Are Timed-Release Supplements Right For You?

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You've decided on which supplements you need to use and you're now faced with yet another decision. What form should I use? There are many choices available from capsule, to liquids, powders, caplets, tablets and lastly timed-release tablets. Of the forms available capsules are my favourite and timed-release and "one a day" tablets my least.

What are timed-release tablets?

Timed-release or sustained release as they're also known are tablets that release their nutrients over a longer period of time relative to regular tablets or capsules. The theory is that releasing nutrients slowly over a period of time instead of all at once ensures the best possible absorption. Although in theory this may sound logical in reality there are some inherent problems in trying to achieve this. Another reason for the use of timed-release tablets is convenience. Instead of taking say two or three multivitamins in capsule form a day in divided doses (by far the best way to do it) some manufacturers put all the ingredients in one "high potency" timed-release tablet. Timed-release technology is most commonly used in the making of multivitamin and mineral formulas, vitamin C products, and B-complex formulas.

What goes into timed-release tablets?

The beauty and simplicity of a capsule is that all the raw materials can be added in their pure form into them without the need for any extra and unnecessary compounds. All that you get are the active compounds (vitamins, minerals, co-factors, etc). By contrast tablets (especially "one a days") and timed-release tablets have many other "inactive" compounds needed for their formulation. These inactive compounds are known collectively as excipients and they include binders, fillers, flow agents, lubricants, disintegrants, preservatives, colouring agents and coatings. Let's explore some of these ingredients further:

- Binders - hold together all the ingredients so they don't break apart in the tablet (examples: hydroxypropyl cellulose, methyl cellulose, lactose)
- Fillers - add bulk to the tablet (also used in some capsules), making it easier to manufacture and allowing consumers to handle it conveniently. For example if you had to take a selenium tablet which only contains 200mcg (1000000 mcg = 1 g) it would be incredibly small making it not only

difficult to manufacture but too small for a consumer to handle (examples: lactose, sorbitol, Dibasic calcium phosphate, calcium carbonate, cellulose)

- Flow agents - allow ingredients to flow easily and smoothly during the manufacturing process (examples: calcium stearate, glyceryl monostearate, hydrogenated vegetable oil, magnesium stearate, maltodextrin, shellac)
- Lubricants - keep ingredients from clumping/sticking together in the tablet or capsule machines (examples: sunflower oil, talc, silica, vegetable stearin, magnesium stearate, stearic acid, polyethylene glycol)
- Disintegrants – help tablets disintegrate (examples: cellulose microcrystalline, silica, crosscarmellose sodium)
- Coatings – used to coat tablets so they don't degrade when exposed to air moisture and to mask the taste of the tablet when consumed (examples: hydroxypropyl methylcellulose phthalate, beeswax, shellac, cellulose)

How can these excipients effect absorption?

Many of these excipients found in timed-release supplements are known to prevent the optimal absorption of nutrients[i] [ii]. To get all of these compounds that ideally should be taken over three or more doses into one single timed-release tablet that's small enough for you to swallow they need to be compacted. The combination of compression and excipients can often limit the absorption of vitamins and minerals. Of special concern are a few of these compounds some of which allow a tablet to be timed-release.

- **Magnesium stearate** - Commonly used for making a tablet "timed-release" and as a lubricant is a wax like powder that allows compounds that normally don't mix well together (e.g. oil and water) to now mix.

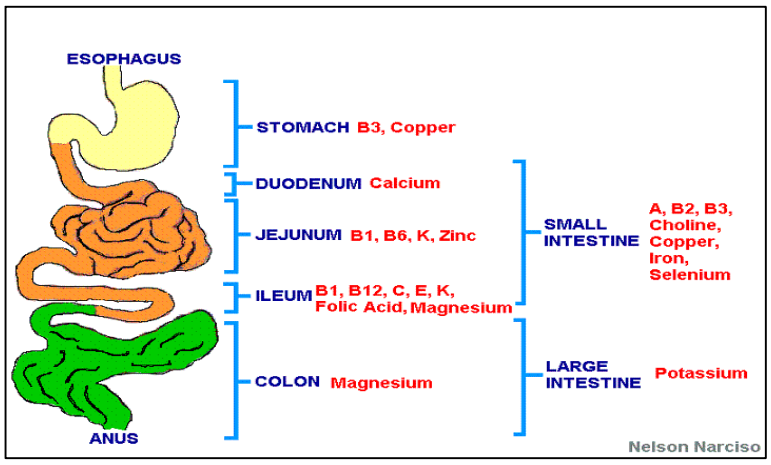
It has been shown to interfere with the rate the tablet dissolves (dissolution) and interfere with the absorption of active ingredients. The journal *Pharmaceutical Technology* published a study which showed that when mixing nutrients with magnesium stearate the ingredients dissolution (time it takes to dissolve) after 20 minutes in solution went from 90% without stearates to 25% with stearates.[iii] [iv] Stearic acid has also been shown to negatively impact immune function[v]

- **Pharmaceutical glaze, confectioners glaze, natural glaze, or food glaze** – These are all names commonly used for its more accurate name SHELLAC. It is used to give tablets a slippery coating making them easier to swallow it can

help mask the taste of the ingredients in the tablet and delay the absorption on nutrients (i.e. timed-release).

- It may surprise you to discover that shellac is the secretion of the insect *Kerrie lacca*, found in forests of India and Southeast Asia. Although regarded as safe for human consumption it can delay the absorption of nutrients considerably and would not be appropriate for vegans.[vi] [vii]

Another key concern with timed-release tablets is that specific nutrients are made available in the intestinal tract far too late in the game. As the figure below illustrates the digestive tract has specific regions that absorb nutrients most efficiently. If that timed release nutrient takes 6 hours or longer to become available (as is often the case) it may have "missed the boat".



No time for "timed-release"

Many excipients may increase the risk of sensitivity and are not suitable for individuals who have food allergies/intolerances. Many digestively compromised individuals like the elderly population have a higher incidence of hypochlorhydria (low levels of stomach acid) which make absorption under the best circumstances challenging let alone when they have to deal with nutrients bound up in timed-release tablets. The Journal of the American Geriatric Society (1980 Jan 28(1):42-45, Baker et al) published a study that found many elderly are unable to absorb nutrients from tablets. Timed-release may not be suitable for certain vitamins like niacin because it increases the risk of liver toxicity [viii] [ix]. I challenge anyone to find a naturopath that recommends timed-release tablets to any of their patients and hopefully this article will allow you to appreciate why. Choose wisely.

[i] The British Dietetic Association http://www.bda.uk.com/Downloads/November04foodfacts.pdf

[ii] C. Fogle, former Colorado State University Extension food science and human nutrition specialist; J. Anderson, food science and human nutrition specialist and professor; and K. Wilken, food science and human nutrition specialist; food science and human nutrition. 12/98

[iii] The Weston A. Price Foundation: http://www.westonaprice.org/healthissues/supplements.html

[iv] *Czap, AL. Townsend Letter For Doctors and Patients, July 1999, Vol.192;Pg. 117-11)*

[v] *T*ebbey PW, Buttke TM. Molecular basis for the immunosuppressive action of stearic acid on T cells. Immunology. 1990 July; 70(3): 379–386.

[vi] FAO - Food and Agriculture Organization of the United Nations 1995. http://www.fao.org/docrep/V8879E/V8879e08.htm#a

[vii] 2. SHELLAC EXPORT PROMOTION COUNCIL http://www.shellacepc.com/history.html)

[viii] Capuzzi DM, Guyton JR, Morgan JM, et al. Efficacy and safety of an extended-release niacin (Niaspan): a long-term study. *Am J Cardiol* . Dec 17, 1998;82:74U–81U.

[ix] McKenney JM, Proctor JD, Harris S, et al. A comparison of the efficacy and toxic effects of sustained- vs immediate-release niacin in hypercholesterolemic patients. JAMA 1994;271:672-677.)