

Curcumin with high solubility and bioavailability in complementary feed MiniTabs.

Benefits:

- **Complementary feed in form of tablets MiniTabs contains curcumin with high solubility and bioavailability, which was scientifically proven.**
- With an innovative process involving the reduction of curcumin particles to submicron dimensions and particle size control, in combination with lecithin and piperine, **up to 220 times increased solubility and 200 times higher curcumin cellular absorption were achieved.**
- **World unique small and tasty tablets for dogs and cats.**
- Up to 20x smaller than conventional tablets on the market, no more rejection of tablets!
- **Patent application** for processing technology filed in the US, EU and Canada.
- The product was developed within the framework of research and development cooperation between mcePharma s.r.o. and BIOCEV (Biotechnology and Biomedical Centre of the Academy of Sciences and Charles University in Vestec).
- Made from **natural materials** - contains highly absorbable turmeric submicron particles, piperine and lecithin and standardized extract of Echinacea purpurea and Canadian Cranberries.
- **Active Ingredient Content** - The tablets contain 2 mg of curcuma extract containing 95% curcumin

Scientific study

Curcumin is almost insoluble in its native form in the dogs and cats body - it dissolves only in organic solvents such as ethanol, acetone and dimethyl sulfoxide. Increased solubility and cellular absorption were achieved using a sophisticated process that involves reducing and controlling the size of the curcumin particles, enriched with sunflower lecithin and piperine at a suitable ratio, and final ODT treatment for maximum user comfort.

Introduction

Curcumin is a yellow dye that can be isolated from turmeric (*Curcuma longa*) or Indian saffron. It is the biologically most active component of turmeric and has recently received a lot of attention - a large number of scientific studies focused on curcumin suggests that this extract could have many positive effects on human health. Curcumin is the subject of intensive research, scientific studies point to health benefits, for example, in the following areas.

Even low concentrations of curcumin reduce the catabolic and degradative effects of lipopolysaccharides in the cultures of articular cartilage in dogs¹. Curcumin has the potential as a natural anti-inflammatory factor acting against osteoarthritis. The positive effect of curcumin on the health of joints and bones was also confirmed by further studies^{2, 3, 4, 5, 6}.

The beneficial effects of curcumin and echinacea on the immune system of dogs were observed in the study of Sgorlon et al. from 2016⁷ for a total of 74 dogs. The administration of these substances allows the modulation of immune responses to improve animal health. Curcumin has a protective effect on the immune system⁸.

Curcumin also has a positive effect on urinary tract health and the prevention of urinary tract infections⁹.

Types of MiniTabs products

- MiniTabs JOINTS - health and well-being of joints and bones
- MiniTabs IMMUNITY - a combination of curcumin and Echinacea purpurea extract to promote a healthy immune system
- MiniTabs URO – a combination of curcumin and cranberries extract to urinary tract health and prevention of urinary tract infections

One of the problems associated with curcumin is its bioavailability. Even at high doses of curcumin administered orally in native form, only a small amount is brought into circulation, due to the very fast metabolic transformation in both the liver and the intestinal wall. Within the research and development cooperation between mcePharma s.r.o. and BIOCEV (Biotechnology and Biomedical Centre of the Academy of Sciences and Charles University in Vest), an increased solubility and cellular absorption of curcuma and curcumin as an active substance for tablets use was achieved.

The following parameters were evaluated in the scientific study:

1. Increased cellular absorption was tested on human fibroblasts, human breast cancer cells and osteosarcoma.

Procedures:

After one hour of incubation of the cells with curcumin, the presence of fluorescence in the cells was measured.

Results:

The results of this test showed, that cells that were incubated with submicron particles of curcumin that were combined with sunflower lecithin and piperine and incorporated as ODT were absorbed up to 200 times more efficiently. Selected cell cultures show a strong green fluorescence indicating a high rate of curcumin absorption administered to cells compared to cells incubated with native turmeric contained in commonly available complementary feed (**Figure 1**)

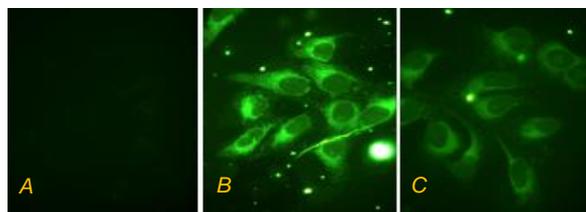


Figure 1: comparison of fluorescence of fibroblast cultures after incubation of different forms of curcumin (A – native curcumin, B – curcumin with decreased particle size, C – curcumin used in MiniTabs)

2. The solubility improvement was tested by fluorescence spectroscopy

Procedures: Individual samples were dispersed or dissolved in water, then the intensity of fluorescence was measured over time (over 1 hour).

Results:

The results of this test confirmed that curcumin in the form of MiniTabs showed significantly greater fluorescence (**Figure 2**) and therefore solubility (according to generally valid formulations up to 220 times better solubility) compared to the native form of curcumin.

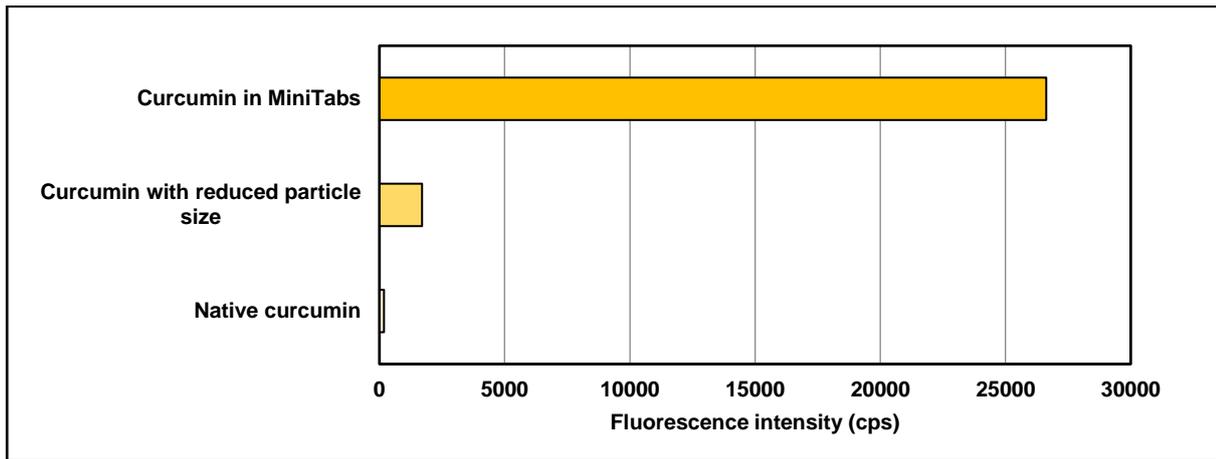


Figure 2: Fluorescence intensity comparison of different forms of curcumin (cps – counts per second, min – minutes)

The results showed increased curcumin solubility - up to 220 times higher in the form of MiniTabs versus native curcumin contained in commonly available supplements (**Figure 2**).

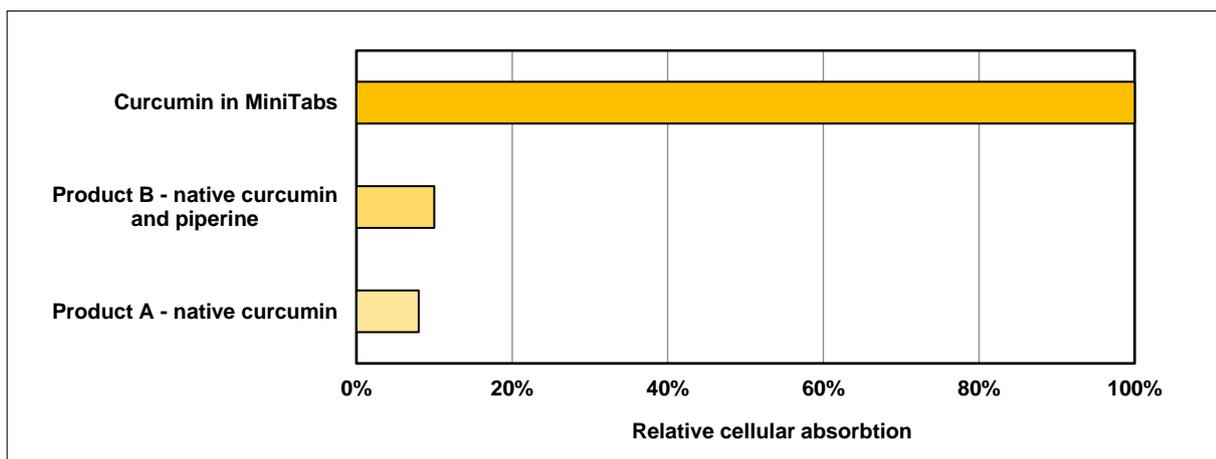


Figure 3: Comparison of cellular absorption of Minitabs JOINTS, IMMUNITY and URO and two products containing native curcumin

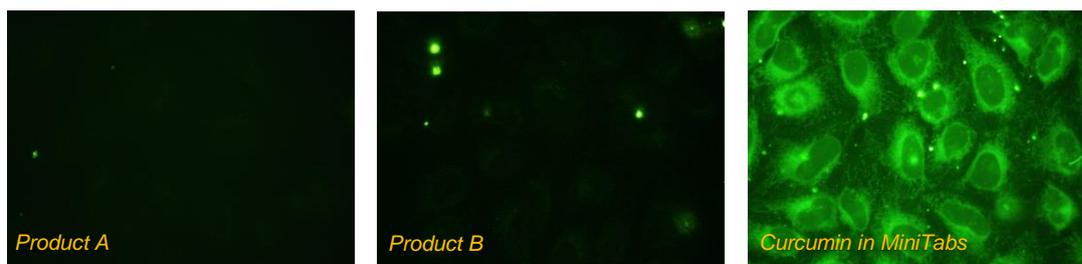


Figure 4: Images of cell cultures inoculated with product A, B-containing turmeric products in the native state and curcumin in MiniTabs. Turmeric from products A and B is incapable of penetrating the cells. Curcumin from MiniTabs is more absorbed by cells. (Source: BIOCEV)

Curcumin in MiniTabs show better solubility (**Figures 1 and 2**) compared to native turmeric contained in commonly available complementary feed. The results of a scientific study conducted by the BIOCEV Centre have confirmed that curcumin in MiniTabs have higher cellular adsorption than curcumin in native form in commonly available formulations. (**Figures 3 and 4**).

Conclusion:

MiniTabs has been developed as part of research and development co-operation between mcePharma s.r.o. and BIOCEV (Biotechnology and Biomedical Centre of the Academy of Sciences and Charles University in Vest). The combination of innovative turmeric in the form of submicron particles and addition of lecithin with piperine results in increased bioavailability - **up to 220 times increase in solubility and 200 times higher cellular absorption of curcumin** have been demonstrated.

References:

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