® 5 ml twice daily for 20 weeks. Three health-related and eight behaviour-related parameters were recorded on an individual basis using weekly questionnaires. An overall improvement in learning behaviour was observed when compared to the previous year, and in addition, absence from school due to illness was less compared to the general population (Joller, 2005).

Parameter	Mean score	Standard deviation (+/-)	Mean Score trend slope (group)	Max trend slope (individual)	Improvement /stability (% of children)
Concentration	2,2	0,7	+0,72	+10	36/64 (56 %)
Distraction	2,7	0,8	+1,21	+8,31	43/64 (67 %)
Restlessness	3,2	0,8	+0,90	+10	43/64 (67 %)
Agitation	3,3	0,8	+0,85	+9,47	46/64 (72 %)
Disturbing lessons	3,3	0,8	+0,57	+8,44	47/64 (73 %)
Disturbing pupils	3,3	0,7	+0,14	+8,44	43/64 (67 %)
Fatigue	3,5	0,5	+0,42	+9,50	43/64 (67 %)
Aggression	3,6	0,5	+0,24	+9,00	44/64 (69 %)

Neukomm (1968) conducted an open-label study with 24 female students (about 14 years of age) who had attended 8th grade of a secondary school in Berne. They took BIO-STRATH® 5 ml three times daily for 10 weeks. Their grades improved compared to those before supplementation, i.e. intercantonal language scores improved by +1,3 marks (maximum score of 6 points) and arithmetic by +1,0 marks (maximum score of 6 points). In addition, absence due to illness was less compared to 4 other classes that served as control (Neukomm, 1968).

Geriatric and pre-geriatric

Pelka conducted a 3-arm randomised, double-blind, placebo controlled multi-centre study on 184 patients between the ages of 45 and 83 years with a pre-geriatric diagnosis (prematurely aged), they took either BIO-STRATH® SYRUP (5 ml three times daily), BIO-STRATH® TABLETS (2 tablets three times daily), or placebo. After 3 months, short-term memory capacity improved ($p<0,01$) as did cardio-vascular test results ($p<0,001$), and the general condition ($p<0,01$). Overall, the medical assessment showed better results for the groups with supplementation with BIO-STRATH® than without ($p<0,05$) (Pelka, 1990).

Pelka and Leuchtgens (1995) conducted a randomised, double-blind, placebo-controlled study with 75 patients between the ages of 55 and 85 years with suspected mild forms of dementia. The patients received BIO-STRATH® SYRUP (5 ml three times daily) or placebo. After 3 months, in terms of the mental subcategory of the Scale of Geriatric Symptoms (GESY) both 'poor short-term memory' and 'mental alertness' improved significantly in response to treatment ($p<0,01$). In addition, the GESY somatic symptoms 'headache', 'fatigue' and 'giddiness' as well as intrapsychic symptoms, 'sleep disorders', 'emotional instability', 'depressive mood' and psychosocial symptom 'apathy' improved significantly ($p\leq0,05$). Somatic geriatric findings in the following areas also improved: respiratory tract, cardiovascular system, joints and spine, 'other' geriatric diseases improved ($p<0,001$) (Pelka and Leuchtgens, 1995).

5.1.2.2 Fatigue and stress, natural energy and vitality, recovery from exercise

Dörling (1981) conducted a double-blind, placebo-controlled study involving 60 healthy subjects (24 – 80 yrs.) who received BIO-STRATH® 5 ml three times daily or placebo. Interviews and measurements of physical performance were regularly carried out over a period of 3 months. An assessment of the performance on the bicycle ergometer revealed a performance improvement of 19 % in the placebo group compared to 66 % in the BIO-STRATH® group. The ability to withstand stress, determined based on the recovery ratio, was improved by 60 % in the BIO-STRATH® group, and by 17 % in the placebo group after 12 weeks. Interviews revealed that of 1 260 possible statements (fatigue, nervousness, concentration, resistance, physical and mental capacity and vitality) a 64 % improvement was experienced in the BIO-STRATH® group and a 10 % improvement seen in the placebo group.

Schwarzenbach (1976) tested BIO-STRATH® in a 7-week controlled, cross over trial involving 70 Finnish top athletes from various athletic/sporting disciplines. The trial consisted of two 3-week periods, which were separated by a stress test in the form of a forced march of approximately 80 kilometres. Each athlete took BIO-STRATH® 5 ml three times daily during one of the two trial periods; half of the participants received the preparation in the first period, and the other half in the second period.

Mathematical-statistical evaluation led to the following conclusions:

- During the preparation intake period, the performance of individual athletes, in terms of distance covered during a 12-minute run, improved on average by 142 metres.
- The preparation had a small effect on the course of the body weight curve.
- During the trial period, the trainers noted an improvement in concentration in all their athletes.
- Ingestion of BIO-STRATH® was followed by a more positive self-assessment, with emphasis on the parameters appetite, digestion, and sleep.
- According to the athlete's self-assessment, they were more balanced during the period with the preparation.
- Recovery time following a period of physical stress was reduced when BIO-STRATH® had been taken regularly beforehand, compared to the control group (Schwarzenbach, 1976).

5.1.2.3 Recovery from illness (convalescence) and improved vitality
Huber and Joller (2011) conducted an open, non-randomized intra-individual controlled study with matched pairs. The study included 42 volunteers undergoing systemic chemotherapy, 37 took either BIO-STRATH® SYRUP (5 ml twice daily) or BIO-STRATH® TABLETS (2 tablets twice daily) and 7 served as control for 14 - 16 weeks. A questionnaire developed by the European Organisation for Research and Treatment of Cancer (EORTC QLQ-C30, V3.0) was used to assess their state of well-being. The results indicated that supplementation led to overall improvement in quality of life, specifically in terms of symptoms such as fatigue, nausea and vomiting and loss of appetite. Improvements in functioning, specifically emotional and social functioning, were also noted. Supplementing the diet with BIO-STRATH® SYRUP or TABLETS had a positive impact on aspects of daily life in patients undergoing systemic cancer treatment. No objective or subjective adverse reactions were observed (Huber and Joller, 2011).

In a randomized, double-blind, placebo-controlled study, Schwarzenbach and Brunner (1996) enrolled 200 cancer patients, who had been receiving radiotherapeutic treatment. The patients received 1 teaspoon of BIO-STRATH® SYRUP 3 times daily, or placebo for 12 weeks, plus 1 month for follow up. Weight was the primary outcome criterion, in addition activity, appetite, subjective general condition, and haemoglobin levels and other clinical laboratory parameters were assessed. With BIO-STRATH® SYRUP the average weight was significantly higher than in the control group ($p<0,001$), i.e. on average patients receiving BIO-STRATH® SYRUP gained 1,35 kg whereas those in the placebo group lost 3,0 kg. Supplementation with BIO-STRATH® SYRUP also prevented a decrease in haemoglobin levels ($p<0,001$). Results confirm that regular administration of BIO-STRATH® SYRUP improved subjective general condition in cancer patients receiving radiotherapy (Schwarzenbach and Brunner, 1996).

5.1.2.4 Strengthening of the immune system
Joller (1996) in a prospective 4-arm controlled trial, investigated the prophylaxis of influenza and colds with BIO-STRATH® SYRUP (5 ml twice daily) or BIO-STRATH® TABLETS (2 tablets twice daily) in comparison to flu vaccination, and a control in 232 healthy employees over a period of 4 - 6 months. The incidences of coughs and colds and influenza were low in the general public during the study period and hence, no statistical significant differences were detected during this study. However, in the self-assessment of general well-being, volunteers favoured the tablets (+ 1,08) over the liquid (+ 0,55) and vaccination (+ 0,49), whereas the control group had the lowest values (- 0,56). The study covered a total of 22 600 working days, of which only 260 were lost due to illness (1,2 %), a figure 5 times lower than a projection based on figures of the Swiss Federal Office for Industry, Trade and Labour which predicted about 1 400 lost working days for the overall study group (6,2 %) i.e. 5 % higher than what was achieved in patients taking BIO-STRATH® during this period (Joller, 1996).

Comparison of absence from work (Joller, 1996)			
	1 month prior to study	**Monthly average during study**	**Reduction in work lost %**
Control	34	10,3	70
Influenza vaccine	20	7,6	62
BIO-STRATH® SYRUP	23	6,3	73
BIO-STRATH® TABLETS	40	10	75

Similarly, in children taking BIO-STRATH®, number of days off school due to sickness was also significantly lower than expected; Joller (2005), in an open-label study with 83 children (4 – 18 yrs.) and adolescents with special needs who received BIO-STRATH® SYRUP 5 ml twice daily for 20 weeks during autumn and winter observed a prophylactic effect of BIO-STRATH® against influenza. Despite high recorded levels of influenza locally during the study period, this pattern was not evident in the treatment group i.e. there were 106 recorded days of illness out of 5 640 potential school days, and in a subset of 34 children for which historical absenteeism data was available, absenteeism was 42 % lower than during the similar period the previous year (Joller, 2005).

Neukomm (1968), in an open-label study with 24 female, school going students (about 14 years of age) also observed an increase in resistance to infections and reduced absence from school during the study period compared to controls when taking BIO-STRATH® 5 ml three times daily for 10 weeks:

Cohort	**Absence from lessons**				**N**	**Av. Absence in lesson periods over 10 weeks per pupil**
	Jan	**Feb**	**Mar**	**TOT**		
BIO-STRATH® group	**8**	**8**	**2**	**43**	**24**	**1,9**
Control group (1 year older)	224	74	55	353	21	17,1
Control group (1 year younger)	41	40	0	81	21	3,8
Co-ed class same age #1	102	38	54	194	26	7,5
Co-ed class same age #2	135	22	0	157	26	6,1

Pelka evaluated questionnaires, which had been distributed with BIO-STRATH® and were returned over a period of 15 years, between 1976 and 1991. He reported on 390 children, between 1 and 14 years of age, of whom 304 had taken BIO-STRATH® SYRUP and 86 who had taken BIO-STRATH® TABLETS over periods of 1 month to several years. The daily doses taken had been between 1 and 3 teaspoons of BIO-STRATH® SYRUP, or 1 and 6 BIO-STRATH® TABLETS, respectively. The questionnaire had inquired about effects of BIO-STRATH® on fatigue, susceptibility to infection (resistance), concentration, and convalescence. Improvement in resistance was reported by 88 % of respondents, improvements in the other parameters were also reported by the majority of participants, i.e. fatigue (90 %), concentration (85 %) and convalescence (90 %) (Pelka, 1992).

5.1.2.5 Support and contribute to the healthy metabolism of nutrients, and vitality in pregnancy
Leffler *et al.* (2000) conducted an open-label study with 31 expecting mothers with haemoglobin levels in the normal range between 120 and 130 g Hb/L. The study started after conception and ran until delivery. The women who took 1 teaspoon of BIO-STRATH® 3 times daily were instructed to maintain a healthy diet and abstain from alcohol and smoking. Haemoglobin levels were measured before taking BIO-STRATH®, and at weeks 24, 30, and 36 of pregnancy. Of the women enrolled, 21 (≈68 %) maintained their normal haemoglobin levels during pregnancy and continued taking BIO-STRATH® until delivery. A final haemoglobin assessment 3 - 4 weeks before delivery confirmed normal haemoglobin status and energy levels in these women were rated as 'excellent'. One woman dropped out at week 24 and returned to the study at week 30, because her haemoglobin level had dropped from 130 to 110 g Hb/L within 6 weeks, she resumed treatment with BIO-STRATH®, and when tested 3 weeks prior to delivery her haemoglobin had returned to normal. Three women entered the study at week 9 of pregnancy, because of adverse reactions to existing prescribed prenatal vitamins, they reported constipation and low energy levels and had haemoglobin levels of 115 g Hb/L. Prenatal vitamins were replaced with BIO-STRATH® and dietary advice given, by 24 weeks haemoglobin levels had increased to 120 g Hb/L and 6 weeks prior to delivery haemoglobin levels were maintained as had energy levels and constipation had improved. Three women had decreased haemoglobin levels around 100 Hb/L at week 24, they had not followed their dietary instructions, after adapting to the diet as instructed, the haemoglobin levels increased to 117 g Hb/L in 6 weeks. BIO-STRATH® use appeared to effectively maintain haemoglobin levels of the majority of expectant mothers throughout pregnancy without additional vitamin or iron supplementation. It also appears that the addition of BIO-STRATH® to iron supplementation in anaemia cases can enhance the assimilation of the supplement suggesting a catalytic action and maintain a sense of wellbeing and vitality in pregnancy (Leffler *et al.*, 2000).

5.1.2.6 Positive influence on the gut microbiome
A 5-week single-arm, pre-test post-test clinical trial was conducted on 26 healthy, overweight women (BMI 30 – 35) (25 – 35 yrs.) to determine the influence of BIO-STRATH® on the gut microbiome. Stool samples were collected before commencement of BIO-STRATH® and again after 21 days of BIO-STRATH® SYRUP 5 ml three times daily 30 min before meals. Shotgun metagenome sequencing was used to analyse the respective stool samples.
69 % of participants (18/26) experienced significant increases in more than 3 species out of 5 known to be desirable butyrate producing bacteria i.e. *Anaerostipes hadrus, Faecalibacterium prausnitzii, Eubacterium hallii, Roseburia hominis,* and *Roseburia inulinivorans.*

The published normal Firmicutes to Bacteroidetes ratio (F/B) is 1,6 or less, with lower BMI this value can be as low as 0,7. In the present study on overweight individuals, 12 participants had ratios of > 1,6 at baseline, in 5 of these participants, after 3 weeks on BIO-STRATH® F/B ratios reduced to below 1,6 (normalised) and overall 14/26 participants experienced a reduction in their F/B ratios. Researchers concluded that BIO-STRATH® was able to modulate the gut microbiome of overweight young women within three weeks to an extent supported by literature as influencing well-being and health. (Joller *et al.* 2020).

5.2 Pharmacokinetic properties
Metabolism of nutrients
In a controlled *in vitro* study using a technique in which artificial digestion simulates the enzymatic conditions and changes in pH during gastrointestinal transit, and a Caco-2 simulation of the intestinal mucosa, concomitant supplementation of micronutrients and BIO-STRATH® SYRUP or TABLETS that led to a significant increased uptake of the micronutrients magnesium, zinc, iron, and vitamin B1 compared to these micronutrients alone (without BIO-STRATH®). Data demonstrated an improved bioavailability of all tested micronutrients across the Caco-2 epithelium when supplemented simultaneously with BIO-STRATH®, suggesting its ability to act as a 'carrier' for micronutrient uptake. The results strongly indicate a supportive effect of BIO-STRATH® supplementation in human nutrition (Engelhart – Jentzsch *et al.* 2018).

5.3 Preclinical safety data
The LD_{50} of BIO-STRATH® SYRUP has been determined experimentally to be 48 ml/kg, which equates to the approximate consumption of more than 3 litres in adults (Leslie, 2013).

6 PHARMACEUTICAL PARTICULARS

6.1 List of excipients
Corn starch
Microcrystalline cellulose
Pectin
Silicon dioxide

6.2 Incompatibilities
Not applicable.

6.3 Shelf life
60 months.

6.4 Special precautions for storage
Store at or below 25 °C, in a cool, dry place.
Store in the original package/container.

6.5 Nature and contents of container
The tablets are packed in PVC/aluminium blisters.

Pack sizes:
20 blistered tablets are packed in a foil sleeve.
60, 100 and 300 blistered tablets are packed in a carton.

Not all pack sizes may be marketed.

6.6 Special precautions for disposal of a used medicine or waste materials derived from such medicine and other handling of the product
No special requirements.

7 THE HOLDER OF THE CERTIFICATE OF REGISTRATION

PharmaForce (Pty) Ltd.
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Manufacturer:
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8 REGISTRATION NUMBER(S)/REFERENCE NUMBER

Listing number: 418650

9 DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

To be allocated.

10 DATE OF REVISION OF TEXT

November 2022